Visual Communication Design Units 3 & 4

Chapter 5 — Three-dimensional drawing, rendering & presentation

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Contents

Theory

Documentation drawings define and record the technical specifications required for the assembly of three-dimensional objects and environments. They may represent a form in **two dimensions** — orthogonal drawings, plans and elevations, packaging nets, technical flats — or in **three dimensions**, as **perspective** and **paraline (isometric and planometric)** drawings. This subtopic covers the paraline methods. Like every documentation drawing, a paraline drawing carries **technical conventions**: symbols, dimensions and scales.

What "paraline" means. A paraline drawing is a **parallel projection**. The lines of sight (the *projectors*) that carry the object onto the paper are **parallel to one another**, so edges that are parallel on the object stay **parallel on the drawing**. There are **no vanishing points** and **nothing converges**. Because the drawing does not shrink with distance, measurements can be taken directly from it — which is exactly why paraline drawing is used to *document* and *present* a resolved design, and why the examination accepts it as a drawing method **appropriate to the field of design practice** — isometric for objects and furniture, planometric for interiors and environments — with perspective (Chapter 5B) the alternative in each case.

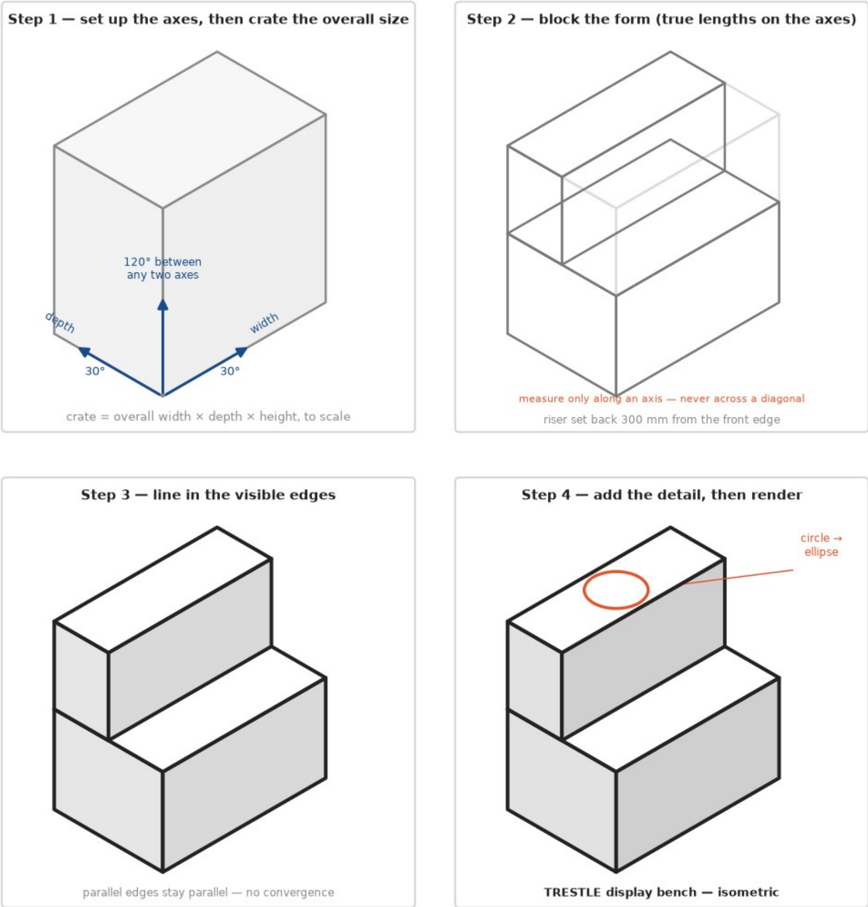
Paraline compared with perspective. A **perspective** drawing (Chapter 5B) imitates how the eye sees: its projectors are **not** parallel — they converge on a **single viewpoint** (the eye, or *station point*), so parallel edges **converge** on one or more vanishing points and the object gets smaller as it recedes. It looks natural but it is **not measurable**. A **paraline** drawing keeps edges parallel and lengths to scale: it looks slightly less natural but it is **measurable and repeatable**. The choice is a design decision — perspective to persuade an audience, paraline to specify a form.

Isometric drawing. Isometric is the paraline method used for **objects and furniture**. It is built on three axes:

- two **receding axes** drawn at **30° to the horizontal** — one to the left (depth), one to the right (width);
- a **vertical axis** for height.

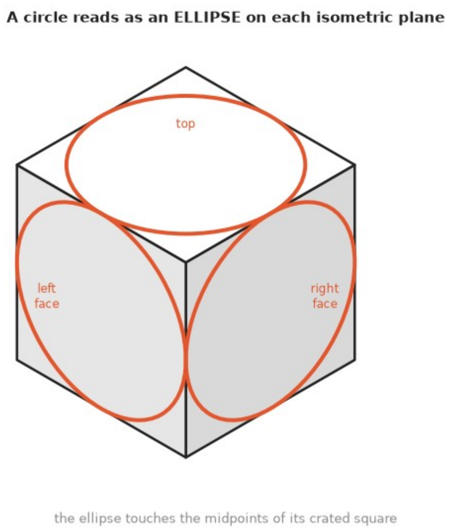
The three axes are equally spaced, so there is **120° between any two** of them — the *iso* (equal) *metric* (measure) of the name. Crucially, **all three axes are drawn to one scale**, so a width, a depth and a height of the same size are drawn the same length. This gives the method's single most important working rule: **you may only measure along an axis** (or along a line parallel to an axis). Any line that is *not* parallel to an axis is **not a true length** on the drawing and must be found by plotting its **end points** first.

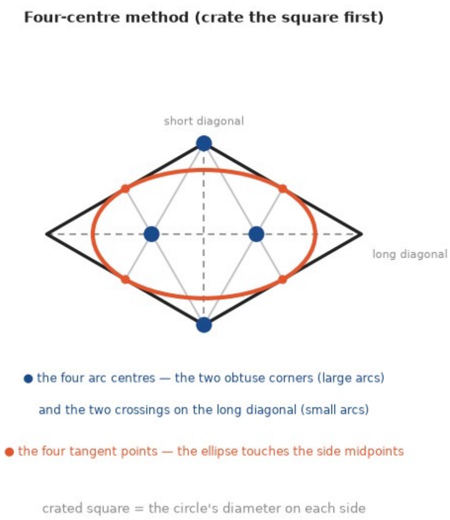
The reliable procedure is the **crate (box) method**: enclose the whole form in a crate of its overall width × depth × height, then cut the form out of the crate.



The four stages above set out the **TRESTLE display bench** (900 × 600 × 900 mm), an original stepped bench with a low platform and a back riser. **Step 1** draws the axes and crates the overall size to scale. **Step 2** blocks the form inside the crate, measuring every size along an axis. **Step 3** lines in the visible edges with a firm, even outline — notice that the parallel edges of the object are still parallel on the paper. **Step 4** adds detail and light rendering.

Circles on an isometric drawing. An isometric plane is a *skewed* plane, so a **circle drawn on it becomes an ellipse**. It is never drawn as a circle. To set one out, first **crate the circle**: draw the square that would enclose it (each side equal to the circle's **diameter**) on the correct isometric plane. That square appears as a **rhombus**, and the ellipse is drawn inside it, **touching the midpoint of each of the four sides**.

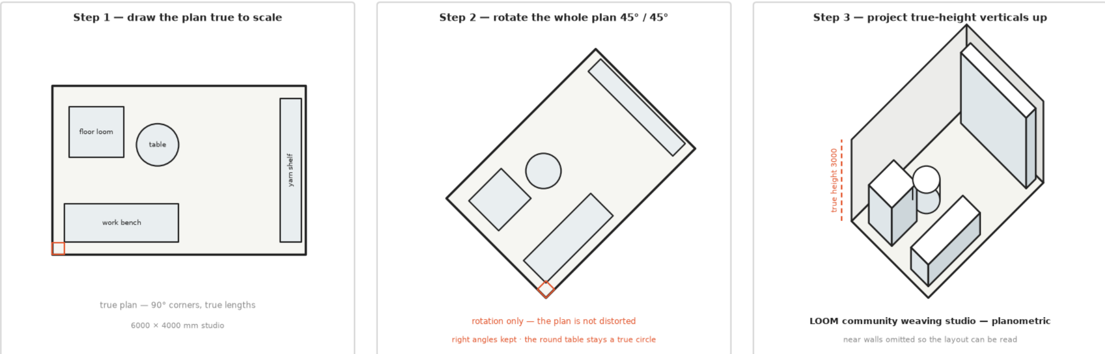




Manually, the ellipse is approximated by the **four-centre method**: from each **obtuse corner** of the rhombus, rule a line to the midpoints of the two opposite sides; these lines cross the **long diagonal** at two points. The two obtuse corners are the centres of the two **large arcs**, and the two crossings are the centres of the two **small arcs**. The four arcs meet at the four side midpoints. (An ellipse template may also be used — the isometric ellipse is the **35° ellipse**.) A cylinder is drawn the same way: an ellipse at each end, joined by two straight lines drawn **tangent** to both.

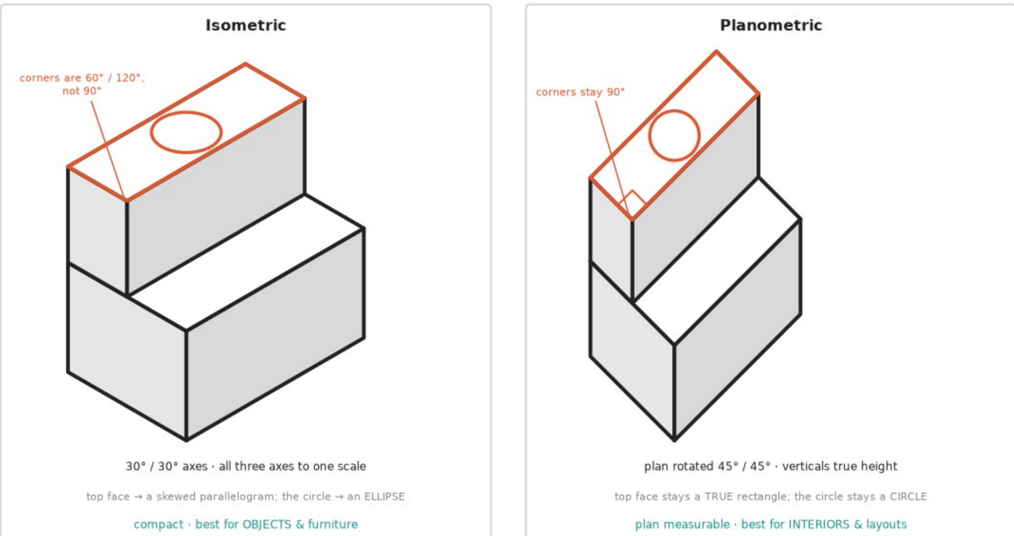
Planometric drawing. Planometric (also called *plan oblique*) is the paraline method used for **environments, interiors and layouts**, because it is built **from the true plan**. The procedure is:

1. Draw the **plan** accurately to scale — its true shape, with **true 90° corners**.
2. **Rotate the whole plan**, most commonly **45° / 45°** (or **30° / 60°** when one wall is to be favoured). This is a **rotation only**: nothing is stretched or skewed.
3. Project **vertical** lines up from every corner of the rotated plan and mark the **true heights** to the same scale, then line in the walls, furniture and fittings.



The three stages above set out the **LOOM community weaving studio**, an original 6000 × 4000 mm interior with 3000 mm walls. Because the plan is only rotated and never distorted, the plan **keeps its true shape**: right angles stay 90°, plan lengths stay true, and a **circle in plan stays a true circle** (the round table does not become an ellipse). Heights are drawn **straight up at true length**. It is normal to **omit the two near walls** so the layout inside can be read.

Choosing between the two methods. Both are paraline; both are measurable. They differ in what they keep true and in the viewpoint they imply.



The same TRESTLE bench is drawn both ways above. In the **isometric** the top face becomes a **skewed parallelogram** (corners of 60° and 120°) and the circular recess becomes an **ellipse** — but the drawing sits lower and reads more like the object as you would meet it, which suits **objects, furniture and products**. In the **planometric** the top face stays a **true rectangle** and the recess stays a **true circle**, because that face is parallel to the plan; the drawing looks down more steeply, like a bird's-eye view, so **spatial relationships and the layout can be read and measured directly** — which suits **environments, interiors and site layouts**. The trade-off is that a planometric shows the vertical faces less convincingly, so an object's front elevation reads less well than it does in isometric.

Conventions on a paraline drawing. Because it is a documentation or presentation drawing, apply the conventions from 4B: state the **scale** (for example SCALE 1:5); give **dimensions in millimetres**, each feature dimensioned **once** and always at its **true size**; use **Ø** before the size of a full circle or hole and **R** before the size of an arc; keep **construction lines thin and light** and the **visible outline firm**; and title the drawing. Hidden detail is not normally shown on a paraline drawing — the point of the method is the visible three-dimensional form. Rendering to show materials, light, shade and shadow is covered in 5C.

> **Watch-out — paraline is not perspective.** In a paraline drawing **nothing converges** and there are **no vanishing points**. If your receding edges lean toward a point, or the far end of the object is drawn smaller, you have drawn a perspective, not an isometric or planometric.
>
> **Watch-out — measure only along an axis.** A length is true only along an axis (or a line parallel to one). A **sloping** edge, a diagonal or a chamfer is **not** a true length in isometric: plot the **two end points** by their width, depth and height measurements, then join them.
>
> **Watch-out — a circle on an isometric plane is an ellipse.** Crate the circle as a square (side = diameter) on its plane, then draw the ellipse **touching the four side midpoints**. Drawing a true circle on an isometric face is a common and costly error. On a **planometric** the plan-plane circle **does** stay a true circle.
>
> **Watch-out — keep planometric heights vertical and true.** In planometric it is the **plan** that is rotated, not the heights. Heights are drawn **straight up** at **true length** and to the same scale — do not slope them at 45° and do not foreshorten them.
>
> **Watch-out — one scale on all three axes.** In isometric, width, depth and height are drawn to the **same** scale. Do not shorten the depth “so it looks right”; that is a perspective habit, and it makes the drawing unmeasurable.
>
> **Watch-out — match the method to the field.** Of the two paraline methods, use **isometric** for objects and furniture and **planometric** for environments, interiors and layouts. In the examination the drawing method must be **appropriate to the field of design practice** you have chosen.
>
> **Watch-out — conventions are marked two ways: applied *and* discussed.** In the resolved drawing the conventions must be **used** — the scale note, true-size dimensions, correct line weights, a title. A separate question may then ask you to **discuss the conventions** you would consider in presenting the concept to a client; there the marks go to **naming** the conventions in the study design’s own terms (scale, dimensioning, line types) and explaining **how each helps the client read the drawing**. What earns nothing in either mode is **describing your design or pitching the idea** in place of the conventions themselves.

Worked examples

Example 1 — scaffolded

*Produce an **isometric** drawing of the TRESTLE display bench at a scale of 1:10. The bench is 900 mm wide, 600 mm deep and 900 mm high overall; the lower platform is 480 mm high and the back riser is 300 mm deep, set at the back edge, rising to the full 900 mm. Show your construction. (6 marks)*

Working	Comment
Rule the **isometric axes** from one origin: a **vertical** for height, and two receding axes at **30° to the horizontal** — left for depth, right for width. Check they sit **120°** apart.	Set the axes first, with a set square. The 30° / 30° pair is what makes the drawing isometric; freehand angles will not scale correctly.
Work out the drawn sizes at **1:10**: 900 → 90 mm, 600 → 60 mm, 480 → 48 mm, 300 → 30 mm. **Crate** the overall form: 90 along the width axis, 60 along the depth axis, 90 up the vertical.	Convert once, at the start. The crate is the object’s overall width × depth × height and it guarantees the proportions before any detail is drawn.
Inside the crate, **block the form**: mark 48 mm up the vertical for the platform top, and 30 mm back along the **depth** axis for the front face of the riser. Draw the blocking lines **parallel to the axes**.	Every measurement is taken **along an axis**. Because parallel edges stay parallel in a paraline drawing, the blocking lines simply repeat the axis directions.
Line in the visible edges of the two blocks — the	The finished form is cut out of the crate. Construction

Working	Comment
platform (900 × 600 × 480) and the riser (900 × 300, rising to 900) — with a firm, even **visible outline**, leaving the crate and blocking lines **thin and light**.	stays faint so the object reads; do not erase it if the question asks you to *show your construction*.
Add the detail: the **Ø250 circular recess** in the riser top is **crated as a 25 mm square on that isometric plane** and drawn as an **ellipse** touching the four side midpoints.	A circle on an isometric plane is an **ellipse**. Crating it first is what keeps it the right size and on the right plane.
Note **SCALE 1:10** and **DIMENSIONS IN MILLIMETRES**, and title the drawing *TRESTLE display bench — isometric*. Dimension figures give the **true sizes** (900, 600, 480, 300, Ø250).	The conventions are part of the answer. The figures are the object's real sizes, never the drawn lengths.

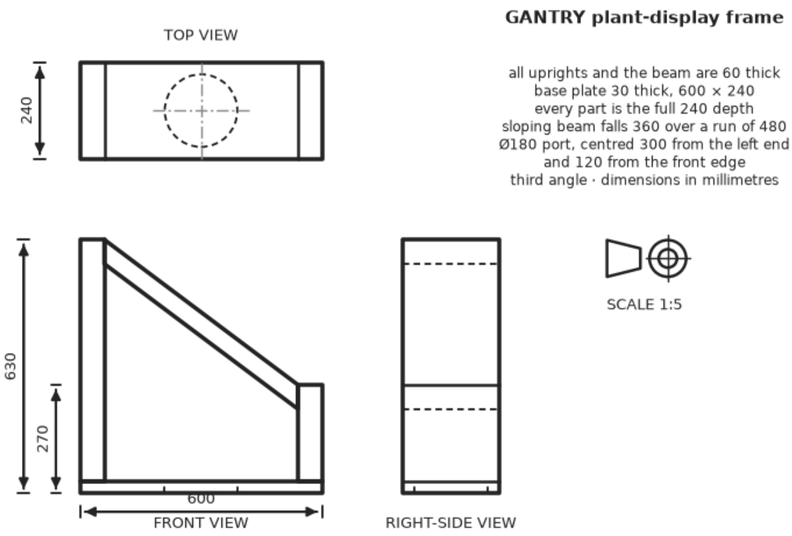
Example 2 — scaffolded

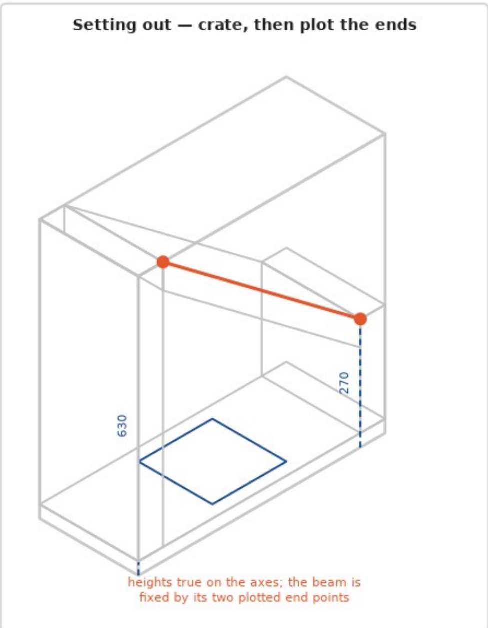
Produce a ***planometric*** *drawing of the LOOM community weaving studio at 45° / 45°, scale 1:50. The studio is 6000 mm × 4000 mm with 3000 mm walls, and contains a work bench, a yarn shelf, a floor loom and a round table. (6 marks)*

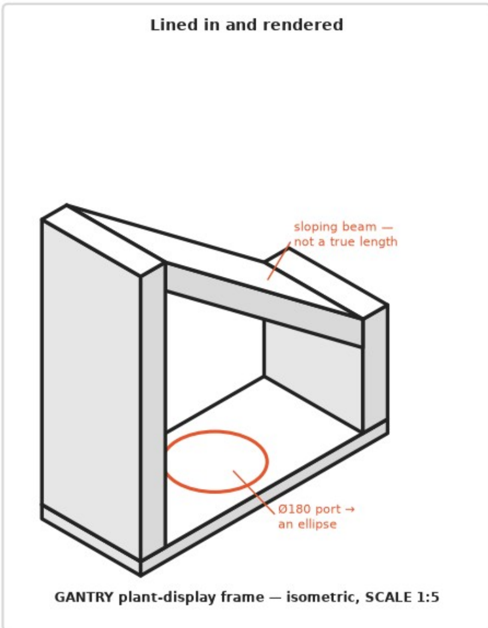
Working	Comment
Draw the **plan** first, true to scale at 1:50: a 120 mm × 80 mm rectangle with **true 90° corners**, and locate the bench, shelf, loom and table in their correct plan positions.	A planometric is built **from the plan**, so an inaccurate plan produces an inaccurate drawing. Everything downstream depends on this step.
Rotate the whole plan 45° / 45° on the sheet, keeping it rigid. Do not stretch, skew or foreshorten any part of it.	This is a **rotation only**. It is what preserves the plan's true shape — the trap is to redraw the plan as a distorted parallelogram.
Check what has been kept: the corners are still **90°**, the wall lengths are still true, and the **round table is still a true circle**.	This is the defining property of planometric and the reason it suits environments — the plan can still be measured off the drawing.
Project verticals straight up from every plan corner and mark the **true heights** at the same scale: 60 mm for the 3000 mm walls, and the true heights of the bench, shelf, loom and table.	Heights are **vertical and true length** in planometric. Sloping them, or shortening them "for effect", is the most common error.
Line in the **two far walls** and the furniture, and **omit the two near walls** so the layout can be read. Draw the nearest items last so they sit in front.	Omitting the near walls is the standard interior convention. Working far-to-near keeps the overlaps correct without erasing.
Note **SCALE 1:50** and title the drawing *LOOM community weaving studio — planometric*.	A documentation drawing is not finished until the scale and title are on it.

Example 3 — unscaffolded

The third-angle orthogonal views below document the GANTRY plant-display frame. Produce a resolved ***isometric*** *drawing of the frame at scale 1:5, showing your setting out. (8 marks)*







Read the three views first: the frame is 600 wide, 240 deep and 630 high overall, with a 30 thick base plate, a tall left upright and a short right upright (270 high), a **sloping beam** between them, and a **Ø180 port** through the base plate. Set the isometric axes at **30° / 30°** and **crate** the overall 600 × 240 × 630 at 1:5 (120 × 48 × 126 mm drawn). Block in the base plate and the two uprights inside the crate, taking every measurement **along an axis** — 60 wide for each upright, 240 deep for every part, 630 and 270 for the two upright heights.

The sloping beam cannot be measured directly, because it is **not parallel to any axis** and so is **not a true length** on the drawing. Plot its **two end points** instead — the top of the left upright at 630, and the top of the right upright at 270 — using true heights measured **up the verticals**, then join them and add the beam's 60 thickness parallel to the first line. The **Ø180 port** lies on a horizontal (isometric) plane, so it is drawn as an **ellipse**: crate it as a **36 mm** square on that plane — the crating square's side is the circle's **diameter**, so 180 at 1:5 gives 36 mm, not the 18 mm radius — centred 300 from the left end and 120 from the front edge, then draw the ellipse touching the four side midpoints, using the four-centre method.

Finally, line in the visible edges with a firm outline, keeping the crate and setting-out lines thin and light, render the faces to distinguish them, and note **SCALE 1:5**, **DIMENSIONS IN MILLIMETRES** and the title *GANTRY plant-display frame — isometric*. *(8 marks: correct 30° / 30° axes and crate to scale; all axis measurements true and to one scale; the sloping beam fixed by plotted end points, not measured; the port drawn as a crated ellipse of the right size; parallel edges kept parallel; line quality; rendering; scale note and title.)*

Example 4 — unscaffolded

*A studio is preparing two presentations: a **stackable stool** for a furniture client, and a **café interior** for a hospitality client. **Justify** the paraline drawing method you would select for each, and **explain** why a paraline drawing rather than a perspective drawing is used to document a resolved design. (6 marks)*

For the stackable stool I would select an **isometric** drawing. Isometric sets the two receding axes at 30° to the horizontal and draws all three axes to one scale, so the client sees the stool's **form and proportion** from a viewpoint close to the way the object is met in use, while every width, depth and height can still be measured off the drawing. The method suits **objects and furniture**, and a stool's curved seat or circular section can be crated and drawn as ellipses on the isometric planes.

For the café interior I would select a **planometric** drawing. A planometric is built from the **true plan**, so the plan's right angles, lengths and circular tables remain **true shape** after the plan is rotated 45° / 45°, and true heights are projected vertically. The hospitality client can therefore read the **layout** directly — circulation space, the relationship of counter to seating, how many tables fit — which is exactly what an **environmental** design decision turns on, and which a lower isometric viewpoint would obscure.

A **paraline** drawing rather than a perspective drawing is used to document a resolved design because a paraline drawing is a **parallel projection**: edges that are parallel on the object stay parallel on the paper, nothing converges to a vanishing point, and lengths stay to scale. That makes the drawing **measurable**, so a maker or builder can take true sizes from it and the design can be specified, dimensioned and repeated. A perspective drawing deliberately converges and diminishes to imitate the eye, so although it is more persuasive for pitching an impression, no reliable measurement can be taken from it.

Practice questions

Scaffolded

Q1. Isometric axes: (a) State the angle at which the two receding axes are drawn to the horizontal. *(1 mark)* (b) State the angle between any two of the three isometric axes. *(1 mark)* (c) Explain the rule about which lines on an isometric drawing may be measured directly. *(2 marks)*

Q2. Circles in isometric: (a) State what shape a circle becomes when it is drawn on an isometric plane. *(1 mark)* (b) Describe how you would **crate** a circle before drawing it. *(2 marks)* (c) In the four-centre method, where are the centres of the two **large** arcs and the two **small** arcs? *(2 marks)*

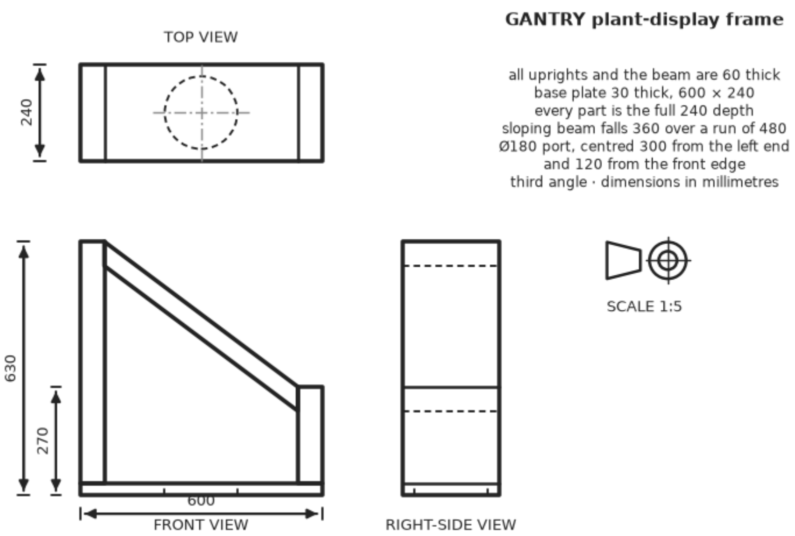
Q3. Setting out a planometric: (a) Which drawing is a planometric built from? *(1 mark)* (b) State the two rotations commonly used. *(1 mark)* (c) Describe how heights are drawn on a planometric. *(2 marks)*

Q4. Using the isometric and planometric drawings of the TRESTLE bench: (a) State which of the two keeps the plan (top) face a **true rectangle**. *(1 mark)* (b) Describe the difference in the viewpoint each method implies. *(2 marks)* (c) Explain one **limitation** of a planometric drawing when presenting an object. *(2 marks)*

Q5. Paraline drawing and the eye: (a) Explain, in terms of the **projectors** (the lines of sight), why edges that are parallel on the object stay parallel on a paraline drawing. *(2 marks)* (b) State what the projectors do instead in a **perspective** drawing. *(1 mark)* (c) Explain why a paraline drawing cannot show an object exactly as the eye would see it. *(2 marks)*

Q6. The crate method: (a) State what the **crate** represents. *(1 mark)* (b) List, in order, the four stages of building an isometric drawing by this method. *(2 marks)* (c) Explain how construction lines should appear on the finished drawing, and why. *(2 marks)*

Unscaffolded



Refer to the GANTRY plant-display frame documented above wherever a question names it.

Q7. Produce a **planometric** drawing of the GANTRY at 45° / 45°, scale 1:5, and state how the heights are set out. *(5 marks)*

Q8. A student lays a ruler along the **sloping beam** on the finished 1:5 isometric drawing, multiplies the measurement by five, and dimensions the beam with that figure. Explain why the figure is wrong, state how the beam's position was correctly fixed on the isometric, and state **which of the three orthogonal views** shows the beam at its true length and what that length is. *(3 marks)*

Q9. Explain how the **Ø180 port** appears on an isometric drawing of the GANTRY and how it would appear on a planometric drawing of the same frame, and account for the difference. *(4 marks)*

Q10. The LOOM studio (6000 × 4000 mm, 3000 mm walls) is to be drawn as a planometric on an A3 sheet. (a) State a suitable standard scale. *(1 mark)* (b) Give the drawn length of the 6000 mm wall at that scale. *(1 mark)* (c) State the figure that would be dimensioned against that wall. *(1 mark)*

Q11. A student's "isometric" of the GANTRY has vertical edges that lean in toward a point above the frame, and the far end drawn smaller than the near end. **Identify** the fault, **explain** why it is wrong for a paraline drawing, and **state** the correction. *(3 marks)*

Q12. A student's planometric of the LOOM studio contains these faults: (i) the plan has been redrawn as a skewed parallelogram; (ii) the wall heights slope up at 45°; (iii) the round table has been drawn as an ellipse; (iv) the depth of the room has been shortened so it "looks further away". **Identify and correct** each fault. *(4 marks)*

Q13. Distinguish between isometric and planometric drawing, referring to the **axes**, the treatment of **heights**, and what remains **true shape** in each. *(4 marks)*

Q14. Explain why the two **near walls** are normally omitted from an interior planometric such as the LOOM studio, and describe **one other** decision a designer makes so that the interior reads clearly. *(3 marks)*

Q15. State **three technical conventions** you would apply to a resolved paraline documentation drawing, and explain what each contributes. *(3 marks)*

Q16. Explain when a designer would rotate a planometric **30° / 60°** rather than 45° / 45°, and describe the effect this has on the drawing. *(3 marks)*

Q17. The HALYARD pedestal side table has a circular base plate **Ø350 mm × 25 mm** thick, a central cylindrical column **Ø90 mm** rising to 525 mm, and a square top **450 × 450 × 25 mm** thick, giving an overall height of 550 mm.

Produce a resolved **isometric presentation drawing** of the table at 1:5, applying the appropriate technical conventions. *(8 marks)*

Answers

Q1. (a) 30° to the horizontal. (b) 120°. (c) Only lines drawn along (or parallel to) an axis are true lengths. **Q2.** (a) An ellipse. (b) Draw the enclosing square, each side equal to the circle's diameter, on the correct isometric plane — it appears as a rhombus. (c) Large arcs = the two obtuse corners; small arcs = the two crossings on the long diagonal. **Q3.** (a) The true plan. (b) 45° / 45° or 30° / 60°. (c) Projected vertically, at true length, to the same scale. **Q4.** (a) The planometric. (b) Isometric = a lower, more natural object view; planometric = a steeper, bird's-eye view. (c) See solutions. **Q5.** (a) The projectors are parallel to one another, so parallel edges arrive on the paper still parallel. (b) They converge on a single viewpoint — the eye (station point). (c) Because nothing converges or diminishes with distance. See solutions. **Q6.** (a) The object's overall width × depth × height, to scale. (b) Axes + crate → block the form → line in the visible edges → detail and render. (c) Thin and light; see solutions. **Q7.** Rotate the plan (600 × 240) 45° / 45°, then project true heights (630, 270, 30) vertically. See solutions. **Q8.** The beam is not parallel to an axis, so it is not true length on the isometric; its ends were plotted at 630 and 270 and joined. True length is seen in the **front view** = **600 mm**. **Q9.** Isometric = an ellipse (crated square becomes a rhombus); planometric = a true circle (the plan plane is undistorted). **Q10.** (a) 1:50. (b) 120 mm. (c) 6000. **Q11.** The drawing has been given perspective convergence; paraline edges never converge — redraw the verticals parallel and the far end the same size. **Q12.** See solutions (rotate the plan without distortion; verticals true; table stays a circle; depth true to scale). **Q13.** See solutions. **Q14.** They would stand between the viewer and the interior and hide the layout; see solutions for the second decision. **Q15.** Any three of: scale note; true-size dimensions in millimetres given once (Ø, R); correct line types; title. **Q16.** To favour one wall: it is set at the shallower 30° and reads more broadly; the plan still stays true shape. **Q17.** See fully-worked solutions.

Fully-worked solutions

Q1. (a) The two receding axes are drawn at **30° to the horizontal** — one to the left for depth, one to the right for width. (b) There is **120°** between any two of the three axes. (c) Only lines drawn **along an axis, or parallel to an axis**, are **true lengths** and may be measured directly, because all three axes are drawn to the **same scale**. Any line that is not parallel to an axis — a slope, a chamfer, a diagonal — is **not** a true length and must be found by plotting its end points *(2 marks: the rule + the reason).*

Q2. (a) An **ellipse**. (b) **Crate** the circle by drawing the square that would enclose it — each side equal to the circle's **diameter** — **on the isometric plane the circle sits on**. In isometric that square appears as a **rhombus**, and the ellipse is drawn inside it touching the **midpoint of each side** *(2 marks: square of side = diameter, drawn on the correct plane).* (c) The centres of the two **large arcs** are the two **obtuse corners** of the rhombus; the centres of the two **small arcs** are the two points where the lines from those obtuse corners to the opposite side midpoints **cross the long diagonal** *(2 marks).*

Q3. (a) A planometric is built from the **true plan**, drawn accurately to scale. (b) The plan is commonly rotated **45° / 45°**, or **30° / 60°** when one wall is to be favoured. (c) Heights are projected **vertically** — straight up from every corner of the rotated plan — at **true length** and to the **same scale** as the plan. They are never sloped or foreshortened *(2 marks: vertical + true length/one scale).*

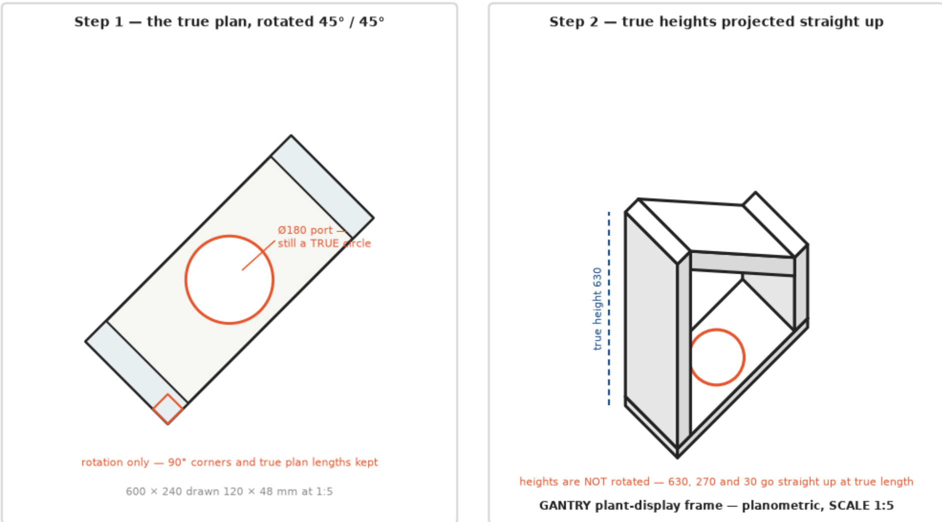
Q4. (a) The **planometric** keeps the top face a **true rectangle** (and the recess a true circle), because that face is parallel to the plan, which has only been rotated. (b) The **isometric** implies a **lower viewpoint** — the object is seen from a modest angle above and to one side, close to the way it is met in use — whereas the **planometric** implies a **steeper, bird's-eye viewpoint**, looking down on the plan from above *(2 marks).* (c) Because it looks down so steeply, a planometric shows the **vertical faces less convincingly**: the front elevation of an object is compressed and reads poorly, so a product's face, detailing and proportion are communicated less effectively than in an isometric *(2 marks: the limitation + its consequence for the viewer).*

Q5. (a) The **projectors** are the lines of sight that carry each point of the object onto the paper. In a paraline drawing they are all **parallel to one another**, so every point is carried across in the same direction and by the same rule; two edges that are parallel on the object are therefore projected by two parallel sets of projectors and arrive on the paper still **parallel**. Nothing swings toward a common point, which is why a paraline drawing has **no vanishing points** *(2 marks: the projectors are parallel + so parallel edges are projected as parallel).* (b) In a perspective drawing the projectors are **not** parallel: they **converge on a single viewpoint** — the eye, or station point — which is what sends parallel edges to **vanishing points**. (c) The eye sees by **convergence and diminution**: parallel edges appear to close together and distant parts appear smaller. A paraline drawing deliberately does the opposite — it keeps parallel edges

parallel and draws the far end of the object the **same size** as the near end, so that lengths stay to scale. Because it suppresses the very effects the eye relies on, it cannot reproduce the optical experience of the object; it is a measured description of the form rather than a view of it *(2 marks: the eye converges/diminishes + paraline holds edges parallel and sizes constant, so it is measured, not optical).*

Q6. (a) The **crate** is the object's **overall width × depth × height**, drawn to scale on the isometric axes — a bounding box the form is cut out of. (b) **(1)** Set up the axes and crate the overall size; **(2)** block the form inside the crate, measuring along the axes; **(3)** line in the visible edges; **(4)** add the detail and render *(2 marks: four stages, in order).* (c) Construction, crate and projection lines should stay **thin and light (faint)** so they do not compete with the **firm visible outline** of the object. They are kept rather than erased because they **show the setting out** — evidence that the drawing was constructed to scale rather than sketched *(2 marks: appearance + reason).*

Q7. *(Model — the drawing below is the answer; check yours against it line for line.)*



Begin with the frame's **plan**: a 600 × 240 rectangle, drawn at 1:5 as 120 × 48 mm, showing the two uprights (60 wide each) and the Ø180 port in its located position. **Rotate the whole plan 45° / 45°** without distorting it — the corners stay 90° and the port stays a **true circle**. Then **project verticals straight up** from every plan corner and mark the **true heights** to the same scale: **630** (126 mm) for the tall left upright, **270** (54 mm) for the short right upright, and **30** (6 mm) for the base plate. Join the two plotted upright tops to give the sloping beam, add its 60 thickness, line in the visible edges and note **SCALE 1:5** and the title *(5 marks: true plan drawn to scale; rotated 45° / 45° without distortion; heights projected vertically at true length; beam fixed by plotted end points; scale note and title).*

Q8. The figure is wrong because the beam is **not parallel to any of the three isometric axes**. Only lines drawn along an axis (or parallel to one) are **true lengths** on an isometric drawing, so the beam is drawn at a length that is not its real length; scaling that measurement up by five simply enlarges the error. The beam's **position** was fixed correctly by plotting its **two end points** from axis measurements — **630 up the vertical** at the tall upright and **270 up the vertical** at the short upright — and joining them. Its **true length** is shown in the **front view** of the orthogonal drawing, because the beam lies in a plane parallel to that view; there it measures **600 mm** (a run of 480 and a fall of 360) *(3 marks: not parallel to an axis, so not a true length + position fixed by plotted end points + front view, 600 mm).*

Q9. On the **isometric** drawing the port lies on a **horizontal isometric plane**, which is a skewed plane, so the circle appears as an **ellipse**. It is set out by crating it — drawing the square of side Ø180 on that plane, where it appears as a **rhombus** — and drawing the ellipse to touch the **four side midpoints** (four-centre method). On a **planometric** drawing the same port appears as a **true circle**, drawn with compasses at its true scaled diameter. The difference arises because a planometric is built from the **true plan**, which is only **rotated** and never distorted, so any shape lying in the plan plane keeps its true shape; the isometric plane, by contrast, is skewed by the 30° / 30° axes, so every circle on it is compressed into an ellipse *(4 marks: ellipse in isometric + how it is set out + true circle in planometric + the reason the plan plane is undistorted).*

Q10. (a) A suitable standard scale is **1:50**. Once the plan is rotated 45° / 45° the drawing occupies a wider envelope than the plan itself — roughly 141 × 141 mm at 1:50, plus 60 mm of wall height — which sits comfortably on A3, whereas 1:20 would run well past the sheet *(accept 1:100).* (b) At 1:50 the 6000 mm wall is drawn **120 mm** long. (c)

The figure dimensioned against it is **6000** — a dimension always gives the object's **true size**, not the drawn length *(1 mark each).*

Q11. The fault is that the student has given the drawing **perspective convergence** — leaning verticals and a diminishing far end. This is wrong for a **paraline** drawing because a paraline drawing is a **parallel projection**: parallel edges on the object must stay **parallel** on the paper, there are **no vanishing points**, and every axis is drawn to **one scale**, which is what makes the drawing measurable. Converging edges destroy that, so no true size can be taken from the drawing. The correction is to **redraw all verticals parallel to one another** (and all width and depth edges parallel to their 30° axes), with the **far end the same size as the near end** *(3 marks: fault identified as perspective convergence + explanation via parallel projection/measurability + the correction).*

Q12. (i) **Rotate the plan, do not redraw it.** The plan must keep its **true shape** — 90° corners and true lengths — and simply be turned 45° / 45° on the sheet; a skewed parallelogram is a distortion. (ii) **Draw the heights vertically.** In planometric it is the **plan** that is rotated, not the heights: every height is projected **straight up** at **true length**, so the 45° walls must be redrawn as verticals. (iii) **Redraw the table as a true circle.** A circle lying in the plan plane stays a **true circle** in planometric (only an *isometric* plane turns it into an ellipse), so it is drawn with compasses at its true scaled diameter. (iv) **Draw the depth to true scale.** Shortening the depth is a **perspective** habit; in a paraline drawing all measurements are to **one scale**, so the 4000 mm depth is drawn at its full scaled length *(1 mark each correction).*

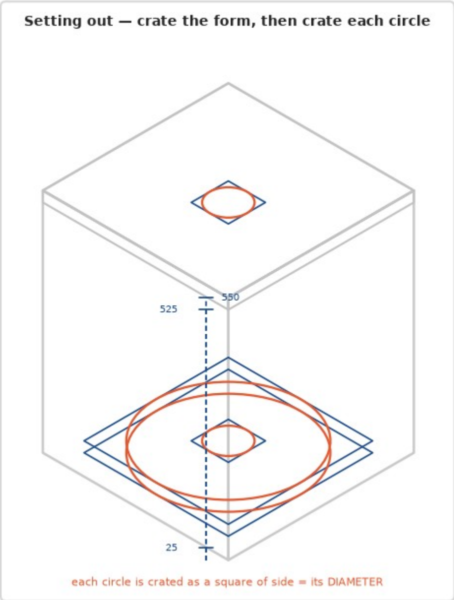
Q13. In **isometric**, the two receding **axes** are drawn at **30°** to the horizontal with a vertical third axis (120° between any two); **heights** are measured up the vertical axis, and **all three axes are to one scale**; what stays true is **length along any axis**, but no face is true shape — a rectangular top face becomes a skewed **parallelogram** and a circle becomes an **ellipse**. In **planometric**, there are no 30° axes: the **true plan** is **rotated** 45° / 45° (or 30° / 60°); **heights** are then projected **vertically** at true length; what stays true is the whole **plan** — right angles, plan lengths and plan circles are all **true shape**. So both are parallel projections drawn to one scale, but isometric favours the **object's form** while planometric favours the **measurable plan** *(4 marks: axes in each + heights in each + what is true shape in each + a congruent two-sided treatment).*

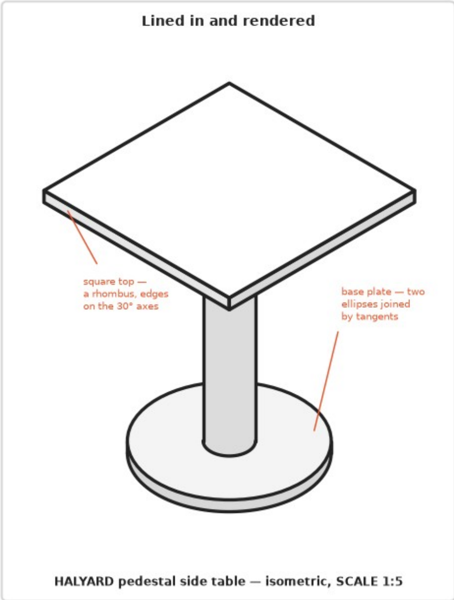
Q14. Once the true heights are projected up, the two walls **nearest the viewer** stand directly between the viewer and the interior. Drawn in, they would **conceal the floor area, the furniture and the circulation space** — that is, the very information the drawing exists to show — so they are **omitted** by convention, leaving the two far walls to enclose the space and give it height. One other decision a designer makes is to **draw the contents from the farthest item to the nearest**: each near item is then laid over what stands behind it, so the overlaps — and with them the depth of the space — read correctly, and no line has to be erased out of an item already drawn. *(Also accept: omitting the ceiling; rendering the floor and furniture lightly so the layout stays legible; giving the walls a firmer outline than the fittings so the enclosure reads first.) (3 marks: near walls hide the interior + the layout is what the drawing must show + one further decision, described.)*

Q15. Any three, with their contribution — **(1) A scale note** (for example SCALE 1:5), which tells the reader the ratio between the drawing and the object so sizes can be interpreted correctly. **(2) Dimensions in millimetres, each feature dimensioned once and at its true size**, using **Ø** for a full circle or hole and **R** for an arc, so the maker builds the object to the intended size without ambiguity. **(3) Correct line types** — a firm **visible outline** with **thin, light construction and setting-out lines** — so the form reads clearly and the construction is evident without competing with it. *(Also accept: a title and the drawing method named; a title block.) (1 mark each: convention named + what it contributes.)*

Q16. A designer rotates the plan **30° / 60°** instead of 45° / 45° when **one wall or face of the space is more important than the others** and should be **favoured** in the drawing — a shopfront, a display wall, the elevation carrying the entrance. The effect is that the two sets of walls are no longer treated equally: the favoured set is drawn at the **shallower 30°**, so it opens out and reads more broadly, almost like an elevation, while the other set is drawn at **60°** and is comparatively compressed, taking a supporting role. What does **not** change is the geometry: the plan has still only been **rotated**, so it keeps its **true shape** — 90° corners, true plan lengths and true circles — and heights are still projected **vertically at true length**, so the drawing remains fully measurable *(3 marks: chosen to favour one wall + the shallower 30° set reads more broadly and the 60° set is compressed + the plan still stays true shape / still measurable).*

Q17. *(Model — the setting out and the resolved drawing are shown below.)*





Convert the sizes to **1:5** first: Ø350 → Ø70 mm, Ø90 → Ø18 mm, 450 → 90 mm, 550 → 110 mm, 525 → 105 mm, 25 → 5 mm. Rule the **isometric axes** — a vertical and two receding axes at **30° to the horizontal**, 120° apart — and **crate** the overall 450 × 450 × 550 as a 90 × 90 × 110 mm box.

The base plate. On the ground plane, **crate the Ø350 circle** as a 70 mm square (which appears as a **rhombus**) and draw the **ellipse** inside it touching the **four side midpoints**, using the four-centre method. Repeat the ellipse **5 mm higher** for the top of the plate and join the two with short **vertical tangent lines** at the extreme left and right; only the **front half** of the lower ellipse is visible.

The column. Crate the Ø90 column as an 18 mm square centred on the same axis, and draw its **ellipse** on the top of the base plate and again at **105 mm** up the vertical. Join them with two **vertical tangent lines** to form the cylinder.

The top. Set out the 450 square on the isometric plane at **110 mm** — the top surface of the table: its four edges are drawn **parallel to the two 30° axes**, 90 mm long each, so the square appears as a **rhombus**. Add the 5 mm thickness by dropping verticals from the two front edges to the underside at **105 mm**, where the column meets it. Every height is measured **up the vertical axis** and every plan size **along an axis** — none of it is measured across a diagonal.

Finishing. Line in the visible edges with a firm, even outline, keeping the crate and setting-out lines **thin and light**; check that all matching edges are still **parallel** and that nothing converges. **Render** the top, the column and the base to describe the form and the direction of the light. Apply the conventions: **SCALE 1:5**, **DIMENSIONS IN MILLIMETRES**, the true-size figures **Ø350, Ø90, 450, 550 and 25** given **once** each, and the title *HALYARD pedestal side table — isometric (8 marks: correct 30° / 30° axes and overall crate to scale; all measurements taken along the axes to one scale; base plate as two crated ellipses joined by tangents; column as two crated ellipses joined by tangents; square top set out as a rhombus with true thickness; parallel edges kept parallel with faint construction retained; rendering; scale note, true-size dimensions and title).*

Theory

Perspective drawing is the three-dimensional drawing method that imitates the way the eye actually sees. A **paraline** drawing (5A) is a *parallel* projection: the projectors are parallel, nothing converges, and every length stays to scale. A **perspective** drawing is a **central** projection: all the lines of sight run back to a single viewpoint, so edges that are parallel on the object appear to **converge** as they recede, and parts further from the viewer are drawn **smaller**. This pairing of **convergence** and **diminution** is what makes a perspective look like the space as it will be experienced — and it is exactly why **nothing on a perspective drawing may be measured**.

The Study Design lists **perspective** alongside paraline among the three-dimensional **documentation drawings**, and lists **rendered impressions of buildings, environments or objects** among **presentation drawings**. In practice perspective earns its place in the **Deliver** phase: it is the method a designer uses to show a stakeholder what a space or structure will feel like to stand in. That is why it is the drawing method expected for **environments and structures** — where a client is buying an *experience* — while paraline remains the method for documenting **objects and furniture**.

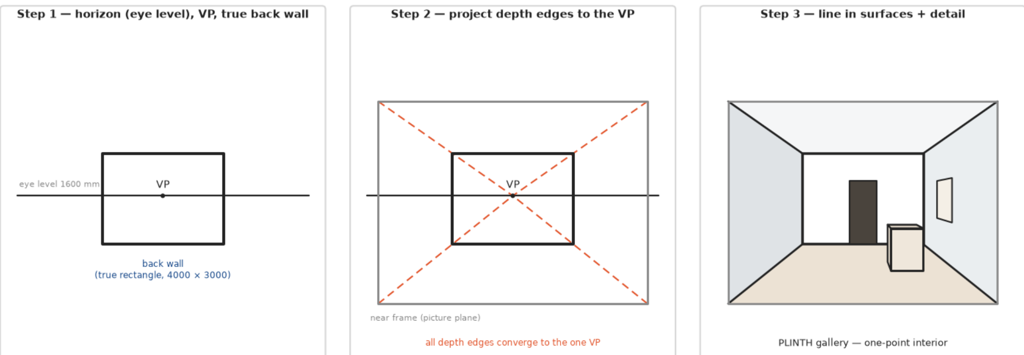
The set-up. However complicated the subject, every perspective drawing is built on three things.

- **Eye level**, drawn as the **horizon line**. One horizontal line placed at the height of the viewer's eye. It is a *decision*, not a default: it fixes where the viewer is standing and how tall they are. Anything in the drawing at that height sits **on** the line.
- **Vanishing points (VPs)**. A vanishing point is a point **on the eye level** at which one set of parallel, horizontal edges appears to converge. One set of parallel edges gives one vanishing point, and the **number of vanishing points names the method** — one-point, two-point, three-point.
- **A true height line**. One vertical edge drawn at its correct **scaled height**. Every other height in the drawing is then found from it by projection, because that single line is the only true measurement on the sheet.

Three supporting terms describe the geometry behind the set-up: the **station point** is where the viewer stands; the **picture plane** is the imaginary vertical sheet of glass between the viewer and the subject on which the image is traced; the **ground line** is where that plane meets the ground. In both one-point and two-point perspective, **verticals stay vertical** — only the *horizontal* edges converge.

> **Watch-out — one horizon, and every VP on it.** A drawing has **one** eye level. Both vanishing points of a two-point drawing must sit on that **same** horizon line. Two horizons, or a second VP floating above or below the first, twists the form and is the most common construction error seen in student work.

One-point perspective. In a one-point drawing the subject is viewed **square-on**: one face of the object, or the back wall of the space, is **parallel to the picture plane**. Because that face is parallel to the picture plane it does not recede at all, so it is drawn as **true shape, to scale** — a rectangle stays a rectangle, a square stays a square, a circle stays a circle. Every edge that runs **away** from the viewer converges on a **single vanishing point** on the eye level.

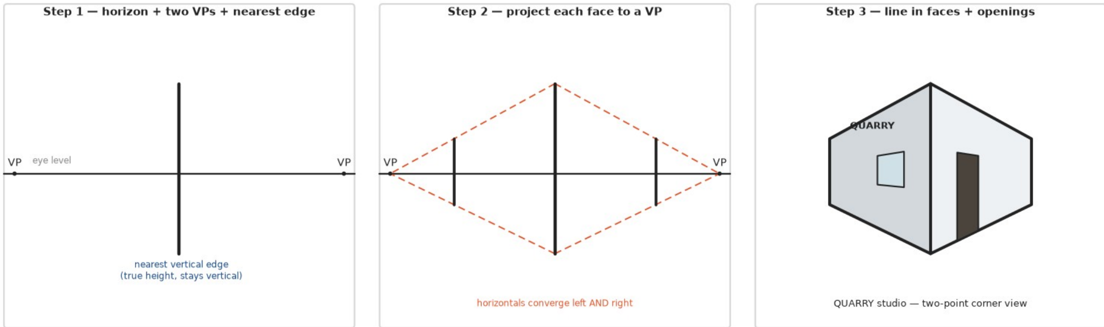


The three stages above set out the **PLINTH gallery**, an original single-room exhibition space viewed straight down its length. The method is:

1. Rule the **eye level (horizon)** across the sheet and mark the **single VP** on it. Placing the VP centrally gives a formal, symmetrical view; sliding it left or right swings the view without changing the construction.
2. Draw the **true face** — here the far wall — as an accurate scaled rectangle. Its horizontals stay horizontal and its verticals stay vertical.
3. From every corner of the near opening (the picture-plane frame), rule a line **to the VP**. These are the receding edges of the floor, ceiling and two side walls.
4. **Line in** the surfaces between the near frame and the true face, and fix the depth of anything inside the space along those converging lines.
5. Add the detail. Everything **on** a side wall — a doorway, a picture frame, a skirting — has its top and bottom edges running **to the same VP**, while its own verticals stay vertical.

One-point suits **interiors, corridors, streetscapes and any straight-on view**, and it is the quicker of the two methods to construct because half the drawing is true shape.

Two-point perspective. In a two-point drawing the subject is viewed **at a corner**. No face is parallel to the picture plane, so **no face is true shape** — both sets of horizontal edges recede, one to a **left VP** and one to a **right VP**, both sitting on the **same eye level**.

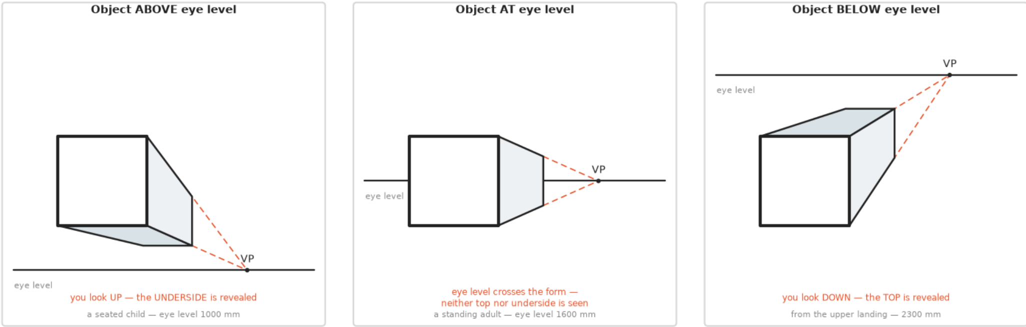


The three stages above set out the **QUARRY studio**, an original single-storey workshop met at its front corner. The method is:

1. Rule the **eye level** and mark **two vanishing points** on it, as **far apart** as the sheet allows.
2. Draw the **nearest vertical corner edge**. This is the **true height line** — the one edge drawn at its correct scaled height, and the only measurement taken directly.
3. From the **top and bottom** of that edge, rule lines to the **left VP** and to the **right VP**. These four lines give the top and bottom edges of the two visible faces.
4. Decide how far each face runs and drop a **vertical** at each far end. Verticals never converge, so these are ruled straight up and down; where they cut the converging lines fixes the far corners.
5. **Line in** the two faces and add openings. A window or door on the left face has its horizontal edges running to the **left** VP; one on the right face runs to the **right** VP. Its verticals stay vertical.

Two-point suits **buildings, exhibition stands, retail fit-outs, signage structures and furniture seen at an angle** — anything where the corner and two faces need to be read at once.

Eye level decides what the viewer sees. Moving the horizon does not move the object; it moves the *viewer*, and it changes which faces are revealed.



CAIRN display cube (600 mm, on a 1300 mm plinth) — the cube does not move; only the eye level does

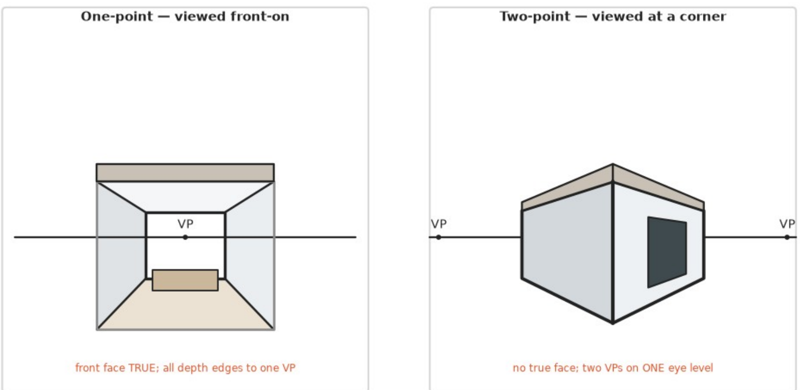
The same **CAIRN display cube**, standing on its 1300 mm plinth in the PLINTH gallery, is drawn three times above. The cube has not moved; only the **eye level** has, as three different viewers meet it.

- **Above eye level** (the horizon below the form) — the viewer looks **up**, and the **underside** is revealed. Here that is the seated child at a **1000 mm** eye level; it is also how a sign, an awning or a high shelf is seen from below.
- **At eye level** (the horizon crossing the form) — **neither** the top nor the underside is seen; the form reads as a flat-topped block. Any horizontal surface exactly at eye level appears as a single line. Here that is the standing adult at **1600 mm**.
- **Below eye level** (the horizon above the form) — the viewer looks **down**, and the **top** face is revealed. Here that is the visitor on the gallery's upper landing at **2300 mm**; it is also the normal view of furniture, objects, models and site layouts.

Watch-out — a form standing on the ground is never *above* eye level. The horizon **is** the viewer's own eye height, so anything resting on the same ground plane has its base **below** the horizon and its underside can never be seen. You see the underside of a form only where it is genuinely raised above the viewer's eye — a sign, an awning, a high shelf, or an object on a plinth met by a seated viewer or a child.

A designer sets the eye-level **height** to match the audience and the context: about **1600 mm** for a standing adult, about **1200 mm** for a seated adult or a child, near **0 mm** for a dramatic worm's-eye view of a monument, and high above the subject for a **bird's-eye** or aerial view of a whole site. Because everyone standing on the same ground plane shares the same eye level, a **human figure drawn for scale has their eyes on the horizon** no matter how far away they stand — which is the quickest check that a figure has been sized correctly.

Choosing between one-point and two-point. The choice is a design decision about **viewpoint**, not about difficulty.



CRAG park shelter — same structure: one-point for a straight-on view, two-point for a corner view

The same **CRAG park shelter** is drawn both ways above. The **one-point** view is formal, symmetrical and calm; it keeps the front face true, so proportions and signage on that face can be read directly, and it draws the eye straight into the depth of the structure — ideal for **interiors and views along a space**. The **two-point** view is more natural and dynamic; because the viewer meets a corner, **two faces and the form as a whole** are read at once, giving a better sense of mass, materials and how the structure sits in its site — ideal for **buildings and free-standing structures**. A third method, **three-point** perspective, adds a **third vanishing point above or below the horizon** so that the **verticals**

converge too. It is used only for extreme views of tall structures and sits outside the two constructions named in this study.

Dividing space in perspective. Equal real distances are **not** equal on the paper — each successive bay, tile, post or window is drawn narrower as it recedes. So a receding surface can never be divided by measuring the sheet with a ruler. Instead, use the **diagonal method**: draw both **diagonals** of the receding rectangle; they cross at its **perspective centre**; a vertical through that crossing halves the surface correctly. Repeat inside each half to get quarters, then eighths.

Halving in this way can only ever give **two, four or eight** parts. To divide a receding surface into any other number — **six**, say — divide a line that is **true** (one lying in the picture plane, such as the near floor edge or the nearest vertical edge) into that many equal parts and **project** those divisions into the drawing along the converging lines.

The same construction, run in **reverse**, extends a fence or a row of columns beyond the last bay drawn. Rule the **mid-height line** of the first bay back to the VP — it passes through the crossing of that bay's diagonals — then rule a line from the **top of the first post through the point where the mid-height line cuts the second post** and carry it on to the **base line**: where it lands is the foot of the **third** post. Repeating adds equal bay after equal bay, each correctly narrower than the one before.

Perspective is a presentation drawing, not a measured one. Because everything converges and diminishes, a perspective drawing is **not to scale** and must **never be dimensioned**. That does not make it informal: a resolved perspective still carries its own conventions. State the **eye level** used, include a **human figure (or a familiar object) for scale**, keep verticals truly vertical, render it to describe light, shade, shadow, materials and textures (5C), and title it. If the same structure must be *documented* for construction, that is done separately with plans, elevations, sections and a **paraline** drawing that carries the **scale, dimensions in millimetres and line-type conventions** (4B, 5A).

> **Watch-out — verticals stay vertical.** In both one-point and two-point perspective, only the *horizontal* edges converge. If your vertical edges lean in toward a point, you have drawn a three-point perspective by accident and the form will look as if it is toppling.
>
> **Watch-out — do not place the VPs too close together.** Vanishing points crowded near the subject force the horizontals to converge steeply, and the structure distorts into a sharp, unnatural wedge. Set them **wide apart**, ideally off the edge of the drawing area, so the subject stays inside a comfortable **cone of vision**.
>
> **Watch-out — never dimension a perspective.** Convergence and diminution mean nothing on the sheet is to scale. Marks for **technical conventions** are earned on the orthogonal, plan/elevation and paraline drawings; on a perspective, the conventions that count are a stated eye level, a figure for scale, clean line work and rendering.
>
> **Watch-out — do not measure a receding surface with a ruler.** Four equal bays are not four equal distances on the paper. Halve the surface with its **diagonals**, then halve again — the far bays must be visibly narrower than the near ones.
>
> **Watch-out — match the method to the field of practice.** Perspective for **environments and structures**; isometric or planometric for **objects and furniture**; sized screens for **interactive experiences**; symbol and typographic grids for **messages**. In Section B the drawing method must be appropriate to the field you have ticked.
>
> **Watch-out — perspective drawing is a METHOD.** The pencil, marker, ink or software you draw it with is the **media**; the paper, board or screen is the **material**. Say whether the drawing was produced **manually or digitally** — naming a software package as a "method" is a recurring error.

Worked examples

Example 1 — scaffolded

The PLINTH gallery is a single exhibition room 6000 mm long, 4000 mm wide and 3000 mm high, with a doorway in the far wall and a display plinth on the floor. Produce a ***one-point*** *perspective of the interior at an eye level of 1600 mm, showing your construction. (6 marks)*

Working	Comment
Rule the **eye level (horizon)** across the sheet at the	The horizon is set first, because it fixes the viewer. At

Working	Comment
scaled height of **1600 mm**, and mark a **single VP** on it. Place the VP roughly central; on a 3000 mm wall the 1600 mm eye level sits **just above** the wall's mid-height.	1600 mm the viewer is a standing adult — the eye level a gallery visitor would actually have.
Draw the **far wall** as a **true rectangle** to scale: 4000 mm wide by 3000 mm high. Its horizontals stay horizontal and its verticals stay vertical.	This is the face **parallel to the picture plane**, so it is the one part of a one-point drawing that is true shape and can be set out with a ruler.
Draw the **near frame** (the picture-plane opening) around it, then rule a line from **each of its four corners to the VP**.	These four converging lines are the corner edges of the floor, ceiling and two side walls. Every edge running away from the viewer goes to the **one** VP.
Fix the room's **depth** along those lines and line in the floor, ceiling and side walls between the near frame and the far wall.	The 6000 mm depth cannot be measured on the sheet — it is judged, or transferred by a diagonal, because depth diminishes.
Draw the **doorway** on the far wall as a true rectangle standing on the far floor line; draw the **framed work** on the right wall with its top and bottom edges running **to the VP** and its own edges vertical.	Anything on the true face stays true; anything on a receding wall is **foreshortened** and must follow the convergence. This contrast is what earns the construction marks.
Draw the **plinth**: a true front face on the floor, with its side edges running **to the VP**. Because the plinth sits **below** eye level, its **top face is visible**.	The eye level tells you which faces to show. Drawing the top of an object that sits above the horizon is a common and immediately visible error.
Keep the construction lines **thin and light** and the visible outline **firm**; note the **eye level 1600 mm** and title the drawing *PLINTH gallery — one-point perspective*.	The construction is evidence that the drawing was set out rather than sketched. Do **not** dimension it — a perspective is not to scale.

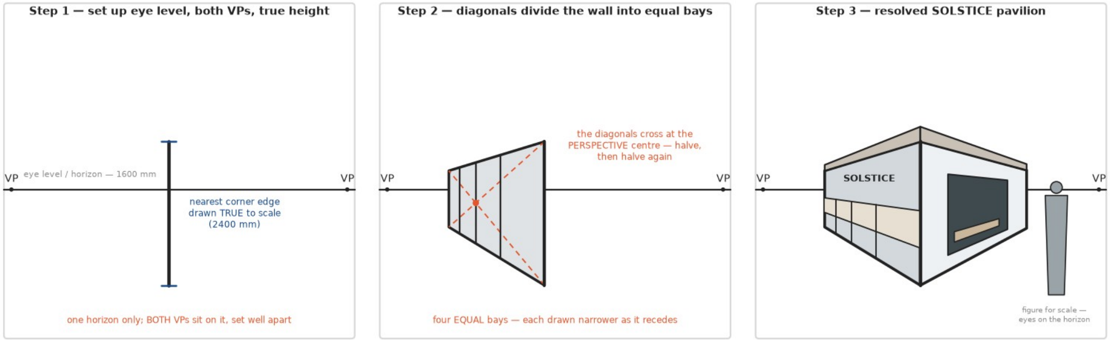
Example 2 — scaffolded

The QUARRY studio is a single-storey workshop 8000 mm × 6000 mm with a 3400 mm wall height, a window on one face and a door on the other. Produce a ***two-point*** *perspective of the building seen at its front corner, with an eye level of 1600 mm. (6 marks)*

Working	Comment
Rule the **eye level** across the sheet and mark **two vanishing points** on it, one near each edge and as **far apart** as the sheet allows.	Both VPs sit on the **same** horizon. Setting them wide apart keeps the convergence gentle; crowding them distorts the building into a wedge.
Draw the **nearest vertical corner edge** at its correct scaled height (3400 mm). Because the wall is taller than the 1600 mm eye level, this edge crosses the horizon.	This is the **true height line** — the only measurement taken directly. Everything else is projected from it.
From the **top** of that edge rule a line to the left VP and another to the right VP; repeat from the **bottom**.	These four lines are the top and bottom edges of the two visible faces. The base edges rise toward the horizon and the roof edges fall toward it.
Decide how far each face runs and rule a **vertical** at each far end, from the lower converging line up to the upper one.	Verticals **never** converge in two-point perspective. Ruling them truly vertical is what stops the building appearing to topple.
Line in the two faces. Put the **window** on the left face with its horizontals running to the **left VP**, and the **door** on the right face with its horizontals running to the **right VP**; both keep vertical sides.	Each face obeys its **own** vanishing point. Sending an opening to the wrong VP is the fault that most often gives a two-point drawing away.
Check the result: **no face is true shape**, both faces are foreshortened, and the two faces are unequal because the corner is not met symmetrically. Title it *QUARRY studio — two-point perspective, eye level 1600 mm*.	In two-point there is no true face — that is the defining difference from one-point, and stating it shows the method is understood rather than copied.

Example 3 — unscaffolded

*The SOLSTICE book-swap pavilion is a 2400 mm high open structure with a shelf wall divided into **four equal bays** and an open reading bay on the adjacent face. Produce a resolved **two-point presentation perspective** for the client, at an eye level of 1600 mm, showing how the equal bays were set out. (8 marks)*



SOLSTICE book-swap pavilion — a resolved two-point presentation drawing (render it, but never dimension it)

Begin by ruling the **eye level** at the scaled height of **1600 mm** and marking **both vanishing points on that one line**, set as wide apart as the sheet allows so the pavilion is not distorted. Draw the **nearest corner edge** as the **true height line**, 2400 mm to scale, and tick its top and bottom. Because the pavilion is taller than the viewer, this edge crosses the horizon: the base edges will rise toward the eye level and the roof edges will fall toward it.

Rule from the **top and bottom of the corner edge to the left VP** for the shelf wall and **to the right VP** for the open face, then drop a **vertical** at the far end of each face to close the two planes. Neither face is true shape, and neither may be measured.

To divide the shelf wall into **four equal bays**, do **not** measure the paper — the bays must diminish. Rule both **diagonals** of the receding wall; they cross at its **perspective centre**, and a vertical through that crossing gives the correct half. Repeat the same diagonal construction inside each half to give the quarters. The four bays are then drawn with the near bay widest and each following bay narrower, which is what a viewer standing at the corner would actually see. Run the two shelf lines back to the **left VP** so they converge with the wall they sit on.

Resolve the drawing for presentation: line in the visible outline firmly, keep the setting-out lines thin and light, add the roof fascia so that **each of its edges still runs to its own vanishing point**, and place the bench inside the open bay with its edges running to the **right VP**. Add a **human figure for scale** standing on the same ground plane, with the figure's **eyes on the horizon** — the immediate check that both the figure and the eye level are right. **Render** the surfaces to describe material, light, shade and shadow, note the **eye level (1600 mm)** and title the drawing *(8 marks: one horizon with both VPs on it, set well apart; nearest corner edge as the true height line; each face projected to its own VP with verticals kept vertical; the four bays divided by diagonals and visibly diminishing; the fascia and bench following the correct VPs; a correctly placed figure for scale; rendering and line quality; eye level stated and titled, with no dimensions).*

Example 4 — unscaffolded

*The CRAG park shelter is to be presented twice: once to a council planning committee assessing how the shelter will sit on its site, and once to the primary-school children who will use it. **Justify** the perspective construction and the **eye level** you would choose for each presentation. (6 marks)*

For the **council committee** I would use a **two-point** perspective at an eye level of about **1600 mm**. Meeting the shelter at a corner shows **two faces and the whole form at once**, so the committee can judge its mass, its roof profile and the way it meets the surrounding paths and planting — the questions a planning assessment actually turns on. A 1600 mm eye level is the height of a standing adult approaching across the park, so the impression is an honest account of how the shelter will be seen from the footpath rather than a flattering one. Placing the two vanishing points **wide apart on a single horizon** keeps the convergence gentle so the structure is not exaggerated, and a **figure for scale with their eyes on the horizon** lets the committee read the shelter's size against a person.

For the **children** I would use a **one-point** perspective at an eye level of about **1200 mm**. A one-point view taken straight into the shelter keeps the front face **true shape**, so the opening, the seat and the signage are read directly and the drawing is easy for a young audience to interpret; the single vanishing point also draws the eye straight in and communicates the *feeling* of sitting inside. Dropping the horizon to 1200 mm sets the viewer at a child's standing eye height, so the roof now sits well **above eye level**: the child looks **up** at its **underside** and the shelter reads as generous and sheltering — which is the experience being presented. In both cases the drawing is a **presentation** drawing: it is rendered and titled with its eye level, and it carries **no dimensions**, because a perspective converges and diminishes and so is not to scale *(6 marks: a justified construction and a justified eye-level height for each audience, tied to what each stakeholder needs to understand).*

Practice questions

Scaffolded

Q1. The perspective set-up: (a) Name the line that represents the height of the viewer's eye. *(1 mark)* (b) Define a **vanishing point**. *(1 mark)* (c) Explain what happens to two parallel horizontal edges of a building as they recede from the viewer. *(2 marks)*

Q2. One-point perspective: (a) State how many vanishing points are used. *(1 mark)* (b) Identify which face is drawn true shape, and explain why. *(2 marks)* (c) State what happens to the vertical edges. *(1 mark)*

Q3. Two-point perspective: (a) State the position from which the subject is viewed. *(1 mark)* (b) State where the two vanishing points must sit. *(1 mark)* (c) Explain why **no** face of the subject is drawn true shape. *(2 marks)*

Q4. Eye level: (a) State which face of a box is revealed when the box sits **below** eye level. *(1 mark)* (b) State what is seen of a horizontal surface that lies exactly **at** eye level. *(1 mark)* (c) Explain how a designer decides the **height** of the eye level for a presentation drawing. *(2 marks)*

Q5. Using the two drawings of the CRAG park shelter: (a) State the number of vanishing points in each drawing. *(1 mark)* (b) Identify which drawing keeps a face true shape, and name that face. *(1 mark)* (c) Explain one reason a designer would choose the **two-point** view to present the shelter to a client. *(2 marks)*

Q6. Dividing a receding surface: (a) State why four equal bays are **not** drawn the same width on the paper. *(1 mark)* (b) Describe how the **perspective centre** of a receding wall is found. *(2 marks)* (c) Explain why measuring the drawn wall with a ruler and dividing by four is wrong. *(2 marks)*

Unscaffolded

Q7. The QUARRY studio has a **covered walkway** along one side: a row of **six identical 2400 mm posts at equal 1800 mm spacings** carrying a flat canopy, seen straight down its length. Produce a **one-point** perspective of the walkway at an eye level of 1600 mm. Set out the **first bay**, then use the diagonal construction **in reverse** to carry the remaining posts back, describing each step. *(6 marks)*

Q8. The MERIDIAN information kiosk is 1200 mm wide, 900 mm deep and 2100 mm high, with a screen recessed into one face. Produce a **two-point** perspective of the kiosk seen at its front corner from a standing eye level of 1600 mm, and **explain** which faces of the kiosk will be visible from that eye level. *(6 marks)*

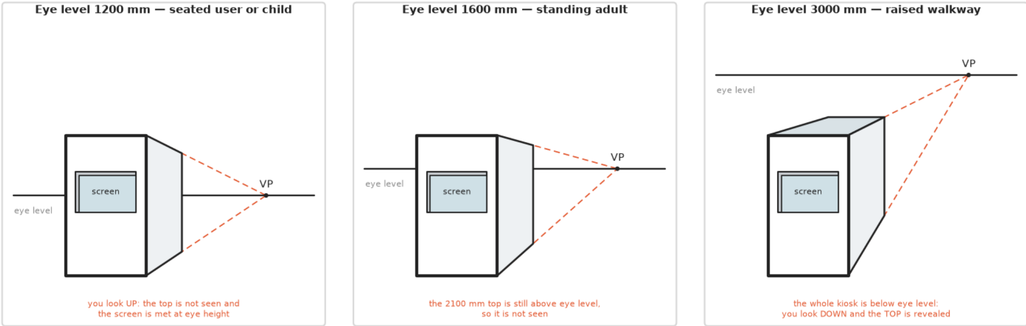
Q9. A student's two-point perspective of the QUARRY studio contains these faults: (i) the left VP has been placed on the horizon but the right VP has been placed 40 mm above it; (ii) the vertical edges lean in toward each other at the top; (iii) the front face has been drawn as a true rectangle to scale; (iv) the window on the left face has its top and bottom edges running to the **right** VP. **Identify and correct** each fault. *(4 marks)*

Q10. Explain why a perspective drawing is never dimensioned, and state which drawing methods would be used instead to **document** the same structure for construction. *(3 marks)*

Q11. Distinguish between one-point and two-point perspective, referring to the number and position of the **vanishing points**, whether any face is **true shape**, and the **viewpoint** each implies. *(4 marks)*

Q12. A student sets both vanishing points just outside the edges of the building itself. **Describe** the effect this has on the drawing and **explain** how it should be corrected. *(3 marks)*

Q13. Explain how a **human figure** is used to communicate scale in a perspective impression, stating where the figure's eyes sit and why this holds true for figures at different distances. *(3 marks)*



MERIDIAN information kiosk — 1200 × 900 × 2100 mm, screen recessed into the front face; the same kiosk at three eye levels

Question 14 refers to the MERIDIAN kiosk study shown above.

Q14. The MERIDIAN kiosk is drawn three times at three different eye levels. **Explain** what each of the three views communicates about the kiosk, and **justify** which one you would select for a presentation to a client deciding whether the kiosk's touchscreen is reachable. *(4 marks)*

Q15. A resolved perspective impression of the SOLSTICE pavilion is drawn in pencil on cartridge paper and then rendered with alcohol markers. **Identify** the **method**, the **media** and the **material**, and **state** whether the drawing is manual or digital. *(3 marks)*

Q16. A designer must present two resolved solutions to the same client: the **CRAG park shelter** (Environments) and the **timber bench** that will be installed inside it (Objects). **State** the three-dimensional drawing method you would use for each and **justify** each choice. *(3 marks)*

Q17. The PLINTH gallery (6000 × 4000 × 3000 mm) is to be presented to its client as a resolved **one-point** perspective impression, showing **six equally spaced artworks** hung along the right-hand wall and a **floor of equal square tiles**. Produce the drawing at an eye level of 1600 mm, applying the appropriate presentation conventions. *(8 marks)*

Answers

Q1. (a) The eye level / horizon line. (b) A point on the eye level where one set of parallel horizontal edges appears to converge. (c) They converge on a vanishing point and diminish. See solutions. **Q2.** (a) One. (b) The face parallel to the picture plane (the front or far face) — it does not recede. (c) They stay vertical. **Q3.** (a) At a corner. (b) Both on the same eye level / horizon line, set well apart. (c) See solutions. **Q4.** (a) The top face. (b) It appears as a single line. (c) By the viewer's eye height in the context — about 1600 mm standing, 1200 mm seated or a child, high for a bird's-eye view. **Q5.** (a) One-point = 1 VP; two-point = 2 VPs. (b) The one-point drawing; the front face. (c) See solutions. **Q6.** (a) Because equal real distances diminish as they recede. (b) Rule both diagonals of the receding rectangle; they cross at the perspective centre. (c) See solutions. **Q7.** Horizon at 1600 → single VP → nearest post drawn true → post tops and bases to the VP → first bay fixed → mid-height line to the VP, then top of post 1 through the mid-height point on post 2 to the base line = foot of post 3, repeated. See solutions. **Q8.** Horizon at 1600 → two VPs wide apart → nearest corner edge true at 2100 → project both faces → far verticals. The kiosk is taller than eye level, so the **top is not seen** — only the two vertical faces. **Q9.** (i) Both VPs on one horizon; (ii) redraw the verticals vertical; (iii) no face is true shape in two-point; (iv) send the window to the **left** VP. See solutions. **Q10.** It converges and diminishes, so it is not to scale; document with orthogonal drawings / plans, elevations and sections plus a paraline (isometric or planometric) drawing. **Q11.** See solutions. **Q12.** Steep convergence and a distorted, wedge-shaped form; move the VPs much further apart, ideally beyond the drawing area. **Q13.** The figure's **eyes** sit on the horizon (the crown of the head a little above it), because every person standing on the same ground plane shares the viewer's eye level. See solutions. **Q14.** See solutions. Select the **1200 mm** (seated user / child) view — reach is decided by the shortest user, and only a view taken from that user's eye height shows the screen as they meet it. **Q15.** Method = perspective drawing (manual); media = pencil and alcohol markers; material = cartridge paper. Manual. **Q16.** Shelter (Environments) = **perspective** — one-point or two-point — as a rendered presentation drawing; bench (Objects/furniture) = **paraline** — isometric or planometric — so it stays measurable. See solutions. **Q17.** See fully-worked solutions.

Fully-worked solutions

Q1. (a) The **eye level**, drawn as the **horizon line**. (b) A **vanishing point** is a point **on the eye level** at which one set of **parallel horizontal edges** appears to converge. (c) As the two edges recede they appear to **converge**, drawing closer together until they meet at their **vanishing point** on the eye level, and the building appears to **diminish** — the far end is drawn smaller than the near end. This is the optical effect a perspective drawing sets out to reproduce, and it is the reason no length on the drawing is to scale *(2 marks: convergence to a VP + diminution).*

Q2. (a) **One** vanishing point. (b) The face that is **parallel to the picture plane** — the front face of an object, or the far wall of an interior — is drawn **true shape and to scale**. It is true because it does not recede from the viewer at all: with no depth to foreshorten, its horizontals stay horizontal, its verticals stay vertical, and a square on that face stays a square *(2 marks: the face named + parallel to the picture plane, so nothing recedes).* (c) The vertical edges **stay vertical** — they do not converge.

Q3. (a) The subject is viewed **at a corner**, so that the corner is nearest the viewer and two faces turn away from it. (b) Both vanishing points sit on the **same eye level (horizon) line**, set **well apart**. (c) Because the subject has been turned, **neither** set of horizontal edges is parallel to the picture plane: one set recedes to the left VP and the other to the right VP. Since every horizontal edge is receding, every face is **foreshortened**, so no face keeps its true shape or its true measurements — only the nearest **vertical corner edge** is a true height *(2 marks: no face parallel to the picture plane + both sets of horizontals recede, so both faces are foreshortened).*

Q4. (a) The **top** face is revealed — the viewer is looking **down** on the box. (b) It appears as a **single line**, because the surface is edge-on to the viewer. (c) The height of the eye level is set by **where the viewer will actually be and who they are**: about **1600 mm** for a standing adult approaching a building, about **1200 mm** for a seated adult or a child, near **0 mm** for a dramatic worm's-eye view of a monument, and well above the subject for a **bird's-eye** view of a whole site layout. The designer chooses the height that gives the stakeholder the information they need — a low eye level to make a structure feel imposing and sheltering, a high one to explain a layout *(2 marks: eye level = the viewer's eye height in context + at least one worked example of the choice).*

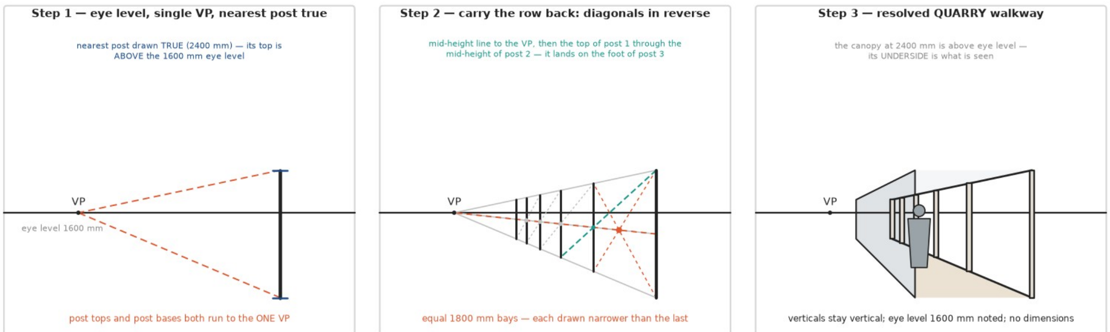
Q5. (a) The **one-point** drawing has **one** VP; the **two-point** drawing has **two**. (b) The **one-point** drawing; the **front face** of the shelter is true shape. (c) A **two-point** view meets the shelter at a **corner**, so **two faces and the whole form** are seen at once. The client can therefore judge the shelter's **mass, roof profile and how it sits in its site**, rather than only its frontage, and the asymmetrical corner view looks more natural and more like the experience of walking up to it *(2 marks: two faces / whole form read at once + why that matters to the client).*

Q6. (a) Because a perspective drawing **diminishes** with distance: equal real distances are drawn **progressively narrower** as they recede, so the near bay is the widest and the far bay the narrowest. (b) Rule **both diagonals** of the receding rectangle (corner to opposite corner). They cross at the surface's **perspective centre**; a **vertical** ruled through that crossing divides the surface into two correct halves, and the construction is repeated inside each half for quarters *(2 marks: both diagonals + the crossing is the perspective centre, halved by a vertical).* (c) Measuring the drawn wall and dividing by four gives **four equal widths on the paper**, which would mean four bays of **increasing real size** as they recede — the opposite of what is being drawn. The ruler measures the sheet, but the sheet is not to scale in perspective; only a construction that itself obeys the convergence, such as the diagonal method, divides a receding surface correctly *(2 marks: equal paper widths = unequal real bays + a perspective drawing is not to scale).*

Q7. *(Model.)* Rule the **eye level** across the sheet at the scaled height of **1600 mm** and mark a **single vanishing point** on it, placed to one side so that the walkway runs away into the sheet. Draw the **nearest post** as the **true height line** — 2400 mm to scale — standing on the ground line; it is the one measurement taken directly, and because 2400 mm is greater than the 1600 mm eye level its top sits **above** the horizon, so the **underside** of the canopy is what the viewer sees. Rule from the **top** and from the **base** of that post **to the VP**: these two converging lines carry the tops and the feet of every post in the row, and the near edge of the canopy runs to the same point.

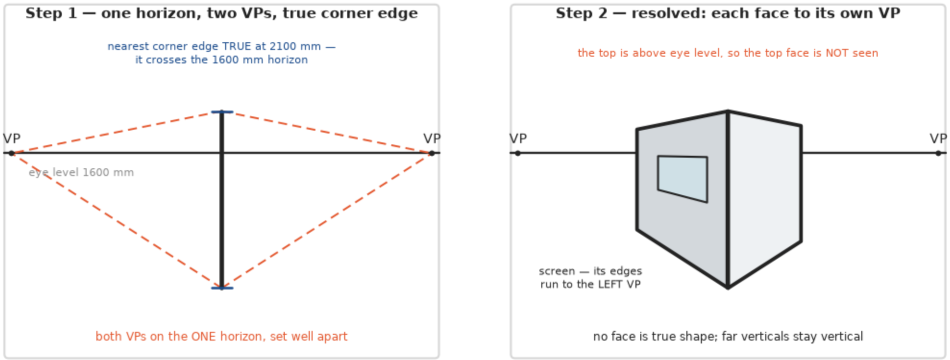
Fix the **first bay** by judging the 1800 mm spacing and dropping a **vertical** for the second post between the two converging lines — the depth cannot be measured on the sheet, and verticals never converge. Then extend the row by the **diagonal construction in reverse**: rule the **mid-height line** of that first bay back to the **VP** (it passes through the crossing of the bay's two diagonals); rule a line from the **top of post 1 through the point where the mid-height line cuts post 2** and carry it down to the **base line** — where it lands is the **foot of post 3**. Repeat from the top of post 2 through the mid-height point on post 3 to place post 4, and again for posts 5 and 6.

Check the result: every post is **truly vertical**, each bay is drawn **narrower** than the one before, and the whole row converges on the single VP. Line in the visible outline firmly over thin, light setting-out lines, note the **eye level 1600 mm** and title the drawing; add **no dimensions**, because a perspective is not to scale *(6 marks: horizon and single VP at 1600 mm; nearest post as the true height line with its top above the horizon so the canopy underside is seen; post tops and bases ruled to the one VP; the first bay fixed by judgement with a vertical; the reverse-diagonal extension correctly constructed; posts kept vertical and visibly diminishing, eye level noted and no dimensioning).*



QUARRY studio covered walkway — one-point perspective, six equal bays carried back by the reverse diagonal construction

Q8. Rule the **eye level** at the scaled height of **1600 mm** and mark **two vanishing points** on that one line, set **as far apart as the sheet allows**. Draw the **nearest vertical corner edge** of the kiosk at its true scaled height of **2100 mm** — this is the **true height line**. Because 2100 mm is **greater** than the 1600 mm eye level, this edge **crosses the horizon**. From the **top** and the **bottom** of the edge, rule lines to the **left VP** and to the **right VP**; the base edges will rise toward the eye level and the top edges will fall toward it. Set the 1200 mm and 900 mm faces along those lines and close each face with a **vertical** at its far end. Line in the two faces and place the **recessed screen** on one of them, with its horizontal edges running to **that face's own VP** and its side edges vertical. Visible faces: only the **two vertical faces** that meet at the near corner. The kiosk's **top is above eye level**, so the top face is **not** seen — the viewer looks slightly **up** at it; nor is the underside, which rests on the ground *(6 marks: one horizon with two well-spaced VPs; corner edge true at 2100 and crossing the horizon; both faces projected to their own VPs; far verticals kept vertical; screen following the correct VP; the two vertical faces identified with the top correctly excluded).*



MERIDIAN information kiosk — two-point corner view at a 1600 mm eye level (1200 × 900 × 2100 mm)

Q9. (i) A perspective drawing has **one eye level**, and **every** vanishing point must sit **on it**. Move the right VP down onto the horizon so that both VPs are on the same line; otherwise the two faces belong to two different viewers and the building twists. **(ii)** In two-point perspective the **verticals do not converge** — only the horizontal edges do. Redraw every vertical edge **truly vertical and parallel** to the others; leaning verticals produce an accidental three-point perspective and the building appears to topple. **(iii)** In a **two-point** drawing **no face is true shape**, because neither set of horizontals is parallel to the picture plane. Redraw the front face as a **foreshortened** plane whose top and bottom edges run to a VP (a true rectangular face belongs to a **one-point** drawing). **(iv)** Every opening obeys the vanishing point of the **face it sits on**. The window is on the **left** face, so its top and bottom edges must run to the **left** VP, with its side edges vertical *(1 mark each: fault identified and corrected).*

Q10. A perspective drawing deliberately **converges** parallel edges and **diminishes** what is far away, so no two lengths on the sheet share a constant ratio with the real object: the drawing is **not to scale**, and a dimension written on it would be meaningless or misleading. Its role is to communicate the **look and experience** of the design to a stakeholder — it is a **presentation** drawing. To **document** the same structure for construction a designer uses **two-dimensional** drawings — third-angle orthogonal projections, or **plans, elevations and sections** — together with a **paraline (isometric or planometric)** drawing. These are parallel projections drawn to a stated **scale**, so they can carry **dimensions in millimetres**, symbols and line-type conventions *(3 marks: not to scale because it converges and diminishes + its role is presentation + the named documentation methods that are dimensioned).*

Q11. In **one-point** perspective there is a **single vanishing point** on the eye level, and the subject is viewed **square-on**, so one face is **parallel to the picture plane** and is drawn **true shape and to scale**; only the depth edges converge, and they all run to that one point. In **two-point** perspective there are **two vanishing points**, both on the **same** eye level and set well apart, and the subject is viewed **at a corner**; because neither set of horizontals is parallel to the picture plane, **no face is true shape** and both faces are foreshortened. The viewpoints they imply differ accordingly: one-point is formal, symmetrical and looks **into** a space, which suits interiors, corridors and streetscapes; two-point is asymmetrical and more natural, showing **two faces and the overall form**, which suits buildings and free-standing structures. What they share is that both are **central projections** built on **one horizon**, with **verticals kept vertical** and neither drawing measurable *(4 marks: VP number and position in each + true shape in each + viewpoint/use in each + a congruent two-sided treatment).*

Q12. Placing the vanishing points close to the subject makes every horizontal edge **converge steeply**, so the two faces fall away sharply from the near corner and the structure is drawn as a narrow, distorted **wedge**; the near corner appears exaggeratedly sharp, the proportions read as false, and a client cannot judge the real form. The cause is that the subject has been pushed outside a comfortable **cone of vision**. The correction is to move both VPs **much further apart** on the same horizon — ideally **beyond the edges of the drawing area**, with the construction lines extended out to them — so that the convergence is gentle and the form reads naturally *(3 marks: steep convergence described + the distorted/wedge-shaped result + move the VPs far apart on the one horizon).*

Q13. A **human figure** gives the viewer a familiar, known size to measure the design against, so a stakeholder can judge how tall a wall is, whether a doorway is generous and how much space a person has to move — information a perspective drawing cannot supply by dimensioning. The figure is drawn with their **eyes on the horizon line**, the crown of the head sitting a little **above** it. This holds for **every** figure standing on the same level ground, however far away they are: the horizon *is* the viewer's eye level, and any other person of similar height standing on that ground plane has their eyes at that same height, so their eyes always fall on the horizon. Distant figures are therefore drawn **smaller**, with their **feet higher up** toward the horizon, but their **eyes still on it** — which is also the quickest way to check that a figure has been placed and sized correctly *(3 marks: what the figure contributes + eyes on the horizon + why it holds at any distance).*

Q14. In the **1200 mm** view the horizon crosses the kiosk at about half its height and cuts through the screen itself, so the viewer looks **up** at everything above that line: the 2100 mm top is well above the eye level and is **not seen**, the kiosk reads as tall, and the screen is shown exactly as a **seated user or a child** meets it. In the **1600 mm** view the horizon crosses the kiosk just above the screen: the **top is still not seen** — 2100 mm is higher than the eye level — and the screen is met face-to-face and very slightly from above, as a **standing adult** meets it. In the **3000 mm** view the horizon sits above the kiosk, so the whole form is **below eye level**: the viewer looks **down**, the **top** face is revealed and the drawing explains the kiosk's **footprint** and how it sits in the plaza, but it shows the screen at a steep, distorted angle.

For a client deciding whether the **touchscreen is reachable**, I would select the **1200 mm** view. Reach is decided by the **most restricted user** — a child or a seated wheelchair user — and only a view taken from that user's actual eye height shows the screen at the height and angle at which it will really be met, so the client can judge reach and legibility rather than admire the form. The 3000 mm view would be the wrong choice: it answers a question about site planning, not about use *(4 marks: what each of the three views reveals and communicates + a justified selection tied to what the client must decide).*

Q15. The **method** is **perspective drawing** — a three-dimensional drawing method, here used to produce a presentation impression. The **media** are the **pencil** used to construct and line in the drawing and the **alcohol markers** used to render it. The **material** is the **cartridge paper** the drawing is made on. The drawing is **manual**, not digital: it has been constructed and rendered by hand with physical media on a physical substrate. *(Note the distinction the examination expects: the drawing method is the method; software such as a vector or 3D application would be **media**, and choosing it would make the drawing digital.) (3 marks: method, media and material each correctly assigned + manual stated.)*

Q16. For the **CRAG park shelter** I would use a **perspective** drawing — **two-point** if the client needs to judge the form on its site, **one-point** if the view along the space matters more. The shelter is an **environment/structure**: the client is buying the **experience** of standing in and approaching it, and only a perspective, with its convergence and diminution, shows how the space will actually be met. It is rendered and titled with its eye level and carries **no dimensions**.

For the **timber bench** I would use a **paraline** drawing — **isometric** (or planometric). The bench is an **object/furniture** item that has to be **made**: a paraline drawing is a parallel projection, so it stays **to scale** and can carry **dimensions in millimetres** and line-type conventions, which a perspective can never do. Matching the method to the field of practice this way is what the examination asks for — the drawing method is the **method**; the pencil, marker or software used is the **media** *(3 marks: perspective named for the shelter + paraline/isometric named for the bench + a justification tied to what each field and each stakeholder needs).*

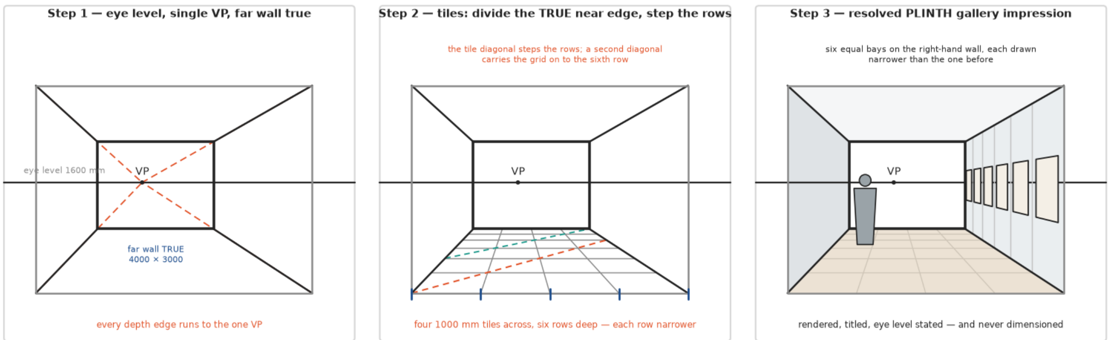
Q17. *(Model.)* Rule the **eye level** across the sheet at the scaled height of **1600 mm** and mark a **single vanishing point** on it. Because a gallery is entered and read along its length, a broadly central VP gives the calm, symmetrical view the client is buying.

The shell. Draw the **far wall** as a **true rectangle** to scale — **4000 mm wide by 3000 mm high** — with true horizontals and verticals, since it is the face parallel to the picture plane. Draw the **near frame** around it and rule a line from each of its **four corners to the VP**; line in the floor, ceiling and the two side walls between the frame and the far wall, and fix the **6000 mm** depth along those converging lines.

The tiled floor. The tiles are equal **1000 mm squares** — four across the 4000 mm width and six along the 6000 mm depth — so they must **diminish** as they recede and cannot be measured off the paper. Divide the **near floor edge** into the four tile widths: it lies on the picture plane, so it *is* true and may be measured with a ruler. Rule each division back to the **VP** to give the joints running away from the viewer. To fix the rows, rule the **diagonal of the first tile** and extend it: because every tile is a square, that one diagonal runs through the far corner of each tile it meets, so wherever it crosses a receding joint it marks the next **cross joint**, and a horizontal ruled through that crossing completes the row. All the tile diagonals run to one further point on the horizon, so where the first diagonal reaches the side of the floor a second is ruled to that same point and the grid carries on to the sixth row, each row correctly narrower than the one in front of it.

The six artworks. These hang on the **right-hand wall**, which is a receding surface, so their equal 1000 mm spacings must diminish too. Halving with diagonals will not give six bays — repeated halving can only produce two, four or eight — so the divisions are taken from a **true** line instead. The floor grid has already divided the 6000 mm depth into six equal parts, so carry each of those cross joints **up the wall as a vertical**: verticals stay vertical, the joints already obey the convergence, and the wall is divided into the six diminishing bays that represent equal real spacings. Hang one work in each bay, with the **top and bottom edges of every frame running to the VP** and the frame's own edges **vertical**. Hung at the gallery's usual height — centres at about **1500 mm** — each frame is **crossed** by the 1600 mm horizon, so neither its top nor its underside is seen; the **ceiling**, above eye level, shows its **underside**, while the **floor**, below eye level, is seen from above — which is why the tile grid reads at all.

Resolution and conventions. Line in the visible outline firmly over thin, light setting-out lines; **render** the walls, floor and works to describe light, shade, shadow and material (5C); add a **figure for scale** standing on the floor with their **eyes on the horizon**; note the **eye level (1600 mm)** and title the drawing *PLINTH gallery — one-point perspective impression*. Add **no dimensions and no scale**: a perspective converges and diminishes, so it is a **presentation** drawing, and the gallery would be documented separately with plans, elevations and a paraline drawing *(8 marks: eye level and single VP set up; far wall true to scale; all depth edges to the one VP; tiles set out by dividing the true near edge and stepping the rows with the tile diagonal, visibly diminishing; the six artwork bays carried up from those true divisions and foreshortened to the VP; ceiling and floor correctly revealed about the 1600 mm eye level; rendering, figure for scale and line quality; eye level stated, titled, and no dimensions).*



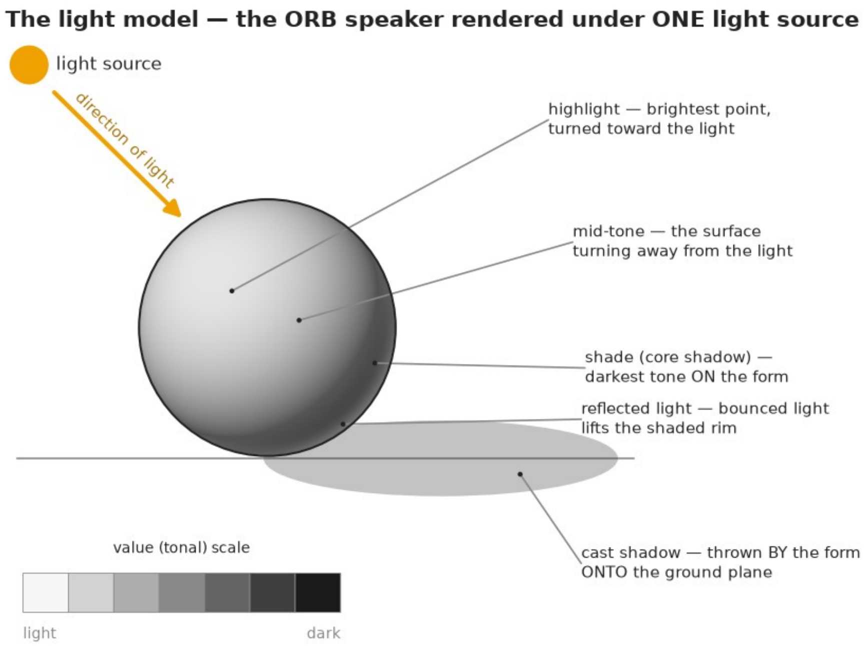
PLINTH gallery — resolved one-point perspective impression: tiled floor and six equally spaced works on the right-hand wall

Theory

Rendering is the application of **tone**, colour and **texture** to a drawing so that a flat, two-dimensional drawing reads as a three-dimensional **form** made of a particular **material**. The Study Design names the skill directly: *rendering techniques used to simulate surfaces, materials, texture and form, and depict the direction of light, shade and shadow.* Development drawings *might be rendered to suggest surface textures, materials and the direction of light, shade and shadow*, and **presentation drawings** include *rendered impressions of buildings, environments or objects*.

Two of the eight **design elements** do the work. **Tone** is the lightness or darkness of a surface; **texture** is the surface quality of a form — how it would feel or appear to feel. Rendering is therefore not "colouring in": it is a controlled use of two design elements to carry information about form, surface and material to a stakeholder.

Fix the light source first. Before any tone is applied you decide **where the light comes from** — conventionally from the upper left, one source only. Every tone in the drawing is then a consequence of that single decision. This is what the Study Design means by *depict the direction of light*.



The rendered *ORB* portable speaker above shows the whole light model on one curved form:

- **highlight** — the brightest point, where the surface turns directly toward the light;
- **light tone** and **mid-tone** — the surface progressively turning away from the light;
- **shade** (the **core shadow**) — the darkest band of tone **on** the form, on the side away from the light;
- **reflected light** — light bounced back off the ground plane, which slightly lifts the shaded rim and stops the form looking like a flat cut-out;
- **cast shadow** — the dark area thrown **by** the form **onto** the ground plane or an adjacent surface, falling away from the light source.

Shade and shadow are not the same thing. Shade is on the object; a **cast shadow** is thrown by the object onto something else. The Study Design lists both, and a response that uses one word for both loses the distinction. The cast shadow also does a second job: it **anchors** the object to the ground plane. Without one, an object appears to float.

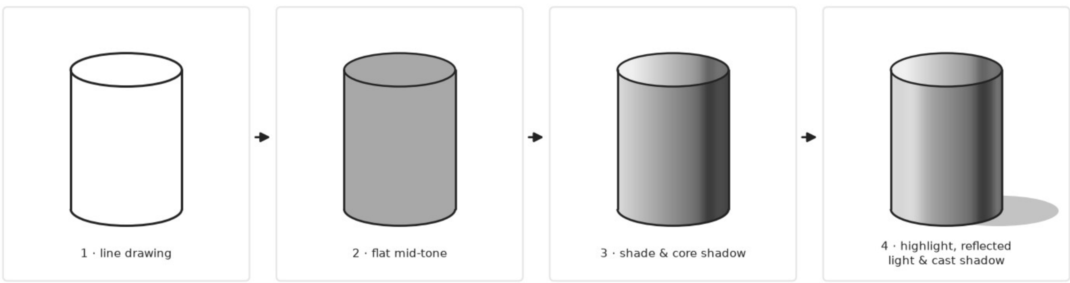
Tone reveals form. How tone is distributed tells the viewer what kind of surface it is:

- **Curved surfaces** (sphere, cylinder, cone, a tapered pot) take a **graduated** tone — a continuous gradation from highlight through mid-tone into the core shadow, with no hard edges.
- **Flat planes** (a cube, a faceted or extruded form) take **one flat tone per plane**, with a crisp change of tone at each edge. The *difference* in tone between two planes is what tells the eye they meet at an angle.

Use the whole value scale. A **value (tonal) scale** runs from near-white to near-black. A drawing rendered entirely in mid-grey reads flat, however carefully it is shaded, because there is no tonal **contrast**. Keep a light area, a mid-tone and a dark area in every rendered form.

Building tone in stages. Tone is built up, not put down in one go.

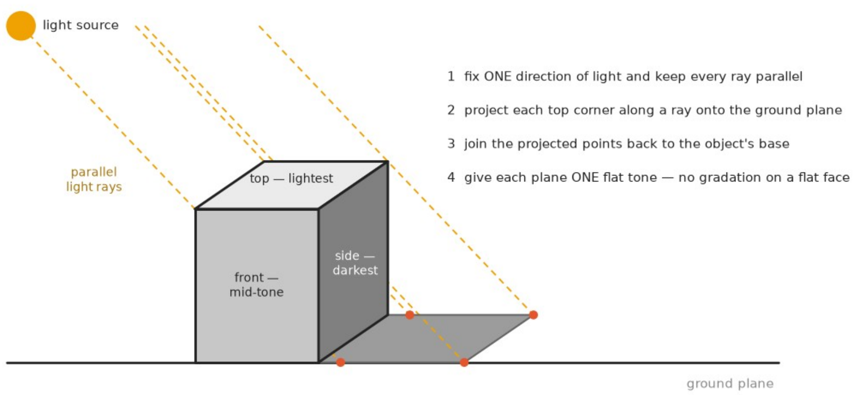
Building tone in stages on one form (a cylinder), light from the upper left



1. **Line drawing** — the accurate outline (and any construction) only.
2. **Flat mid-tone** — a single, even mid-tone laid over the whole form, so the form separates from the page and there is something to work light and dark *against*.
3. **Shade and core shadow** — build the tone up on the side away from the light, deepest in the core shadow band just inside the shaded contour.
4. **Highlight, reflected light and cast shadow** — leave or lift the highlight on the lit side, lift the shaded rim slightly for reflected light, and lay the cast shadow on the ground plane.

Constructing a cast shadow. A cast shadow is not guessed. Fix one direction of light and keep every light ray parallel to it; project each top corner (or, for a curved form, points on the silhouette) along a ray onto the ground plane; then join the projected points back to the object's base.

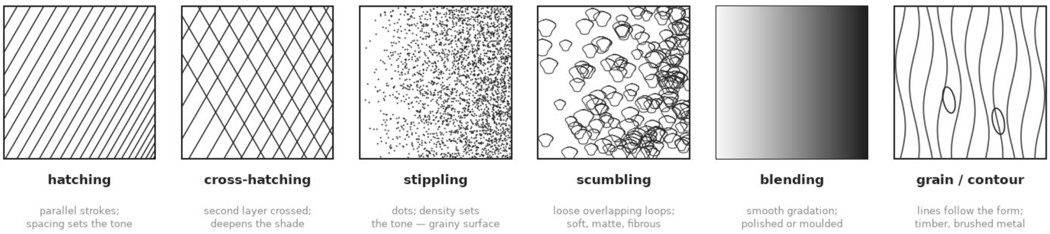
FACET desk organiser — flat tone per plane + constructing the cast shadow



The *FACET* desk organiser above also demonstrates the flat-plane rule: the top plane faces the light and is lightest, the front plane is a mid-tone, the side turned away is darkest — **one flat tone each**, with no gradation across a flat face.

Rendering techniques — the marks that make the tone. Tone and texture are produced by the *marks* you make. The technique chosen carries information about the surface, so the choice is a design decision.

Rendering techniques — the marks that indicate texture and build tone



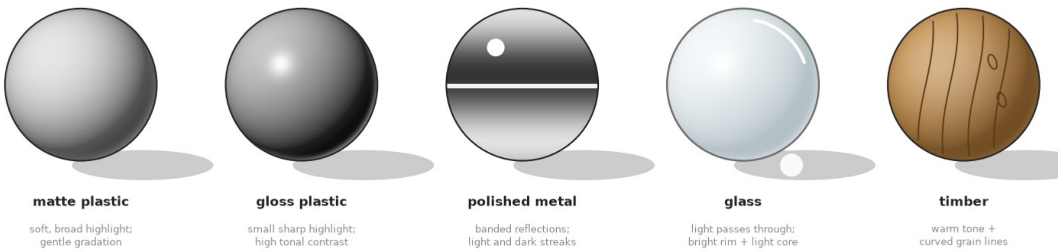
the density of the marks builds the tone in hatching, cross-hatching, stippling and scumbling; blending gradates the tone directly, and grain and contour lines describe the direction of the surface

Hatching and **cross-hatching** build tone with parallel and crossed strokes (the closer the strokes, the darker the tone); **stippling** builds tone with dots and suggests a grainy, porous surface; **scumbling** uses loose overlapping loops and suits soft, matte or fibrous surfaces; **blending** produces smooth continuous gradation and suits polished or moulded surfaces; **grain and contour lines** follow the curvature of the form and read as timber, brushed metal or a ribbed surface. Marks that follow the form describe its curvature; marks that ignore it flatten the drawing.

Texture may be **actual** (a real, physical surface quality that could be felt — the tooth of the paper, an embossed card) or **implied** (also called visual texture — a two-dimensional simulation of a surface, which is what a rendered drawing produces).

Indicating materials. A designer must be able to make the *same* form read as different materials, because material choice is a design decision that stakeholders need to see. The cues are tonal.

One form, five materials — the ORB sphere and the tonal cues that tell them apart



- **Matte** surfaces (unglazed ceramic, rubber, powder-coated steel, MDF, concrete): a **soft, broad** highlight, gentle gradation and a fairly narrow tonal range; stippling or scumbling suits the surface.
- **Gloss** surfaces (polished plastic, lacquer, glazed ceramic): a **small, sharp** highlight, a wide tonal range and a bright reflected rim on the shaded side.
- **Polished metal** (chrome, stainless steel): **banded** reflections of the surroundings — hard-edged light and dark streaks, often near-white directly beside near-black.
- **Glass**: light **passes through** it — a light core rather than a dark one, a bright rim, sharp edge glints and a bright spot inside the cast shadow.
- **Timber**: a warm tone plus **grain lines that curve with the form**, with occasional knots.
- **Textile**: low contrast, no hard highlight, a soft scumbled or stippled surface and a broken contour.

Choosing the media and materials to render with. The Study Design asks you to *select and use appropriate manual and/or digital methods, media and materials to represent and render forms.* Keep the three terms straight: **drawing, illustration and rendering are methods**; the **media** are what you render with — manually, graphite and coloured pencil, marker, ink, pastel or gouache; digitally, a vector application, a raster painting application or three-dimensional modelling and rendering software; and the **materials** are the surfaces you render on — cartridge, marker or toned paper, card, or a digital interface. Coloured pencil and marker suit fast, warm concept renders; graphite gives the widest tonal range for form; digital media allow gradients, transparency and quick material variants, which is why designers use them for presentation drawings.

Where rendering belongs in the process. A **development** drawing may be rendered so a concept can be tested and critiqued. A **presentation** drawing is rendered so the resolved concept can be judged by the client. Rendering is one of the main ways a resolved drawing becomes genuinely **more resolved** than the concept it came from, and it is how a designer unifies the aesthetic qualities of a solution.

> **Watch-out — shade is not shadow. Shade** is the darker tone *on* the form, on the side away from the light. A **cast shadow** is thrown *by* the form *onto* another surface. Use both terms, correctly, and remember the cast shadow anchors the object to the ground plane.
>
> **Watch-out — one light source, one direction.** Every highlight must sit on the same side of every form, and every cast shadow must fall on the opposite side. Highlights on both sides of a form, or shadows falling in two directions, destroy the read of three-dimensional form.
>
> **Watch-out — gradation on curves, flat tone on planes.** Graduating the tone across a flat face makes it look bowed; flat-filling a curved surface makes it look like a cut-out silhouette. Match the tonal treatment to the geometry.
>
> **Watch-out — keep a full tonal range.** Rendering everything in one mid-grey, or pressing so hard that the whole form fills in, removes the **contrast** that describes the form. Preserve a highlight, a mid-tone and a dark.
>
> **Watch-out — rendering is not colouring in.** Tone must depict the **direction of light** and indicate a **material**. Flat colour inside an outline is neither, and earns nothing for rendering.
>
> **Watch-out — method, media and material.** A software application (for example Adobe Illustrator or Photoshop) is **media**, not a method; the method is *rendering* (or drawing/illustration), and the material is the paper, card or digital interface. Distinguish **digital** from **manual**, and judge what is visible in the **final solution**, not what happened during ideation.

Worked examples

Example 1 — scaffolded

Describe the stages you would follow to render the ORB portable speaker — a matte moulded-plastic sphere — so that it reads as a three-dimensional form lit from the upper left. (4 marks)

Working	Comment
Stage 1 — fix the light. Mark one light source at the upper left and note its direction; the highlight will sit at the upper left and every dark tone will build toward the lower right.	The Study Design requires you to *depict the direction of light*. Deciding this **first** is what keeps the whole render consistent.
Stage 2 — flat mid-tone. Lay an even mid-tone over the whole circle, keeping the outline crisp.	Working light and dark *against* an established mid-tone is faster and more controlled than trying to shade straight from white.
Stage 3 — shade and core shadow. Build the tone up toward the lower right, darkest in a curved **core shadow** band just inside the shaded contour, blending smoothly so no hard edges appear.	A sphere is curved, so the tone must be **graduated**. Naming the core shadow shows you are rendering **shade** (tone on the form), not a cast shadow.
Stage 4 — highlight, reflected light, cast shadow. Leave a **soft, broad** highlight at the upper left, lift the extreme lower-right rim slightly for **reflected light**, then lay a **cast shadow** on the ground plane running to the lower right.	The soft, broad highlight is the cue for a **matte** material. The cast shadow anchors the sphere to the ground plane so it does not float.

Example 2 — scaffolded

The FACET desk organiser is a rectangular prism standing on a desk, lit from the upper left. Explain how you would allocate tone to its planes, and describe how you would construct its cast shadow. (4 marks)

Working	Comment
Tone by plane. Give the top plane the **lightest** flat tone (it faces the light), the front plane a **mid-tone**, and the side turned away from the light the **darkest** tone.	Flat planes take **one flat tone each**. The tonal step at each edge is what tells the eye the planes meet at an angle.
No gradation. Keep each tone even from edge to edge, with a crisp change at every arris.	Graduating tone across a flat face makes it read as bowed or curved — a common fault.
Construct the shadow. Fix one direction of light and keep all rays **parallel**; project each top corner along a ray until it meets the ground plane, and mark those points.	A cast shadow is constructed, not guessed. Parallel rays keep the shadow consistent with the single light source.
Close the shadow. Join the projected points to one another and back to the base of the organiser, then fill the shape with a tone **darker than the mid-tone plane**.	The cast shadow is a shape on the ground plane, not a smudge; making it darker than the lit planes keeps the tonal logic readable.

Example 3 — unscaffolded

A designer must show the same ORB speaker body in two finishes: a matte moulded plastic and a high-gloss plastic. Explain how the tonal rendering would differ. (4 marks)

The form and the direction of light stay the same, so the difference is carried entirely by **tone**. In the **matte** version the highlight is **soft and broad** and fades gradually into the mid-tone, the gradation from light to **shade** is gentle, and the overall tonal range is narrow, because a matte surface scatters light in all directions. In the **gloss** version the highlight is **small, hard-edged and near-white**, sitting as a distinct spot on the lit side; the tonal range is much wider, with the core shadow taken close to black; and a bright **reflected** streak appears along the shaded rim where the polished surface picks up bounced light. The cue a viewer reads is therefore the size and sharpness of the highlight plus the amount of tonal **contrast** — a broad, soft highlight and low contrast says matte, a small, sharp highlight and high contrast says gloss *(4 marks: highlight size/sharpness, tonal range/contrast, reflected rim, both materials treated).*

Example 4 — unscaffolded

Select the methods, media and materials you would use to render a presentation drawing of the ORB speaker for a client meeting, and justify your selection. (4 marks)

The **method** is **rendering** applied to a presentation drawing (a rendered impression of the object). For a client presentation I would render **digitally**, using a vector application to lay flat base tones and a raster painting application for graduated tone and highlights (both are **media**), on a **digital interface** as the material, with the drawing exported to paper for the meeting. Digital media are justified because gradients and transparency give smooth, controlled gradation on the curved body, and because material variants — matte, gloss, aluminium — can be produced quickly from one base drawing so the client can compare finishes in the meeting. A **manual** alternative would be graphite and coloured pencil with marker on cartridge or toned paper: slower and harder to revise, but it gives a warm, hand-resolved quality and the widest tonal range for describing form. Either is acceptable provided the selection is justified against the audience and purpose — but note that the application itself is **media**, not a method *(4 marks: method named correctly, media and material named, digital/manual distinguished, justification tied to purpose/audience).*

Practice questions

Scaffolded

Q1. Using the rendered ORB speaker: (a) State the direction the light is coming from. *(1 mark)* (b) Name the zone that is the darkest tone **on** the form. *(1 mark)* (c) Explain why the cast shadow falls to the lower right rather than the lower left. *(2 marks)*

Q2. Using the four-stage tonal build of the cylinder: (a) State what is added at stage 2. *(1 mark)* (b) Explain why a flat mid-tone is laid over the whole form before the dark tones are built up. *(2 marks)* (c) State what the cast shadow added at stage 4 contributes to the drawing. *(1 mark)*

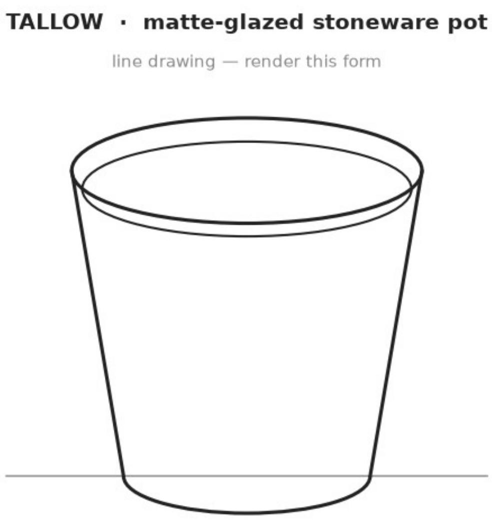
Q3. Using the FACET desk organiser: (a) Name the plane given the lightest tone and explain why. *(2 marks)* (b) Explain why each plane is given one flat tone rather than a graduated tone. *(2 marks)*

Q4. Using the five rendered materials: (a) Name the material indicated by banded, hard-edged light and dark reflections. *(1 mark)* (b) State **two** tonal cues that indicate glass. *(2 marks)* (c) Name the rendering technique used to indicate timber. *(1 mark)*

Q5. Using the rendering-techniques figure: (a) Name the technique that builds tone from dots. *(1 mark)* (b) Name the technique you would choose for a smooth, moulded plastic surface. *(1 mark)* (c) Distinguish between **actual** texture and **implied** texture. *(2 marks)*

Q6. Tone and **texture** are both design elements. (a) Define tone. *(1 mark)* (b) Define texture. *(1 mark)* (c) Explain how rendering uses both elements together to communicate what an object is made of. *(2 marks)*

Unscaffolded



Questions 7–18 refer to the TALLOW matte-glazed stoneware pot shown above, unless a question states otherwise. TALLOW is a tapered, open vessel with a rolled rim, standing on a bench top.

Q7. Render the TALLOW pot in tone so that it reads as a matte-glazed stoneware vessel lit from the upper left. Describe the stages of your render and name the tonal zones you create. *(6 marks)*

Q8. Distinguish between **shade** and **shadow**, with reference to your rendered TALLOW pot. *(3 marks)*

Q9. Explain why a single, consistent light source must be fixed before any tone is applied, and describe what goes wrong in a render when it is not. *(3 marks)*

Q10. The TALLOW pot is to be shown in a second finish: polished stainless steel. Describe **three** changes you would make to the tonal treatment, and state what stays **unchanged**. *(4 marks)*

Q11. The pot stands on a bench top with the light above and to the left. Describe how you would construct its cast shadow, and explain how the shadow of a curved form differs from the shadow of a rectangular prism. *(4 marks)*

Q12. The TALLOW range also includes a square-sided planter of the same height. Explain how the tonal treatment of the square-sided planter differs from that of the round pot. *(3 marks)*

Q13. Select **two** rendering techniques and explain what surface quality each would indicate if used on the TALLOW pot. *(4 marks)*

Q14. A designer renders a presentation drawing of the TALLOW pot digitally. Identify the **method**, the **media** and the **material**, and distinguish digital from manual media in this drawing. *(4 marks)*

Q15. Explain how rendering helps a resolved presentation drawing of the TALLOW pot communicate more to the client than the development drawing it came from. *(4 marks)*

Q16. TALLOW is to be shown in a retail display. Explain how rendering a two-point perspective drawing of the display would help communicate materials and light to the client. *(3 marks)*

Q17. A student's render of the TALLOW pot outlines the whole pot in heavy line, fills it with one flat mid-grey, places a highlight on both the left and the right contour, and includes no cast shadow. Identify **three** faults and state the correction for each. *(6 marks)*

Q18. The TALLOW pot is to be presented sitting on a woven textile mat against a concrete wall. Describe how you would render the textile and the concrete so that the two materials are clearly distinguishable from the glazed pot. *(4 marks)*

Answers

Q1. (a) From the upper left. (b) The shade / core shadow. (c) See solutions (it falls away from the light source). **Q2.** (a) An even flat mid-tone over the whole form. (b) See solutions. (c) It anchors the form to the ground plane. **Q3.** (a) The top plane — it faces the light source. (b) See solutions (flat planes take one even tone; gradation makes a flat face look bowed). **Q4.** (a) Polished metal. (b) Any two of: light passes through (a light core, not a dark one); a bright rim/edge glints; a bright spot inside the cast shadow. (c) Grain/contour lines that curve with the form. **Q5.** (a) Stippling. (b) Blending (continuous gradation). (c) Actual = a real surface quality that can be felt; implied/visual = a two-dimensional simulation of a surface. **Q6.** (a) The lightness or darkness of a surface. (b) The surface quality of a form — how it feels or appears to feel. (c) See solutions. **Q7.** Fix the light (upper left) → flat mid-tone → shade and core shadow on the right → highlight, reflected light, dark interior, cast shadow. Soft, broad highlight = matte glaze. See solutions. **Q8.** Shade = the darker tone ON the form; shadow (cast shadow) = thrown BY the form ONTO the bench. See solutions. **Q9.** All tone follows from one direction of light; otherwise highlights and shadows contradict each other and the form flattens. See solutions. **Q10.** Small, hard highlight; banded light/dark reflections; much wider tonal range (near-white beside near-black). Unchanged: the form, the light direction and the cast shadow. See solutions. **Q11.** Project points on the silhouette along parallel rays to the bench top and join them; a curved form gives a curved (elliptical) shadow edge, a prism gives straight edges from its corners. See solutions. **Q12.** Curved pot = graduated tone; square planter = one flat tone per plane with a crisp tonal step at each edge. See solutions. **Q13.** Two of: blending (smooth glaze), stippling (grainy unglazed base), hatching/cross-hatching (tone with a drawn surface), scumbling (soft matte), grain/contour lines (ribbed or thrown surface). See solutions. **Q14.** Method = rendering (of a presentation drawing); media = the vector/raster application; material = the digital interface (or the paper it is output on). See solutions. **Q15.** It shows materiality, form and light — resolving the concept for client judgement rather than for the designer's own exploration. See solutions. **Q16.** Rendered tone shows the direction of light and the materials of the display in situ, so the client can judge the atmosphere and finishes. See solutions. **Q17.** Faults: single flat mid-tone (no tonal range); two highlights (two light sources); no cast shadow (the pot floats). See solutions. **Q18.** Textile = low contrast, scumbled/stippled surface, broken contour, no hard highlight; concrete = flat matte tone with fine stipple; glazed pot keeps the smoothest gradation and the strongest highlight; all three lit from the same upper-left source. See solutions.

Fully-worked solutions

Q1. (a) From the **upper left**. (b) The **shade**, also called the **core shadow**. (c) A cast shadow is the area from which the form has blocked the light, so it must fall on the side **away from the light source**. With the light at the upper left, the light rays travel down to the right past the sphere, so the unlit ground lies to the lower right *(2 marks: shadow falls away from the light + the form blocks the rays).*

Q2. (a) A single, even **flat mid-tone** laid over the whole form. (b) The mid-tone separates the form from the white page and establishes a middle value that the light and dark tones can then be worked *against*, so the tonal range is judged by comparison rather than guessed; it is also faster and more even than trying to shade straight out of white *(2 marks).* (c) It **anchors** the form to the ground plane, so the object sits on a surface instead of floating.

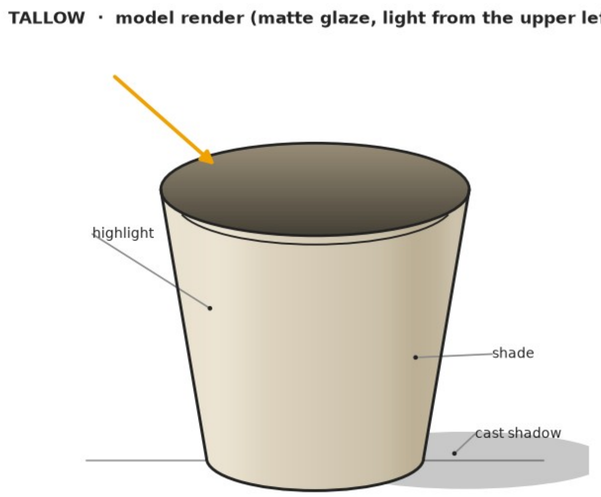
Q3. (a) The **top** plane, because it is turned toward the light source at the upper left and therefore receives the most light *(2 marks: plane named + reason).* (b) A flat plane receives light evenly across its whole surface, so it takes **one flat tone**; the crisp tonal step between adjacent planes is exactly what tells the viewer the planes meet at an angle. Graduating the tone across a flat face makes the plane look bowed or curved, contradicting the geometry of the object *(2 marks).*

Q4. (a) **Polished metal** (chrome or stainless steel). (b) Any two of: light **passes through** the form, so the core is light rather than dark; a **bright rim** and sharp edge glints; a **bright spot inside the cast shadow** where light has been transmitted *(2 marks).* (c) **Grain (contour) lines** that curve with the form.

Q5. (a) **Stippling**. (b) **Blending** — smooth continuous gradation. (c) **Actual** texture is a real, physical surface quality that could be felt, such as the tooth of the paper or an embossed card; **implied** (visual) texture is a two-dimensional simulation of a surface, which is what a rendered drawing produces — the drawing only *looks* rough or polished *(2 marks: both defined, the distinction clear).*

Q6. (a) **Tone** is the lightness or darkness of a surface. (b) **Texture** is the surface quality of a form — how it feels, or appears to feel. (c) Rendering uses tone to describe the **form** — where the light falls, where the surface turns away, where the shade and cast shadow sit — while texture describes the **surface** through the marks used: a soft broad highlight with smooth blending reads as matte moulded plastic, whereas hard-edged banded tone reads as polished metal. Because the two elements are read together, the viewer infers the **material** as well as the shape *(2 marks: tone → form, texture → surface, together → material).*

Q7. Model method *(a model render is shown below)*.



Stage 1 — **fix the light source** at the upper left and note its direction, so every tone that follows is consistent. Stage 2 — lay a **flat mid-tone** over the whole body of the pot. Stage 3 — build the **shade** up on the right-hand side, taking it darkest in a vertical **core shadow** band just inside the right contour, and blend it smoothly, because the pot is a curved (tapered) form and must take **graduated** tone. Stage 4 — leave a **soft, broad highlight** down the left side; lift the extreme right rim a little for **reflected light** bounced off the bench; render the **interior** of the open vessel as the darkest area, lightening slightly on the far inside wall where it catches the light; and lay the **cast shadow** on the bench to the lower right, darker than the mid-tone, to anchor the pot to the surface. The **matte glaze** is indicated by the softness and breadth of the highlight, the gentle gradation and a moderate tonal range — a small, hard highlight would say gloss *(6 marks: light direction fixed; graduated tone appropriate to a curved form; shade/core shadow, highlight, reflected light and cast shadow all named and correctly placed; matte material cue justified).*

Q8. Shade is tone **on** the object: the surfaces of the pot turned away from the light source — the right-hand side of the body and the vertical core-shadow band just inside the right contour — are in shade. A **cast shadow** is thrown **by** the object **onto** another surface: the pot blocks the light and so casts a dark shape across the bench top, running away from the light to the lower right. The difference matters because shade describes the *form* of the pot, whereas the cast shadow describes the pot's *relationship to the surface it stands on* and anchors it there *(3 marks: shade on the form, cast shadow onto another surface, the different job each does).*

Q9. Every tone in a render is a consequence of one decision — where the light comes from — so the light source must be fixed before any tone is applied. Once it is fixed, the highlight sits on the side of each form turned toward it, the shade builds on the opposite side, and every cast shadow falls away from it in the same direction. If the light source is not fixed, tones contradict one another: highlights appear on both sides of a form, or two objects in the same drawing cast shadows in different directions. The eye then reads no single lighting condition, the illusion of three-dimensional **form** collapses and the drawing flattens — and the drawing fails the requirement to *depict the direction of light (3 marks: all tone follows from one light direction + a named consequence + the effect on the read of form).*

Q10. Three changes: (1) replace the soft, broad highlight with a **small, hard-edged, near-white highlight** on the lit side, because polished metal reflects the light source as a sharp point rather than scattering it; (2) add **banded reflections** — hard-edged horizontal streaks of light and dark running around the curved body — because a polished surface mirrors its surroundings instead of showing an even gradation; (3) **widen the tonal range** so near-white sits directly beside near-black, and add a bright reflected streak along the shaded rim. The form, the light direction and the cast shadow stay unchanged; only the surface cues change *(4 marks: three valid metal cues + what stays unchanged — the form, the light direction and the cast shadow).*

Q11. Fix one direction of light — above and to the left — and keep every light ray **parallel** to it. Because the pot is curved, project points along the **silhouette** of the form (the two outer contours and the front and back of the rim ellipse) along light rays until each meets the bench top, then join those projected points into a smooth outline and fill it with a tone darker than the mid-tone. The difference from a rectangular prism is the *edge* of the shadow: a prism has straight vertical edges and corners, so projecting its top corners gives a shadow with **straight sides and sharp corners**; the pot's silhouette is curved, so its shadow is a **smooth, elliptical shape** that is wider than the base and stretches away from the light *(4 marks: parallel rays from a fixed light + project the silhouette and join + curved versus straight-edged shadow outlines).*

Q12. The round pot is a **curved** form, so it takes **graduated** tone: a continuous gradation from the highlight on the left, through the mid-tone, into the core shadow just inside the right contour, with no hard edges anywhere on the body. The square-sided planter is made of **flat planes**, so each plane takes **one flat, even tone** — lightest on the plane facing the light, mid-tone on the front, darkest on the plane turned away — with a **crisp tonal step at each vertical edge** and no gradation across any face. The light direction and the cast shadow method are the same for both; only the distribution of tone changes, because tone must match the geometry of the surface *(3 marks: gradation on the curved form, one flat tone per plane with crisp steps, the reason).*

Q13. Model answer. **Blending** — smooth, even gradation with no visible marks — would indicate the **glazed** surface of the pot: a continuous tonal transition reads as a smooth, non-porous, slightly reflective ceramic. **Stippling** — tone built from dots, denser where the surface is darker — would indicate the **unglazed stoneware** of the foot and base: the granular marks read as a matte, porous, slightly rough clay body. Used together in one drawing the two techniques let a stakeholder see where the glaze stops, so the rendering communicates a real material decision rather than just adding tone. *(Also accept cross-hatching for a drawn, textured surface; scumbling for a soft matte finish; grain or contour lines for a ribbed or thrown surface.) (4 marks: two techniques named + what surface quality each indicates and why).*

Q14. The **method** is **rendering** — applied here to a **presentation drawing** (a rendered impression of an object). The **media** are the digital applications used: a vector application for the flat base tones and a raster painting application for the graduated tone, highlight and cast shadow. The **material** is the **digital interface** the drawing is made on (or the paper or card it is finally output on for the client). **Digital** media build tone with gradients, layers and transparency, and allow material variants to be produced quickly from one base drawing; **manual** media build the same tones by hand — graphite or coloured pencil, marker or pastel worked on cartridge or toned paper — where tone is built by pressure and layered marks and cannot be undone. The distinction matters because the software application is **media**, never a method *(4 marks: method, media and material each correctly named + digital/manual distinguished).*

Q15. A development drawing of the pot is made for the **designer** — to visualise and test an idea — so it may be line work with only light tone. A **resolved presentation drawing** is made for the **client**, who has to judge the design without seeing the object. Rendering supplies what the client needs: the tone shows the **form** and the **direction of light**, so the proportions and the profile of the tapered vessel read as three-dimensional; the highlight, gradation and texture indicate the **material** — a matte glaze rather than plastic or metal; and the **cast shadow** places the pot on a real surface at a real scale. The drawing therefore communicates the aesthetic and material qualities of the resolved concept, and is genuinely **more resolved** than the concept it came from rather than a repeat of it *(4 marks: audience shifts designer → client, at least two things rendering adds — form/light, material, anchoring — and the link to resolution).*

Q16. A two-point perspective drawing gives the client the display as it will be seen in the retail space, and rendering adds the information line alone cannot carry. Applying tone from **one consistent light source** — for example spotlights above the display — shows which surfaces are lit and which fall into shade, so the client can judge whether the pots will be seen clearly and what atmosphere the display will have. Rendering the surfaces with their material cues (warm grain lines for the timber shelving, a soft matte tone for the glazed pots, a flat even tone for a painted wall) lets the client judge the material palette in situ. The rendered perspective therefore communicates **light and materials together**, which is what makes it a presentation-quality drawing *(3 marks: direction of light applied consistently + material indication + the judgement it lets the client make).*

Q17. Fault 1 — **one flat mid-grey over the whole form.** There is no tonal range, so the pot reads as a flat silhouette. Correction: build **graduated** tone from a light left side through the mid-tone to a dark core shadow inside the right contour, keeping a highlight and a dark so the form has **contrast**. Fault 2 — **a highlight on both contours.** Two highlights imply two light sources, which contradicts a single direction of light. Correction: fix one light source at the upper left, keep the highlight on the left only, and treat the slight lift at the right rim as **reflected light** — a mid-tone, not a highlight. Fault 3 — **no cast shadow.** The pot appears to float. Correction: project the silhouette along parallel light rays onto the bench and lay a cast shadow to the lower right, darker than the mid-tone, to anchor the pot. *(A fourth acceptable fault: the heavy outline all the way round — a rendered form should be described by its tone, with the contour lightened on the lit side.) (6 marks: three faults correctly identified with a correct, specific correction for each — 2 marks each.)*

Q18. The three surfaces must be separated by their tonal treatment. The **woven textile** mat would be rendered with **low tonal contrast**, no hard highlight, and a **scumbled or stippled** surface with a suggestion of the weave running with the perspective of the mat; its contour would be softened or broken where the fabric folds, because a textile absorbs and scatters light. The **concrete** wall would be rendered as a **flat, even matte tone** — one value for the plane, since it is flat — with a fine, evenly distributed **stipple** for the aggregate and no highlight at all, so it stays behind the object as a background plane. Against these, the **glazed pot** keeps the smoothest **blended gradation** and the strongest, cleanest highlight, so it reads as the only slightly reflective, non-porous surface in the drawing. All three surfaces are lit from the **same upper-left source**: each raised thread of the weave carries a small shadow on its lower-right side, the wall takes the single flat value of a plane turned away from that light, and the pot keeps its highlight on the left with its cast shadow falling across the mat to the lower right. Because the light direction is held constant across all three, the differences the viewer reads are differences of **material**, not of lighting. The contrast between the smooth gradation of the glaze and the broken, matte marks of the mat and wall is what makes each material identifiable *(4 marks: textile cues, concrete cues, the pot held as the smooth/reflective contrast, and the light direction kept consistent across all three).*

Theory

A **presentation format** is the vehicle in which a **resolved design solution** is delivered to stakeholders. The Study Design states it plainly: *students propose a resolved solution using appropriate presentation formats. Presentations might include documentation drawings, models, concept boards, mock-ups or high-fidelity prototypes, and may be accompanied by a written rationale.* The manufacture of **functional** prototypes is not a requirement of this study.

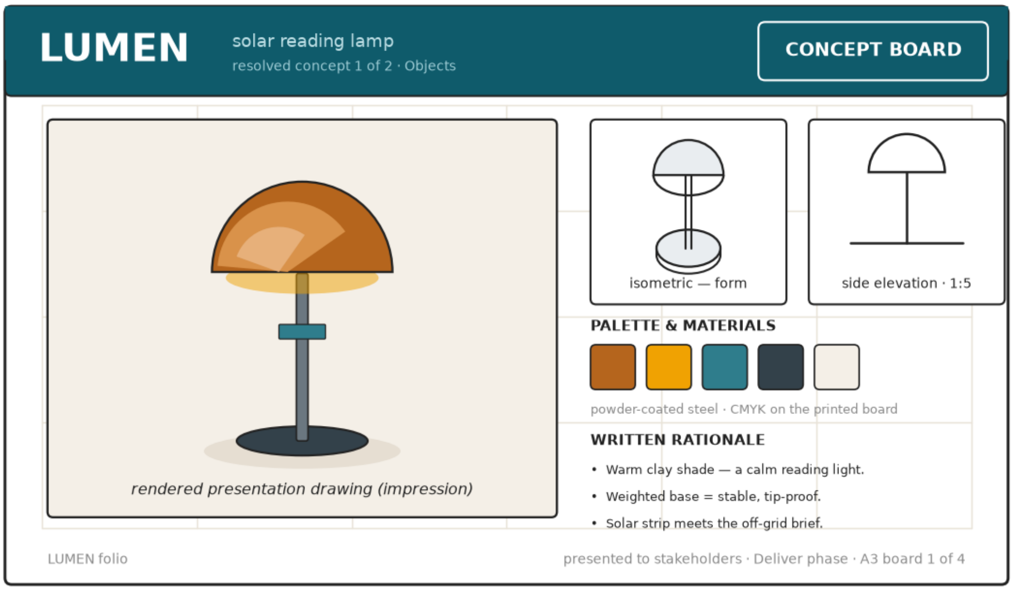
Choosing the format is a **Deliver**-phase decision, and it is assessable in its own right. Unit 4 Outcome 2 asks you to *select suitable presentation formats that meet communication needs defined in the brief*, and Unit 3 Outcome 1 asks you to *use presentation formats characteristic of selected field(s) of design practice*. The format is therefore not decoration — it is a design decision you must be able to **justify** against the brief.

Three words that are constantly confused.

- A **presentation drawing** conveys resolved design concepts to stakeholders for consideration. The Study Design lists *rendered impressions of buildings, environments or objects, illustrations, documentation drawings and storyboards*, and says they *can be a part of mock-ups, concept boards or style guides.* A presentation drawing is a drawing.
- A **presentation format** is the whole package those drawings are delivered in — the board, the guide, the screen set, the model.
- The **context** is the setting and circumstances in which a design is created, used or viewed. It is not the format.

Watch-out — context is not a presentation format. Assessors report students describing the presentation format instead of the setting — naming where the work sits, for instance that a design is "on a kit" — when asked about **context**. Context = the setting and circumstances of creation, use or viewing.

The concept board. A concept board mounts a resolved concept on a single presented sheet so a client can take in the whole proposal at once.

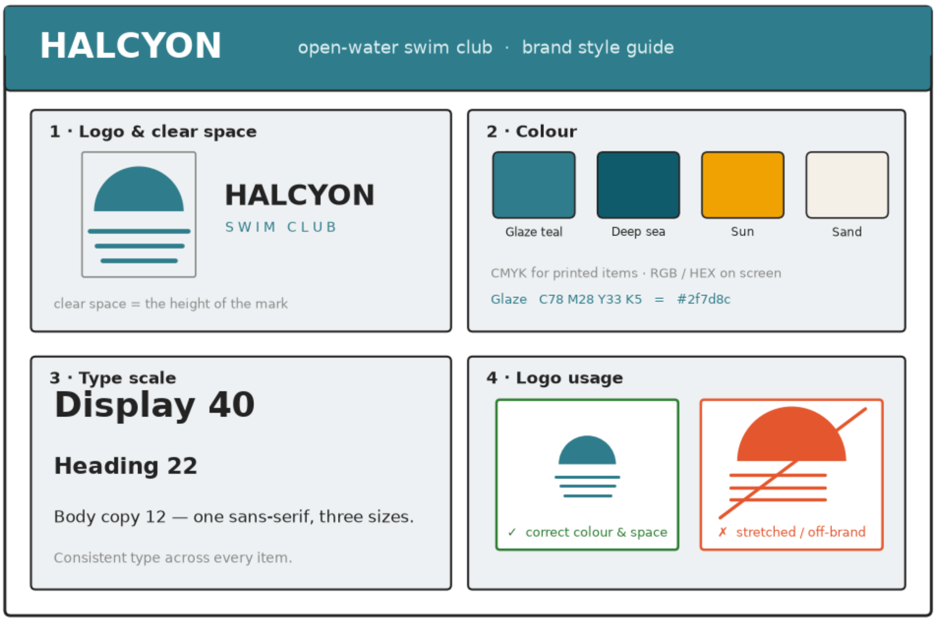


The original LUMEN board above (a solar reading lamp — the **Objects** field) shows the usual anatomy:

- a **hero rendered presentation drawing** (an impression) at the largest scale — the primary layer of the hierarchy;
- **supporting views** that answer the questions the impression cannot — an isometric for the form, a side elevation at a stated scale;

- a **palette and materials** panel, with the colour mode declared (**CMYK**, because the board is printed);
- a **written rationale** — short statements justifying the decisions against the brief;
- a **title block** identifying the project, the phase, the board number and the sheet size;
- the whole thing set on a **layout grid** so every panel aligns.

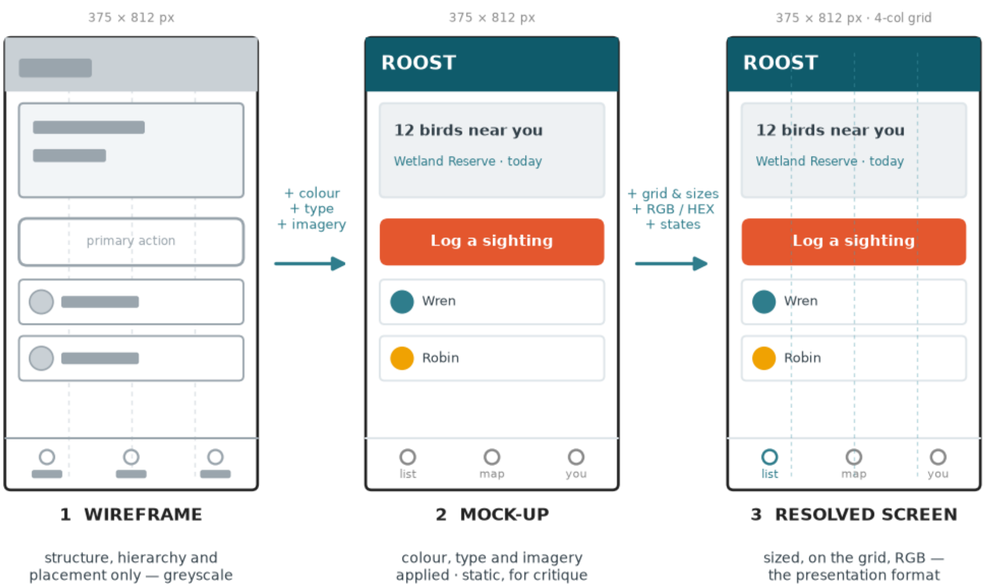
The style guide. A style guide is the characteristic delivery format for the **Messages** field. It does not present one item — it specifies the **system** so the identity stays consistent across every future item, and so people other than the designer can apply it correctly.



The original HALCYON guide above specifies the logo and its **clear space**, the colour palette in both **CMYK** (print) and **RGB / HEX** (screen), a **type scale**, and a correct/incorrect **usage** panel. The “do not” panel matters: a guide that only shows the right answer does not stop the wrong one.

Wireframes and screens. In the **Interactive experiences** field the resolution of a screen is built in stages. The Study Design says students *generate wireframes to explore relationships between the visual components of the interface*, then *mock-ups are generated for testing and critique*, and finally they *present concepts as static visual representations of content and intended interactions and/or experiences.*

ROOST home screen — wireframe → mock-up → resolved screen

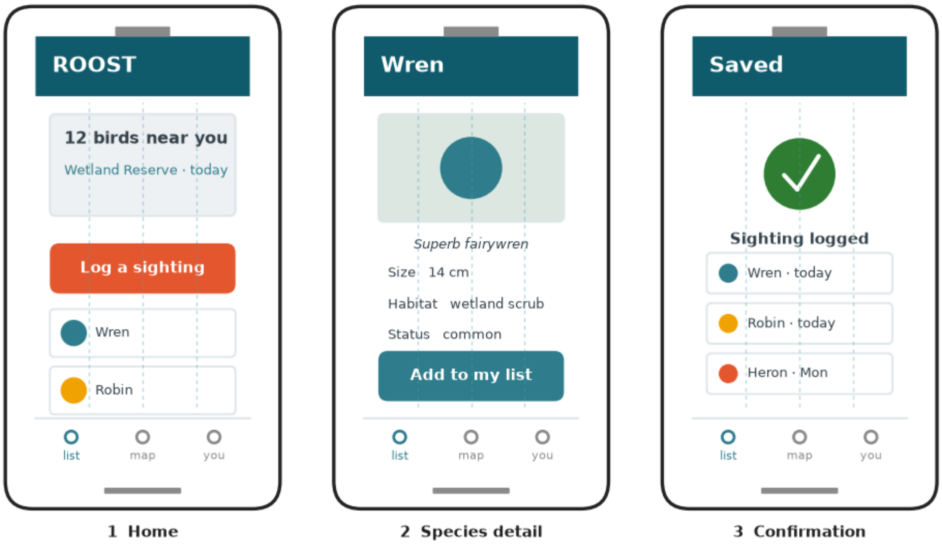


Resolution increases left to right. Only panel 3 is a presentation format.

- A **wireframe** is a greyscale structural layout. It fixes **placement, hierarchy and the relationships between components** and deliberately leaves out colour, typeface, imagery and finished detail so that critique stays on the structure.
- A **mock-up** applies colour, type and imagery to that structure. It is static, and its job is **testing and critique**.
- A **resolved screen** is the presentation format: sized (for example 375 × 812 px), set on the grid, specified in **RGB**, and showing the intended interactions and states.

A wireframe is never the delivered solution. Handing a client a wireframe is handing them the scaffolding.

ROOST — the delivered screen set · one grid, one type system · RGB (screen)

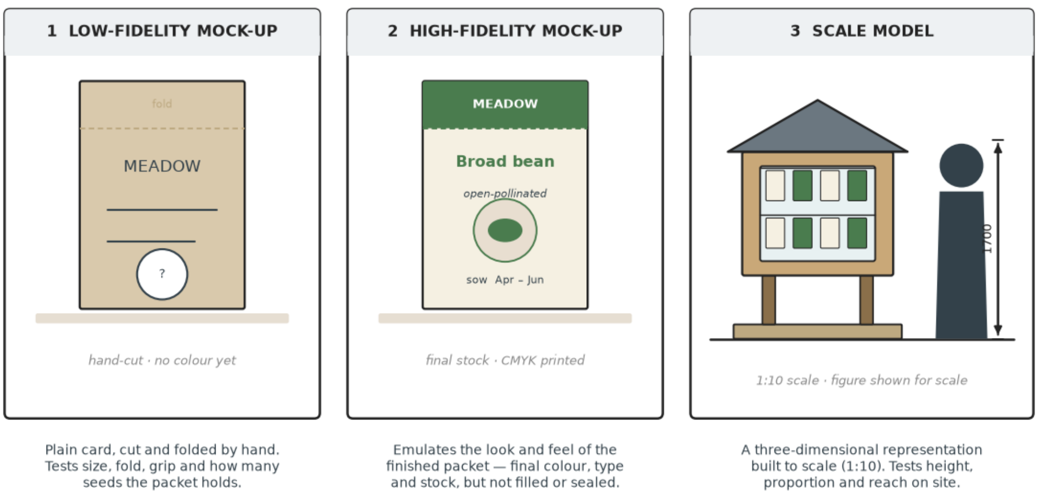


Each screen is drawn to the same 4-column grid and type scale, and shows one intended interaction.

The delivered ROOST set above shows what "resolved" means at the level of the whole format: **more than one screen**, so the client can follow a task through the interface; every screen on the **same four-column grid** and the **same type scale**; and each screen showing one intended interaction. You are not required to produce a functioning prototype.

Mock-ups, models and prototypes. These are the physical formats, and the three terms are not interchangeable.

MEADOW community seed library — physical presentation formats



A mock-up or model is presented to stakeholders alongside the drawings; a functioning prototype is not required.

- A **mock-up** is a made stand-in for a design, used to test what a drawing cannot: real size, fold, grip, weight, how it sits in the hand or on a shelf.

- **Low-fidelity** prototyping *uses inexpensive and readily available materials, together with efficient methods to construct and test design ideas.* The MEADOW card packet above is cut and folded by hand with no colour applied.
- **High-fidelity** prototyping *uses materials and techniques to emulate the look and feel of a finished product.* High-fidelity prototypes may or may not include functioning components.
- A **model** is a three-dimensional representation built to a stated **scale**. A scale model is the characteristic format for the **Environments** field; a **human figure** is included so the client can read the real size.

Choosing the format for the field. The format follows the communication need, the audience or users, the purpose and the field of practice — not personal preference.

Choosing a presentation format and drawing method for the field

FIELD OF PRACTICE	PRESENTATION FORMAT · DRAWING METHOD · COLOUR MODE
Messages	Format: style guide · concept board. Method: symbol construction grids · flat presentation drawings and illustrations. CMYK (print).
Objects	Format: concept board · model or high-fidelity mock-up. Method: paraline (isometric / planometric) rendered impression. CMYK (print).
Environments	Format: scale model (with figure) · concept board. Method: one- or two-point perspective rendered impression. CMYK (print).
Interactive experiences	Format: set of sized, resolved screens (developed from wireframes). Method: screens on a column grid · storyboard. RGB (screen).

Unit 4 requires **two** final presentations *in two separate presentation formats*. Two posters are one format twice. The two solutions must be **distinct from one another in purpose and presentation format**.

> **Watch-out — "distinct in purpose and presentation format".** A poster and a flyer are the same format doing the same job. A printed identity system and a screen-based interface are genuinely distinct in both purpose and format.

Presentation conventions. When you present a resolved solution you apply the **conventions** of the field, and you must be able to say **which** convention and **how** it helps the client understand the design. This is the single lowest-scoring skill in the recent examinations.

Field	Conventions expected in the presentation
Messages	Layout grid and guides; consistent alignment and margins; type conventions (type scale, hierarchy, leading, tracking); symbol construction grids; colour mode (CMYK for print)
Objects	Scale stated (e.g. 1:5); dimensions in millimetres, given once, with diameter (Ø) and radius (R); line types (outline, hidden, centre); third-angle projection symbol; title block; materials schedule
Environments	Scale; plans, elevations and sections labelled; north point; human figure for scale; eye level and horizon line in a perspective impression; site context
Interactive experiences	Screen size in pixels; column grid and gutters; type scale; icon and symbol consistency; indicated states; colour mode (RGB / HEX); contrast for accessibility

Watch-out — conventions are not a description and not a pitch. Assessors report that a significant number of students described what they had created or "pitched" the idea to the client instead of identifying conventions. Name the convention using the Study Design's terminology, then explain how it lets the client read the design correctly.

Watch-out — CMYK for print, RGB for screen. State which colour mode the solution uses and why. It changes both the printing process and how the colour appears on screen, so the client needs to be told.

Watch-out — evaluate what is in the FINAL solution. When you are asked about the methods, media and materials of a presentation, evaluate what is visible in the presented solution — the printed board, the model, the resolved screens — not the sketching or ideation that produced it. Distinguish **digital** from **manual**.

The written rationale and the pitch. A presentation *may be accompanied by a written rationale* — a short written justification of the design decisions against the brief, which travels with the format. A **design pitch** is a different thing: *the presentation, explanation and justification of proposed design concepts to a client*, delivered in person. The rationale is written and attached; the pitch is spoken and performed.

Worked examples

Example 1 — scaffolded

Discuss two presentation conventions you would consider when presenting the resolved HALCYON identity to the client. (4 marks)

Working	Comment
Convention 1 — the layout grid and guides. Every element of the HALCYON guide (logo panel, colour panel, type panel, usage panel) is set to a shared grid, so margins and alignments repeat across the sheet.	NAME the convention first, using the Study Design's terminology. "Layout" alone is not a convention; "a layout grid and guides" is.
This lets the client see that each item in the identity follows the same mapping and alignment, so they can judge the system as a whole rather than one artwork.	Explain HOW it supports the client's understanding — this is where the marks sit.
Convention 2 — type conventions. The guide fixes a type scale of three sizes in one sans-serif (display, heading, body) and shows the hierarchy each size carries.	Second convention, again named. Type scale / hierarchy is a Messages convention, appropriate to the field.
Presenting the type scale tells the client exactly how future items will rank information, so they can approve the identity knowing a newsletter and a signboard will read consistently.	Tie the convention to the client's decision. Do NOT describe the design or pitch it — that is the reported error.

Example 2 — scaffolded

Distinguish between a wireframe and a resolved screen, with reference to the ROOST app. (4 marks)

Working	Comment
Wireframe. The ROOST wireframe is a greyscale layout: grey blocks stand in for the header, hero card, primary action and list rows. It explores the relationships between the visual components of the interface.	"Distinguish" needs a congruent two-sided treatment — same categories addressed on each side. Use the Study Design's own words for the wireframe's purpose.
It deliberately omits colour, typeface and imagery so that feedback stays on structure, hierarchy and placement, and so it can be changed quickly.	State what is left out AND why — the reason earns the mark.
Resolved screen. The resolved ROOST home screen applies the brand colour, the type scale and the imagery to that same structure, is sized at 375 × 812 px, sits on	The matching side of the comparison: same components, now resolved and specified.

Working	Comment
the four-column grid and is specified in RGB.	
The distinction: the wireframe is a development tool used within the Develop phase, while the resolved screen is the presentation format delivered to the client in the Deliver phase.	Close with the actual point of difference — role in the design process, not just appearance.

Example 3 — unscaffolded

Justify the selection of a concept board as the presentation format for the resolved LUMEN reading lamp. (4 marks)

A concept board is an appropriate presentation format for LUMEN because the client must approve a three-dimensional object from a two-dimensional presentation. A single board carries a rendered presentation drawing (the impression) that shows how the finished lamp will look, together with the supporting isometric and the dimensioned side elevation that the impression cannot supply, so form, proportion and size are all answered in one view. Mounting the palette and materials panel beside the drawings lets the client judge the finish and the powder-coated steel at the same moment as the form, and the written rationale ties each decision back to the brief's off-grid requirement. Because the board is a single printed sheet set on a layout grid, it can be presented and left with the client for consideration, which suits an Objects solution being approved for production.

Example 4 — unscaffolded

Evaluate the effectiveness of the ROOST screen set as a presentation format for delivering an interactive-experience solution to the client. (6 marks)

The ROOST screen set is an effective presentation format for this solution. Its principal strength is that it presents **three** linked screens — home, species detail and confirmation — rather than a single image, so the client can follow a whole task (find a bird, read about it, log the sighting) and judge the experience rather than one picture. A second strength is consistency: every screen is drawn to the same four-column grid and the same type scale, with the header, primary action and tab bar in fixed positions, which demonstrates to the client that the interface is a system and shows how any additional screen would behave. Third, the set is specified in RGB and sized in pixels, which are the conventions of the field and tell the client precisely how the solution will appear on a device.

A limitation is that the screens are **static visual representations**: they show the intended interaction but cannot demonstrate transitions, gesture or timing, so a client may still need those explained. A second limitation is that only three states are shown, so error and empty states remain untested by the presentation.

Overall, because the format communicates content, hierarchy and the intended interactions in the conventions the field expects, and because a functioning prototype is not required, the resolved screen set delivers the solution effectively for client approval.

Practice questions

Scaffolded

Q1. Using the LUMEN concept board: (a) Name the presentation format shown. *(1 mark)* (b) Identify two presentation drawings included on the board. *(2 marks)* (c) Explain what the palette and materials panel tells the client that the drawings alone cannot. *(2 marks)*

Q2. Using the HALCYON style guide: (a) Name two sections of the guide and state what each specifies. *(2 marks)* (b) Explain why the guide includes an "incorrect usage" panel. *(2 marks)* (c) Name the design element controlled by the type-scale panel, and explain how a type scale supports hierarchy across future items. *(2 marks)*

Q3. Using the wireframe / mock-up / resolved-screen figure: (a) State which panel is the wireframe. *(1 mark)* (b) State two things a wireframe deliberately leaves out. *(2 marks)* (c) Explain why a designer produces a wireframe before a resolved screen. *(2 marks)*

Q4. Using the MEADOW mock-ups and scale model: (a) State two visible differences between the low-fidelity and the high-fidelity mock-up shown. *(2 marks)* (b) State one thing the plain card mock-up can test that a rendered drawing cannot. *(1 mark)* (c) Explain why a human figure is included beside the scale model. *(2 marks)*

Q5. Presentation formats and the design process: (a) Name the phase of the VCD design process in which a presentation format is selected. *(1 mark)* (b) Explain the difference between a presentation drawing and a presentation format. *(2 marks)* (c) Name two presentation formats listed in the Study Design other than the concept board. *(2 marks)*

Q6. Using the field / format matrix, for the **Objects** field: (a) Name a presentation format characteristic of the field. *(1 mark)* (b) Name the drawing method you would use within it. *(1 mark)* (c) Explain why that drawing method suits an Objects solution. *(2 marks)*

Unscaffolded

Questions 7–19 refer to the MEADOW brief below and to the MEADOW figure, unless otherwise stated.

MEADOW — community seed library. Client: the Kirrawee Community Garden committee. Problem: residents grow open-pollinated vegetables but have no reliable way to share and label surplus seed. The committee has funded a small seed library in the garden and has defined four communication needs:

Need	Field of practice	What is required
N1	Messages	A visual identity and a printed seed-packet range that identifies MEADOW and labels each variety
N2	Objects	A weatherproof timber cabinet that stores, protects and dispenses the packets
N3	Environments	A small potting and reading shelter beside the cabinet
N4	Interactive experiences	A companion screen interface for reserving seed and logging what has been returned

Design criteria: legible outdoors in full sun; low cost, using materials the committee can source locally; weatherproof; usable by children and by older gardeners; and able to be rebuilt by volunteers without the designer present.

Q7. Select a suitable presentation format for communication need **N3** and justify your selection with reference to the brief and to the field of practice. *(4 marks)*

Q8. MEADOW's two final presentations must be distinct from one another in **purpose and presentation format**. Select two of the four communication needs, name the presentation format you would use for each, and explain how the two are distinct. *(4 marks)*

Q9. Discuss two presentation conventions you would apply when presenting the resolved MEADOW cabinet (**N2**) to the committee. *(4 marks)*

Q10. Explain why the presentation conventions you would apply to the MEADOW identity (**N1**) differ from those you would apply to the cabinet (**N2**). *(3 marks)*

Q11. A committee member suggests that the wireframes for the MEADOW interface (**N4**) could simply be handed over as the finished solution. Explain why the wireframes cannot be judged against the brief's design criteria, and name the presentation format and the conventions you would deliver instead. *(3 marks)*

Q12. Explain how a low-fidelity mock-up of the MEADOW seed packet would be used during the design process, and distinguish it from a high-fidelity prototype. *(4 marks)*

Q13. The committee will print future seed packets themselves once the designer has finished. Justify the inclusion of a style guide as one of the presentation formats delivered for MEADOW. *(4 marks)*

Q14. Describe the components you would mount on an A2 concept board presenting the resolved MEADOW shelter (**N3**), and explain how the layout of the board would guide the committee through the proposal. *(6 marks)*

Q15. The MEADOW seed packets are printed and the companion interface is viewed on screen. Explain why the colour mode differs between the two, and what you must communicate to the committee about it. *(3 marks)*

Q16. Evaluate the suitability of a **high-fidelity prototype** as the presentation format for the MEADOW cabinet (**N2**), referring to the design criteria. *(6 marks)*

Q17. At the final presentation a student shows the committee a page of rapid ideation sketches of the cabinet and says, "This is my design — it will look really good in the garden." Identify **two** faults in this presentation and explain how you would correct each. *(4 marks)*

Q18. Compare a **concept board** with a **style guide** as presentation formats, referring to the purpose of each, what each contains, and the stakeholder each is prepared for. *(6 marks)*

Q19. Explain the role of a **written rationale** accompanying a presentation format, and distinguish it from a **design pitch**. *(3 marks)*

Answers

Q1. (a) A concept board. (b) Any two of: the rendered impression; the isometric; the side elevation. (c) See solutions (finish, colour and material). **Q2.** (a) Any two of logo & clear space / colour / type scale / logo usage, with what each specifies. (b) It shows what must not be done, so the identity is protected when others apply it. (c) Type; see solutions. **Q3.** (a) Panel 1. (b) Any two of: colour, typeface, imagery, finished detail. (c) See solutions (structure is settled and critiqued before resolution is invested). **Q4.** (a) Any two visible differences: raw card vs final stock; no colour vs the printed MEADOW green; hand-written marker vs the resolved type; a hand-cut window vs a printed seed illustration. (b) Real size / fold / grip / capacity. (c) So the client can read the true size of the cabinet from a scaled model. **Q5.** (a) Deliver. (b) A presentation drawing is a drawing; a presentation format is the package it is delivered in. (c) Any two of: documentation drawings, models, mock-ups, high-fidelity prototypes. **Q6.** (a) A concept board (accept model / high-fidelity mock-up). (b) Paraline — isometric or planometric. (c) See solutions. **Q7.** A scale model and/or a concept board carrying a rendered two-point perspective impression — the impression is the presentation drawing, the model and the board are the formats. See solutions. **Q8.** e.g. N1 printed identity + N4 resolved screens; distinct in purpose (identify/label vs reserve/log) and format (printed system vs screen set). **Q9.** Any two of: scale; dimensioning in millimetres; line types; title block; materials schedule — each with how it helps the committee. See solutions. **Q10.** Because the two fields carry different information for the stakeholder: Messages conventions govern layout and reading; Objects conventions govern size and construction. **Q11.** Greyscale wireframes carry no colour, type or icons, so the legibility and usability criteria cannot be judged on them; deliver a set of sized, resolved screens applying the field's conventions (pixel size, column grid, type scale, states, RGB / HEX, contrast for accessibility). **Q12.** Cut and folded in card to test size, fold and grip; a high-fidelity prototype instead emulates the look and feel of the finished product. **Q13.** So volunteers can reproduce the identity consistently without the designer — see solutions. **Q14.** See solutions. **Q15.** CMYK for the printed packets, RGB / HEX for the interface; it changes the printing process and on-screen appearance, so both must be specified. **Q16.** See solutions (strengths, limitations against the low-cost / volunteer-rebuild criteria, and a judgement). **Q17.** Fault 1 — ideation sketches are not a resolved solution; Fault 2 — pitching rather than discussing conventions. See solutions. **Q18.** See solutions (one resolved concept for approval vs a system specified for consistent reuse). **Q19.** Rationale = written justification travelling with the format; pitch = the spoken presentation, explanation and justification of concepts to a client.

Fully-worked solutions

Q1. (a) A **concept board**. (b) Any two of: the **rendered presentation drawing (impression)** of the lamp; the **isometric** view; the **side elevation** at 1:5. (c) The palette and materials panel tells the client the actual **colour** specification and the **material** the lamp will be made from — powder-coated steel — together with the colour mode (CMYK) in which the board is printed. The drawings show form and size; only this panel confirms the finish the client is approving *(2 marks: what the panel adds + why the drawings cannot supply it).*

Q2. (a) Any two, for example: **Logo and clear space** — specifies the mark, the wordmark lockup and the minimum space that must be kept around it; **Colour —** specifies the palette with CMYK values for print and RGB / HEX values for screen; **Type scale** — specifies one sans-serif in three sizes; **Logo usage** — specifies correct and incorrect applications. (b) The guide will be applied by people other than the designer. Showing the **incorrect** applications — stretching the mark, changing its colour, crowding it — prevents the most likely errors, so the identity stays consistent across items the designer will never see. (c) The element is **type**. A type scale fixes a small number of sizes and assigns each a rank (display, heading, body), so on every future item the eye is directed to the same layer of information first; this maintains a consistent **hierarchy** across the whole identity *(2 marks: element named + hierarchy mechanism).*

Q3. (a) **Panel 1**. (b) Any two of: **colour**, **typeface / final type**, **imagery**, finished detail or states. (c) A wireframe settles the **structure** — placement, hierarchy and the relationships between the visual components of the interface — while it is still cheap to change. Because there is no colour or imagery to distract, critique stays on whether the content is in the right order for the user; only once the structure is agreed is the effort of resolving colour, type and imagery invested *(2 marks: what the wireframe settles + why it comes first).*

Q4. (a) Any two of: the low-fidelity packet is **plain card** while the high-fidelity packet is on the **final printed stock**; the low-fidelity version carries **no colour**, the high-fidelity version the MEADOW green; the variety is **hand-written in marker** rather than set in the resolved type; the seed window is **hand-cut** rather than a printed illustration. (b) Any one of: the true physical **size** of the packet; whether the **fold** and glue line work; how it feels in the hand (**grip**); how much seed it holds. (c) The model is built to a stated **scale** (1:10), which a client cannot read from the model alone. A

human figure at a known height gives a familiar reference, so the committee can immediately judge the real height of the cabinet and whether a child or an older gardener could reach the shelves *(2 marks)*.

Q5. (a) **Deliver**. (b) A **presentation drawing** is a drawing that conveys a resolved concept to stakeholders — a rendered impression, an illustration, a documentation drawing or a storyboard. A **presentation format** is the package in which the resolved solution is delivered — a concept board, style guide, model, mock-up or set of resolved screens — and presentation drawings sit **inside** it. (c) Any two of: **documentation drawings**, **models**, **mock-ups**, **high-fidelity prototypes**. These four, with the concept board, are the whole of the Study Design's list; a style guide or a set of resolved screens is a legitimate format in practice, but neither is named in that list, so neither answers a question worded "listed in the Study Design".

Q6. (a) A **concept board** (accept a **model** or a **high-fidelity mock-up**). (b) **Paraline** — isometric or planometric drawing. (c) A paraline drawing shows three faces of the object in one view, so the client reads the whole three-dimensional **form** at once; because the receding axes do not converge, measurements along the axes stay **true to scale**, so the same drawing that sells the form can also carry dimensions for the maker *(2 marks: what the method shows + why that suits an object)*.

Q7. The suitable presentation format is a **scale model** of the shelter at a stated scale, presented together with a **concept board** carrying a **rendered two-point perspective impression**. Naming the format correctly matters here: the impression is a presentation *drawing*, while the model and the board are the *formats* that deliver it. Perspective is the drawing method characteristic of the **Environments** field because it shows the shelter as a person standing in the garden would actually see it, with an eye level set at standing height. The committee are not designers, so an impression they can "stand inside" lets them judge the proposal against criteria they can feel — whether it shelters the potting bench, whether it suits the garden. The model, with a human figure beside it, answers what the drawing cannot: real height, proportion and reach on site. Both formats also support the low-cost criterion, since neither requires the shelter to be built before approval *(4 marks: format named, method matched to the field, justified against the stated criteria)*.

Q8. I would deliver **N1 (Messages)** as a **printed identity and seed-packet range with a style guide**, and **N4 (Interactive experiences)** as a **set of resolved screens**. The two are distinct in **purpose**: N1 exists to identify MEADOW and label what is inside each packet at the moment of choosing, while N4 exists to let a gardener reserve seed and log what has been returned. They are distinct in **presentation format**: N1 is a printed system specified in CMYK, applied to a physical packet a person holds outdoors; N4 is a set of sized, static screens specified in RGB and set on a column grid. Because purpose and format differ on both counts, they satisfy the requirement that the two final presentations be distinct from one another *(4 marks: two needs, a format each, difference argued on BOTH purpose and format)*.

Q9. Convention 1 — scale. The cabinet drawings would carry a stated scale (for example 1:10) and the model would be labelled 1:10. This tells the committee that every measurement on the presentation is in a fixed ratio to the real cabinet, so they can judge whether it fits the space they have allowed in the garden. **Convention 2 — dimensioning.** Overall height, width and depth would be dimensioned in **millimetres**, each dimension given once, with diameter (Ø) used for the dowel handles. Because the criteria require volunteers to rebuild the cabinet without the designer present, dimensioned drawings are what make that possible — the committee can see immediately that the design can be reproduced. *(Accept also: line types distinguishing outline, hidden and centre lines; a title block; a materials schedule.) (4 marks: two conventions NAMED using study-design terminology + how each supports the committee's understanding — not a description of the design.)*

Q10. The conventions differ because the two fields must communicate different information to the stakeholder. **N1** is a printed Messages solution, so its conventions govern how the packet is **read**: a layout grid and guides for consistent alignment, a type scale for hierarchy, and CMYK colour so the committee know how it will print. **N2** is an Objects solution that must be **built**, so its conventions govern size and construction: scale, dimensions in millimetres, line types and a materials schedule. Selecting conventions therefore depends on the nature of the design and the communication need, not on personal preference *(3 marks: the principle stated + at least one convention correctly matched to each field)*.

Q11. The brief requires the solution to be **legible outdoors in full sun** and **usable by children and by older gardeners**. Those criteria are carried by colour contrast, type size and icon clarity — none of which exists on a greyscale wireframe. The committee could confirm that the reserve button sits where they expect, but they could not judge whether an older gardener will read it in sunlight or whether a child will recognise the icons, so the criteria cannot be evaluated and the solution cannot be approved on that evidence. What I would deliver instead is a **set of sized, resolved screens**, applying the conventions of the **Interactive experiences** field: the screen size in pixels, the column grid and gutters, the type scale, consistent icons and symbols, the intended states indicated, colour specified in **RGB / HEX**, and **contrast checked for accessibility** so the legibility criterion can actually be tested *(3 marks: criteria named and tied to what a wireframe lacks + the correct format + its conventions).*

Q12. A low-fidelity mock-up of the packet would be cut and folded from plain card, using inexpensive, readily available materials and efficient methods, and used **during Develop** to test what the drawing cannot: whether the packet is a comfortable size in the hand, whether the fold and glue flap hold, and how much seed it holds. It would be taken to a critique and changed on the spot in response to feedback. A **high-fidelity prototype** is different in both purpose and construction: it uses materials and techniques that **emulate the look and feel of the finished product** — the final stock, the final printed colour and type — and is made late in the process to confirm the resolved solution rather than to explore it. High fidelity prototypes may or may not include functioning components *(4 marks: use and stage of the low-fidelity mock-up + a congruent distinction from high fidelity).*

Q13. A style guide is justified because the brief states that the identity must be **able to be rebuilt by volunteers without the designer present**. A single printed packet shows only one outcome; a style guide specifies the **system** — the mark and its clear space, the palette with CMYK values for printing, the type scale, and correct and incorrect usage — so a volunteer printing a new variety next season produces something recognisably MEADOW. It also protects the identity from the most likely errors, because the incorrect-usage panel shows what must not be done. Because it is the presentation format characteristic of the **Messages** field and it directly answers a stated design criterion, its selection can be justified against the brief rather than by preference *(4 marks: criterion identified, contents of the guide linked to it, judgement).*

Q14. The A2 board would carry: a **hero rendered two-point perspective impression** of the shelter in the garden setting, with a figure for scale, at the largest size on the sheet; a **plan** and one **elevation** at a stated scale, so the committee can read footprint and height; a **materials and palette** panel showing the local timber and roofing, with CMYK declared for the printed board; a small **site plan** showing the shelter's position relative to the cabinet; a **written rationale** of three or four statements tying decisions to the criteria (weatherproofing, low cost, use by children and older gardeners); and a **title block** naming the project, the communication need, the scale and the sheet.

The layout would guide the committee by building a clear **hierarchy** on a layout grid. The impression is primary — largest and highest on the sheet, so it is read first and answers "what will it look like". The plan, elevation and site plan are secondary, grouped together down one side so the technical information reads as one block. The materials panel and rationale are tertiary, placed low, where the committee arrive once they have accepted the proposal in principle. Aligning every panel to the same grid means the eye travels a deliberate path — impression, then evidence, then justification — rather than hunting *(6 marks: a full set of components + hierarchy and visual path explained, not just listed).*

Q15. The packets are **printed**, so their colour must be specified in **CMYK**, the four-colour process used by a printer. The interface is viewed on a **screen**, which emits light, so its colour must be specified in **RGB** (or HEX). The same nominal green will not reproduce identically in both, because the two systems build colour in different ways and have different ranges. I must tell the committee which mode each solution uses and supply both sets of values in the style guide, so that when they print packets themselves the green matches the green on the app closely enough to read as one identity *(3 marks: both modes correctly matched + the consequence for the client stated).*

Q16. A high-fidelity prototype is **partly** suitable for the MEADOW cabinet. Its clear strength is that it uses materials and techniques that emulate the look and feel of the finished product, so the committee could test the criteria that matter most on this project directly: whether the cabinet is genuinely weatherproof, whether a child can reach the lower shelf and an older gardener the upper one, and whether the timber they can source locally looks right in the garden. Nothing on a board tests those as convincingly.

Against this are two real limitations. First, **cost**: the criteria require a low-cost solution using locally sourced materials, and building a full-size cabinet in the final timber consumes much of that budget before the design is approved. Second, a prototype is a poor **record**: it does not carry the dimensions, scale or line types the volunteers need in order to rebuild it, so it would still have to be accompanied by documentation drawings. It is also worth noting that the manufacture of functional prototypes is not a requirement of this study.

Overall, a high-fidelity prototype is not the best single format here. A **scale model plus a dimensioned concept board** would meet the same criteria at a fraction of the cost while also giving the volunteers what they need to rebuild; a high-fidelity prototype would be justified only if the weatherproofing detail could not be resolved any other way *(6 marks: strengths, limitations tied to the stated criteria, and a clear judgement).*

Q17. Fault 1 — the drawings are not resolved. Rapid ideation sketches are **development** drawings generated by divergent thinking; they are not a design solution and cannot be approved. To correct this I would select one concept and resolve it as a **presentation drawing** — a rendered paraline impression with the material and finish shown — mounted on a concept board with a dimensioned elevation, so the committee are approving a finished proposal.

Fault 2 — the student has pitched rather than presented. "It will look really good" is an opinion, not a discussion of the **conventions** that let the client read the design. To correct this I would name and explain the conventions applied: the stated **scale**, the **dimensions** in millimetres, and the **line types** used, explaining how each lets the committee check the cabinet's size and see that volunteers could rebuild it *(4 marks: two faults identified + a specific correction for each).*

Q18. Both a concept board and a style guide are presentation formats used in the Deliver phase to give stakeholders a resolved outcome on a printed sheet, and both are set on a layout grid and specified in CMYK. Beyond that they differ on every count.

Their **purposes** differ: a concept board presents **one resolved concept** so that a client can approve or reject it, whereas a style guide specifies a **system** so that the identity can be applied consistently to items that do not yet exist. Their **contents** differ accordingly: the LUMEN board is built around a hero rendered impression with supporting views, a palette and a written rationale — evidence for a decision; the HALCYON guide contains no single hero image but instead the mark and its clear space, colour values in CMYK and RGB, a type scale, and correct and incorrect usage — rules for reuse. The **stakeholder** differs too: the board is prepared for the **client** who is approving the design, while the guide is prepared for those who will **apply** it later — printers, in-house staff or, in MEADOW's case, volunteers — and often for the client as custodian of the brand.

In short, a concept board asks "will you approve this?", while a style guide answers "how do we keep doing this?" *(6 marks: congruent two-sided comparison across purpose, contents and stakeholder, with both similarities and differences.)*

Q19. A **written rationale** is a short written justification that accompanies a presentation format, setting out the reasons for the design decisions and linking each to the brief — for example, the three statements on the LUMEN board explaining the warm shade, the weighted base and the solar strip. It travels with the format, so a stakeholder reading the board later, without the designer present, can still follow the reasoning. A **design pitch** is the **presentation, explanation and justification of proposed design concepts to a client**, delivered in person: the designer speaks to the work, responds to questions and receives feedback. The rationale is written and attached to the solution; the pitch is spoken and performed, and the feedback it generates is then used to make final refinements *(3 marks: role of the rationale + a clear two-sided distinction from the pitch).*

Topic Test 2 — Methods, media and materials; technical drawing conventions

Reading time: 5 minutes • Writing time: 45 minutes • Total 40 marks

Structure of test

Section	Number of questions	Number of questions to be answered	Number of marks
A	4	4	24
B	3	3	16
		Total	**40**

Materials: pens, pencils, coloured pencils, fineliners (0.6 mm or less), eraser, ruler, set squares, protractor, compasses, circle and ellipse templates. No technology and no notes.

Refer to the **Resource Sheet** on the following page. All questions must be answered.

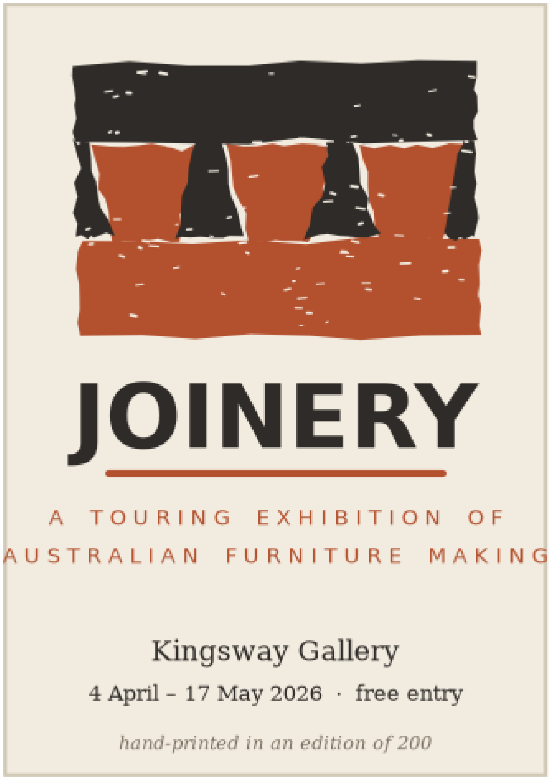
This test covers Chapters 3–5: methods, media and materials; two-dimensional and technical drawing; and three-dimensional drawing, rendering and presentation. Drawings must be completed in the spaces provided. Australian third-angle projection (AS 1100) applies to all documentation drawing in this test.

This topic test mirrors the structure, timing and materials of the VCAA examination. It is an original ClassBasics paper; no VCAA question is reproduced.

Topic Test 2 — Resource Sheet

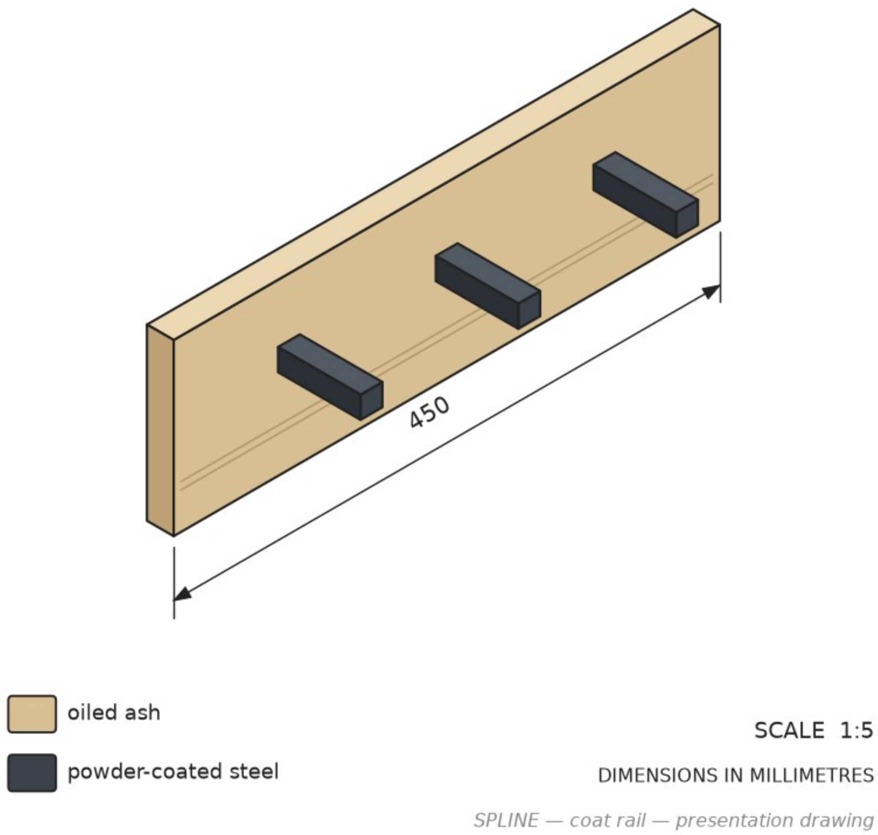
Use these design examples to answer Section A. Each example is an original ClassBasics artifact created for this paper.

Design example 1 — Messages



JOINERY — exhibition poster; two-colour relief (lino) print on uncoated cotton-rag paper, 2026.

Design example 2 — Objects



SPLINE — wall-mounted coat rail in oiled ash and powder-coated steel; digitally modelled and rendered presentation drawing, 2026.

Section A

Instructions for Section A: Answer all questions in the spaces provided. Question 1 offers a choice of design example: tick the box of the ONE example you have chosen, and refer to that same example in Questions 2 and 4.

Question 1 (4 marks)

Tick the design example you have chosen:

[ ] **JOINERY** (Messages) [ ] **SPLINE** (Objects)

a. Identify one **method**, one example of **media** and one **material** that is evident in the final design solution you have chosen. 3 marks

b. State whether the method you identified in part **a.** is **manual** or **digital**. 1 mark

Question 2 (6 marks)

Question 2 refers to the design example you ticked in **Question 1**. Do not change your choice.

a. Describe one property of the **material** you identified in **Question 1** part **a.**, and state how that property can be seen in the final design solution. 2 marks

b. Evaluate the application of that material, referring to the purpose of the design and its audience. 4 marks

Question 3 (6 marks)

Question 3 refers to **Design example 2 — SPLINE**. There is no choice of example in this question.

a. Name the **drawing method** used to present the SPLINE coat rail. 1 mark

b. Explain why measurements can be taken directly from this drawing, but not from a **one-point perspective** drawing of the same coat rail. 2 marks

c. The overall width of the rail is dimensioned **450**. Using the scale noted on the drawing, state the length of the rail as it is drawn on the paper, and explain why the figure written against the dimension is 450 and not the drawn length. 3 marks

Question 4 (8 marks)

Question 4 refers to the design example you ticked in **Question 1**. Do not change your choice.

a. Evaluate the application of the **method** and the **media** you identified in **Question 1** part **a.**, referring to the purpose of the design and its audience. Do not simply name them again. 6 marks

b. Explain why the methods a designer used to **develop** the design earlier in the design process are not relevant to a question about the final solution. 2 marks

Section B

*Instructions for Section B: Answer all questions in the spaces provided. Drawings must be completed using the drawing equipment permitted in this test. Marks are awarded for drawings that **apply** the technical drawing conventions correctly, not for writing about them.*

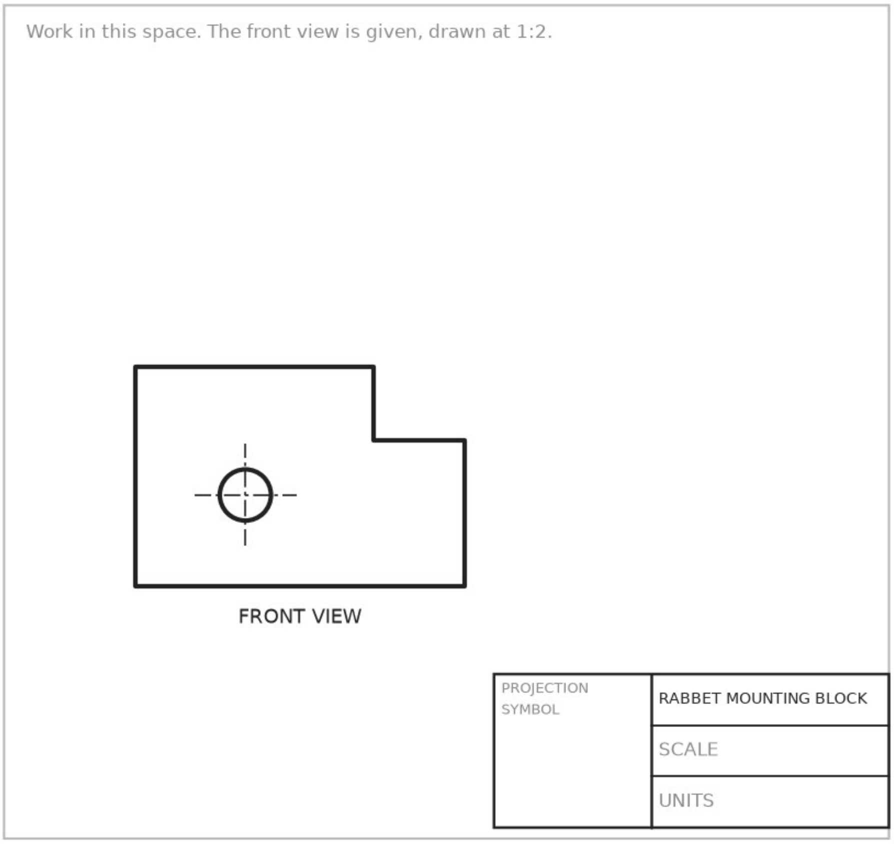
The documentation task

The manufacturer of the SPLINE coat rail needs a documentation drawing of the **RABBET mounting block** — the small aluminium block that fixes each end of the rail to the wall.

The RABBET mounting block is:

- 90 mm wide, 60 mm high and 40 mm deep
- with a **rebate** 25 mm wide and 20 mm high, cut across the **full depth** of the block at the top right
- with a **Ø14 mm hole** drilled straight **through the depth** of the block, its centre 30 mm from the left-hand edge and 25 mm from the bottom edge.

The **front view** has been drawn for you at **1:2** in the space below. Work on this drawing for Questions 5, 6 and 7.



Question 5 (8 marks)

a. Complete the **top view**, projected from the given front view and drawn to the same scale. Show the projectors you use. 3 marks

b. Complete the **right side view**, using a **45° mitre line** to transfer the depth from the top view. Show the mitre line. 3 marks

c. Show the Ø14 hole in **both** of the views you have completed, using the correct line type, and add a **centre line** through the hole in each of those views. 2 marks

Question 6 (4 marks)

a. Dimension the **front view**. Give the overall width, the overall height, the size and position of the hole, and the size of the rebate, using correct dimensioning conventions. Each measurement is to be given once only. 3 marks

b. Complete the **SCALE** and **UNITS** cells of the title block. 1 mark

Question 7 (4 marks)

a. Draw the **third-angle projection symbol** in the cell provided in the title block. 1 mark

b. Tick ONE presentation drawing method below, then draw the RABBET mounting block using that method in the space provided. 2 marks

[ ] **Paraline — isometric** [ ] **One-point perspective**

c. State one reason your chosen method is appropriate for presenting the block, referring to what that method keeps true **and** to the use the drawing would be put to. 1 mark

Topic Test 2 — Answers and marking guide

Marking guide

Question	Marks	What is being assessed
1a	3	One method, one medium and one material, each evident in the FINAL solution and correctly categorised in the Study Design’s terms
1b	1	The method correctly classified as manual or digital
2a	2	One property of the Question 1 material named + how that property can be seen in the solution (the material itself was credited in Question 1a)
2b	4	Judgement on how effectively the material was applied + mechanism + link to purpose and audience + a limitation
3a	1	The method named as paraline (isometric)
3b	2	Parallel projection (no convergence, true lengths along the axes) contrasted with converging perspective
3c	3	Drawn length calculated from the noted scale + the rule that a dimension figure always gives the object’s TRUE size
4a	6	The application of the method evaluated with a mechanism and evidence + the media evaluated the same way + a limitation + an overall judgement tied to purpose and audience (naming and categorising them was credited in Questions 1a and 1b)
4b	2	Methods, media and materials are read from the resolved solution, not from development work
5a	3	Top view directly ABOVE the front view, correct width and depth, step edge shown, projectors drawn thin and light
5b	3	Right side view to the RIGHT of the front view, correct depth and height, rebate floor shown, depth transferred on a 45° mitre line
5c	2	Hidden detail as thin dashed lines in both views + a thin chain centre line through the hole in each
6a	3	Overall dimensions outermost, hole

Question	Marks	What is being assessed
		located from its centre lines, Ø used for the hole, rebate sized, each measurement once, dimensions outside the view on extension lines taken off the feature measured
6b	1	SCALE 1:2 and DIMENSIONS IN MILLIMETRES entered in the title block
7a	1	The third-angle symbol drawn correctly (tapered profile beside two concentric circles)
7b	2	A pictorial drawing that is correctly constructed for the ticked method
7c	1	A reason tying what the method keeps true to the use the drawing serves (measurable parallel edges for the maker, or a natural converging view for a client)

Question 1

a. *(Model, using **JOINERY**.)* **Method** — relief (lino) **printing**. **Media** — printing **ink**. **Material** — uncoated **cotton-rag paper**. *(1 mark each; only the first answer in each category is marked.)*

*(Model, using **SPLINE**.)* **Method** — digital three-dimensional **modelling and rendering** (digital drawing). **Media** — three-dimensional modelling and rendering **software**. **Material — oiled ash timber** (accept powder-coated steel; both are named in the materials key).

Do not accept a piece of software as the "method" — software is media. Do not accept a vague label such as "digital process": name the actual method.

b. JOINERY — the method is **manual**. SPLINE — the method is **digital**. *(1 mark, and it must be consistent with the method given in part a.)*

Question 2

a. *(JOINERY — the material carried forward from Question 1 is **uncoated cotton-rag paper**.)* A property of it is that it is **matte and absorbent**, and this can be seen in the solution because the ink lies flat and dull with no gloss anywhere on the sheet, and the warm off-white surface shows through as flecks inside the printed areas. *(SPLINE — the material carried forward is **oiled ash**: a property is its warm, light tone and straight, open grain, seen in the solution under a matte oiled finish that throws no highlight. Accept powder-coated steel — matte, dark and non-reflective.) (1 mark the property named, 1 mark how that property can actually be seen in the solution; no mark is re-awarded for naming the material, which was credited in Question 1a. Mark consequentially: if the material named in Question 1 was wrong, credit a property correctly described for the material the student named.)*

b. *(Model, using JOINERY.)* The uncoated cotton-rag paper has been applied **effectively**. Because the surface is absorbent and non-reflective, the two flat inks sit dead matte and there is no glare, so the charcoal and rust of the joint motif hold a strong tonal contrast against the pale ground and the poster stays legible across a lit gallery foyer. The warm, slightly textured, hand-feeling stock also carries meaning: it reads as crafted and hand-made, which is exactly the subject of the exhibition, so the material reinforces the message for a design- and craft-interested audience. A **limitation** is that an uncoated, unlaminated stock marks and tears easily and would not survive outdoor display, so the choice suits a short indoor promotional run only. **Overall**, the material is well matched to the purpose and the context. *(4 marks: judgement + a mechanism drawn from the material's property + a link to purpose/audience + a limitation. A response that only asserts the material "looks good", with no mechanism drawn from its properties, no link to purpose or audience and no limitation, gains 1 mark at most.)*

(An equally creditworthy SPLINE response: the oiled ash has been applied effectively — its warm tone and visible grain signal a natural, domestic, hand-finished product, and pairing it with matte powder-coated steel gives a hard-wearing fixing at the points of load, which suits a rail that is handled daily in an entry hall. A limitation is that timber marks and moves with humidity, so the material would be less appropriate in a wet or public setting.)

Question 3

a. A **paraline** drawing — specifically an **isometric** drawing. *(1 mark; "paraline" alone is sufficient.)*

b. A paraline drawing is a **parallel projection**: the projectors are parallel to one another, so edges that are parallel on the object stay parallel on the drawing, **nothing converges**, and every length along an axis is drawn to the one scale — so a measurement can be taken directly off the drawing. A **one-point perspective** drawing imitates the eye: parallel receding edges **converge** on a vanishing point and the rail gets smaller as it recedes, so no receding length is drawn at true length and the drawing cannot be measured. *(2 marks: parallel projection / true lengths versus convergence / foreshortening.)*

c. The drawing is noted **SCALE 1:5**, a reduction, so the rail is drawn one-fifth of its true size: 450 ÷ 5 = **90 mm** on the paper. The figure written against the dimension is **450** because a dimension always states the **true size of the object**, never the length measured on the paper — the maker builds the object, not the drawing. The scale note is what tells the reader how the drawn length relates to that true size. *(3 marks: 90 mm + the true-size rule + the reason.)*

Question 4

a. *(Model, using JOINERY, carrying forward the **relief (lino) printing** method and the **printing ink** media identified in Question 1.)* The ink is applied as two flat colours pulled from two hand-cut blocks.

The method has been applied **effectively**. Cutting the image by hand gives the ragged, slightly irregular edges to the dovetail motif and leaves flecks of bare paper inside the ink areas; that visible evidence of a hand process echoes the subject of the exhibition — hand-made furniture — so the method itself carries part of the message to a craft-interested gallery audience. The ink has also been applied effectively: because relief ink prints as flat, opaque colour, the charcoal pins and rust tails hold high tonal contrast against the pale ground, so the interlocking joint motif and the title *JOINERY* read clearly from across a foyer, which suits a promotional poster.

A **limitation** is that relief printing cannot hold fine detail or photographic tone, and the second colour is visibly out of register against the first; that is acceptable — even desirable — in a short hand-printed edition, but the method could not deliver the exact repeatability a large commercial print run would need. **Overall**, the manual method and manual media have been applied effectively, because both the look they produce and the process they imply support the poster's purpose and its audience.

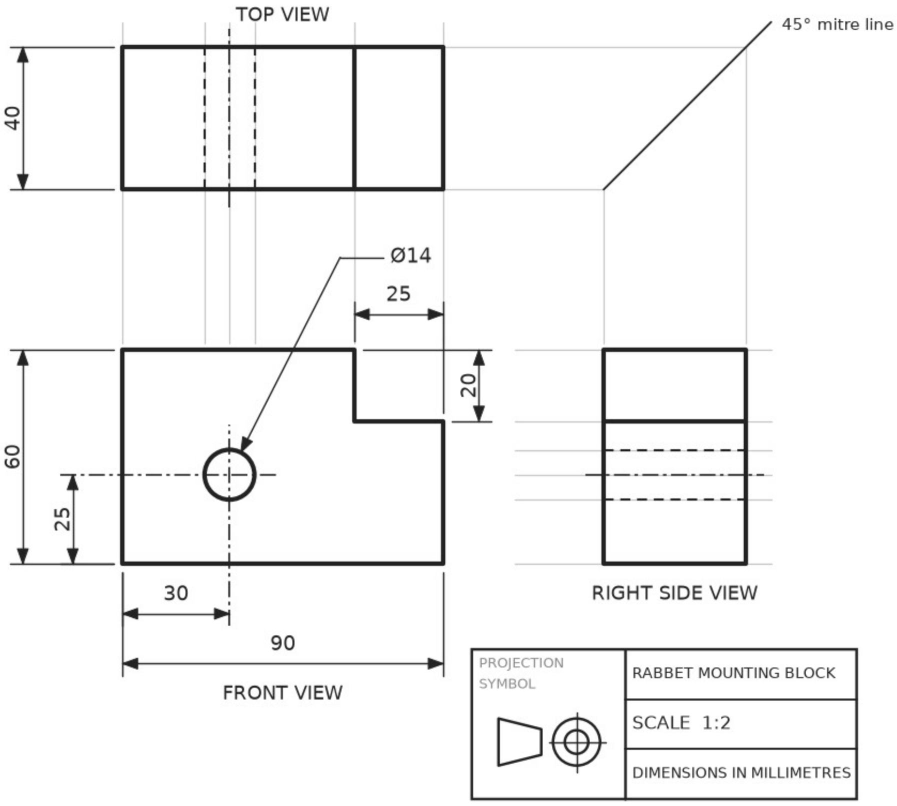
*(6 marks: the application of the **method** evaluated with a mechanism and specific evidence from the solution (2); the application of the **media** evaluated the same way (2); a limitation (1); an overall judgement tied to purpose and audience (1). Nothing is re-awarded here for naming the method and the media or for categorising them manual/digital — that was credited in Questions 1a and 1b — so a response that only names them gains no marks. Mark consequentially from whatever method and media the student named in Question 1.)*

(An equally creditworthy SPLINE response, carrying forward the digital three-dimensional modelling and rendering method and the modelling and rendering software media: applied effectively — the digital method produces exact, repeatable geometry so the paraline drawing can carry a scale and a dimension and still be measured, and the software's even, controlled tonal rendering separates the warm ash from the matte steel so a client can read the two materials at a glance. A limitation is that a rendered drawing can flatter a product, showing an idealised finish that a manufactured sample may not match.)

b. The question asks about the **resolved (final) solution**, so the methods, media and materials must be read from what is **visible in the finished design**. Sketching, ideation, mood boards and prototyping belong to the **development** phase of the design process; they are not evident in the final solution, so a response about them does not answer the question and gains no marks. *(2 marks: the question is about what is evident in the final solution + development work is not evident there.)*

Question 5

Model drawing.



a. The **top view** is placed **directly above** the front view — this is third-angle projection, and placing it below is first angle and gains no marks. It shares the object's **width** with the front view, so it is set out on light **vertical projectors** drawn up from every corner and feature of the front view. It is a 90 × 40 rectangle (width × depth), with a **thick visible outline** and a **visible line** at the 65 mm mark, projected up from the change of profile in the front view — this is the edge where the top surface meets the rebate floor. Projectors and construction lines are left **thin and light** so they do not compete with the outline. *(3 marks: correct placement above; correct width and depth to the same scale, aligned by projectors; the step edge shown as a visible line.)*

b. The **right side view** is placed **to the right** of the front view. It shares the object's **height** with the front view, so the heights are carried across on light **horizontal projectors**. Its **depth** is the measurement it shares with the top view, and it is transferred on a **45° mitre line** struck from the corner where the front edge of the top view meets the front edge of the side view: each depth is run horizontally out of the top view to the mitre line, then turned vertically down into the side view. The result is a 40 (depth) × 60 (height) rectangle in thick visible outline, with a **visible line** at the 40 mm mark where the rebate floor is seen edge-on. *(3 marks: correct placement to the right; mitre line drawn and used to transfer the depth; correct outline with the rebate floor shown.)*

c. The Ø14 hole is drilled through the depth, so it cannot be seen in either the top view or the side view: in each it is shown as a pair of **thin dashed (hidden-detail) lines** running the full depth — vertical lines 23 mm and 37 mm from the left in the top view, horizontal lines 18 mm and 32 mm above the base in the side view. A **thin chain centre line** (long dash–short dash) is drawn through the hole in each view, extending a little beyond the outline, to mark its axis. *(2 marks: hidden detail as thin dashed lines in both views; a chain centre line in each. Hidden detail drawn as a continuous line, or omitted, gains no mark.)*

Question 6

a. Dimension the front view with thin **extension lines** that start with a **small gap** from the outline and run a little past the dimension line, and **dimension lines** with **arrowheads** whose points touch the extension lines, the figure placed centrally and clear of the line:

- overall width **90** and overall height **60**, placed **outermost**;

- the hole located from its **centre lines**, which are **extended out of the view** so that they carry the location dimensions — **30** from the left edge and **25** from the bottom edge — placed nearer the view;
- the hole sized **Ø14** on a leader whose **arrowhead touches the circle** (Ø for a full hole; **R** would be wrong);
- the rebate sized **25** wide, taken **above** the view — the one side on which its extension lines run clear of the material — and **20** high, taken at the **right**.

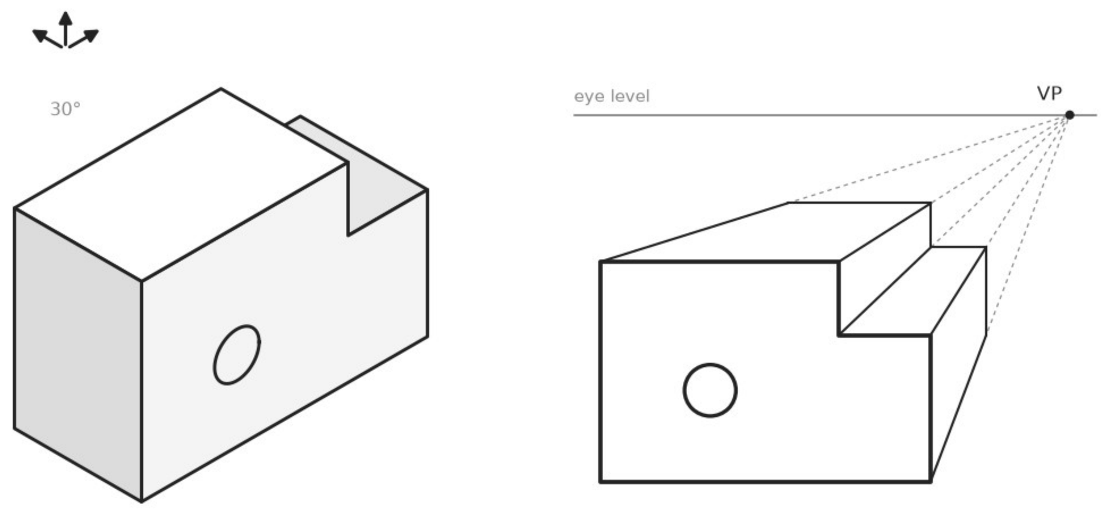
Every measurement is given **once**, dimensioned to **visible outlines** (or, for the hole's position, to the extended centre lines), and placed **outside** the view. No extension line is run through the solid body of the block. The figures are the object's **true sizes**, even though the view is drawn at half size. *(3 marks: one for the overall dimensions placed correctly; one for the hole located from its centre lines and sized with Ø; one for the rebate sized and for correct extension/dimension-line convention with no duplicated measurement.)*

b. SCALE 1:2 in the scale cell and **DIMENSIONS IN MILLIMETRES** in the units cell. *(1 mark for both; accept "mm" for the units cell.)*

Question 7

a. The **third-angle projection symbol** — a small truncated cone drawn as a tapered (trapezoidal) profile beside its end view of **two concentric circles**, with centre lines — placed in the title block so the reader knows the views are arranged in third angle and does not read them mirror-reversed. *(1 mark; see the model drawing for Question 5.)*

b. Either ticked method is fully creditworthy. Model drawings for both are shown below.



Paraline — isometric (measurable)   One-point perspective (not measurable)

Paraline — isometric: crate the block on two receding axes at **30°** to the horizontal and a vertical axis, all three drawn to the **one scale**; measure only along an axis; cut the rebate out of the crate; and draw the hole as an **ellipse**, because a circle on a skewed isometric plane is never a circle. **One-point perspective:** draw the front face at **true shape** (so the hole stays a **circle**), set a **vanishing point** on the eye-level line, run the receding edges back to it, and stop them to give the depth. *(2 marks: a pictorial correctly constructed for the ticked method — for isometric, parallel receding edges at 30° and an elliptical hole; for one-point, a true-shape front face with all receding edges converging on a single vanishing point. 1 mark for a recognisable but partly incorrect construction, for example a "perspective" with edges that do not meet at one point, or an isometric with a circular hole.)*

c. Accept either, tied to what the method keeps true. **Isometric:** it keeps edges **parallel** and every axial length **to scale**, so the drawing is **measurable** — the manufacturer can take sizes from it as well as read the form. **One-point perspective:** it converges on a vanishing point in the way the eye sees, so it gives the most **natural, persuasive** impression of the block in use, which suits presenting a proposal to a client. *(1 mark; the reason must connect what the method keeps true to the use the drawing serves. A reason that does not refer to what the method keeps true — for example "it looks better" — gains no mark, and so does a bare statement that a paraline drawing can be measured, with no reference to who needs to measure it: that point is credited in Question 3b.)*