Mathematics Level 4

Chapter 3 — Algebra: number facts and unknown values

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Contents

Multiplication facts to 10 × 10 and the related division facts

Code `VC2M4A02` (Victorian Curriculum F–10 Version 2.0, Mathematics, Level 4; authority file `maths_4.json`): "recall and demonstrate proficiency with multiplication facts up to 10 × 10 and related division facts, and explain the patterns in these; extend and apply facts to develop efficient mental and written strategies for computation with larger numbers without a calculator". This section draws on elaborations `VC2M4A02.E01`–`VC2M4A02.E04`.

What you need to know

In Year 3 you learnt the 3, 4, 5 and 10 times tables. Those known facts are your building blocks. This section completes the whole table up to 10 × 10, and turns every multiplication fact into division facts as well.

The table. The multiplication table below shows every fact up to 10 × 10. To read 6 × 7, go along the 6 row and down the 7 column. They meet at 42.

The multiplication table up to 10 × 10

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Find 6 × 7: go along the 6 row and down the 7 column. They meet at 42.

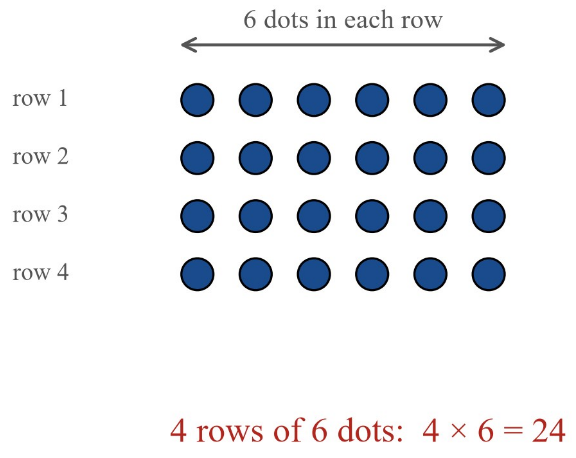
A multiplication table with rows and columns labelled 1 to 10 and every product filled in. The 6 row and the 7 column are shaded, and the cell where they meet, 42, is shaded red.

There are 100 facts in the table, but you never have to learn 100 separate facts. Patterns and known facts make the job much smaller.

Patterns to notice.

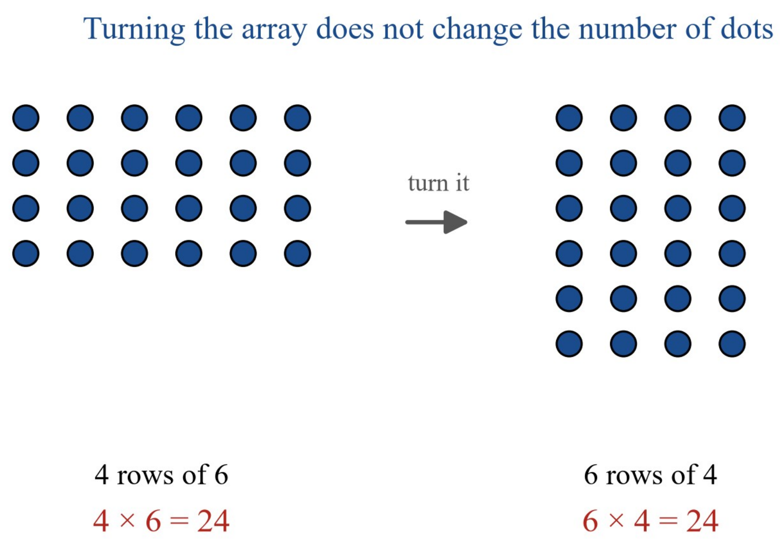
- The × 10 facts all end in 0: 10, 20, 30, …, 100.
- Every fact appears twice, once each way round: 6 × 7 = 42 and 7 × 6 = 42.
- The facts where both numbers are the same run from the top left corner to the bottom right corner: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.

Arrays. An **array** is a set of dots lined up in equal rows. Here is an array of 4 rows of 6 dots.



An array of blue dots in 4 rows of 6, with the rows labelled row 1 to row 4, an arrow above showing 6 dots in each row, and the fact 4 × 6 = 24 below.

Four rows of 6 dots is 4 × 6 = 24. Now turn the array.

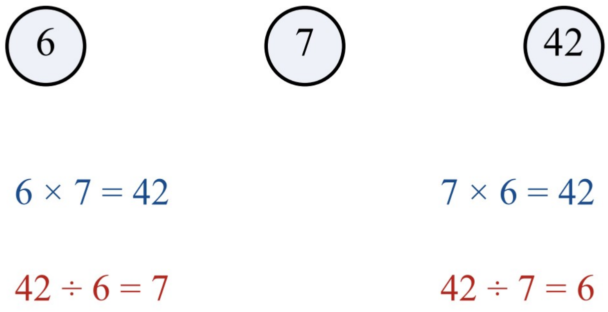


Two arrays side by side: 4 rows of 6 dots on the left and 6 rows of 4 dots on the right, with an arrow between labelled "turn it". Both are labelled 24 dots: 4 × 6 = 24 and 6 × 4 = 24.

Turning the array does not change the number of dots, so 4 × 6 = 24 and 6 × 4 = 24. Knowing a fact one way round means you know it the other way round as well. That is why the table shows every fact twice, and it cuts the learning job nearly in half.

The related division facts. The numbers 6, 7 and 42 make one **fact family**: two multiplication facts and two division facts, all from the same three numbers.

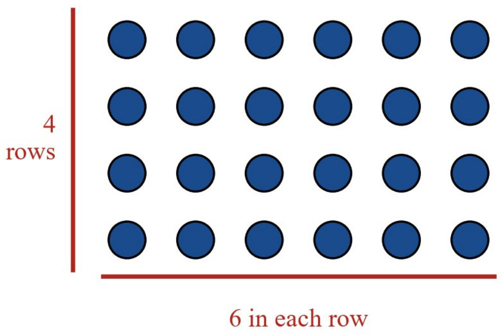
One fact family: 6, 7 and 42



Two multiplication facts and two division facts, all from the same three numbers

Three circles holding the numbers 6, 7 and 42, with the four facts of the family written below: $6 \times 7 = 42$, $7 \times 6 = 42$, $42 \div 6 = 7$ and $42 \div 7 = 6$.

Division undoes multiplication. $42 \div 6$ asks: *if 42 dots are shared into 6 equal rows, how many dots are in each row?* The array gives the answer.



24 dots in 4 rows of 6

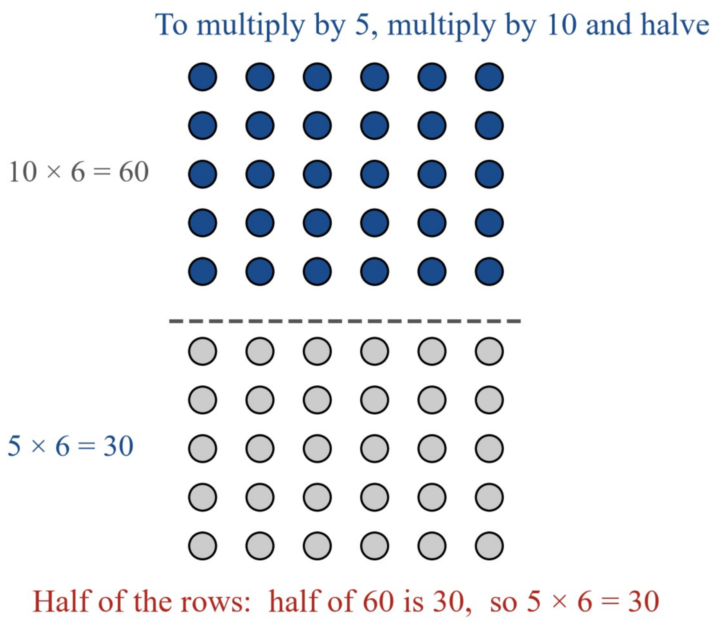
$24 \div 4 = 6$ and $24 \div 6 = 4$

An array of 24 blue dots in 4 rows of 6, with a red line marking 4 rows down the side and a red line marking 6 in each row along the bottom, and the facts $24 \div 4 = 6$ and $24 \div 6 = 4$ below.

The same 24 dots read two ways: 24 shared into 4 rows gives 6 in a row ($24 \div 4 = 6$), and 24 shared into rows of 6 gives 4 rows ($24 \div 6 = 4$). So one array holds the whole fact family.

Patterns that build new facts. You can also grow facts you know into facts you do not know yet.

- **Doubling.** Six is two 3s, so the 6 facts are double the 3 facts: $3 \times 8 = 24$, and 24 doubled is 48, so $6 \times 8 = 48$.
- **Halving.** Five is half of 10, so the 5 facts are half the 10 facts.



An array of 10 rows of 6 dots, with the top 5 rows blue and the bottom 5 rows grey, split by a dashed line. The whole array is 10 × 6 = 60 and the top half is 5 × 6 = 30.

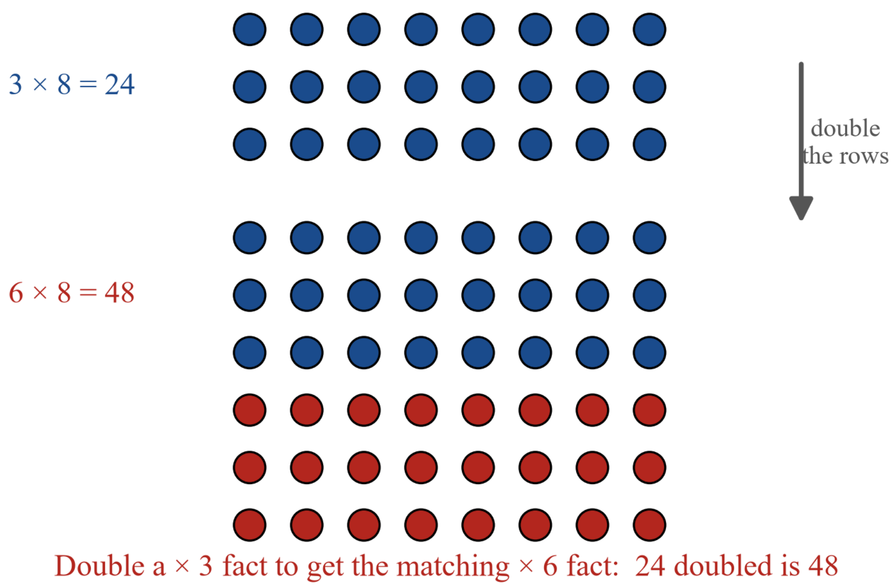
- **Nines from tens.** Nine is 10 take away 1, so $9 \times 7 = 10 \times 7 - 7 = 70 - 7 = 63$.
- **Splitting sevens.** Seven is 2 and 5, so $8 \times 7 = 8 \times 2 + 8 \times 5 = 16 + 40 = 56$.

These four moves — doubling, halving, using the tens and splitting — are the strategies this section uses.

Worked examples

Example 1 — doubling the 3 facts to get the 6 facts

Use your 3 facts to find 6×8.



Two arrays: 3 rows of 8 dots on top labelled 3 × 8 = 24, and 6 rows of 8 dots below it, the extra 3 rows in red, labelled 6 × 8 = 48, with a down arrow between labelled "double the rows".

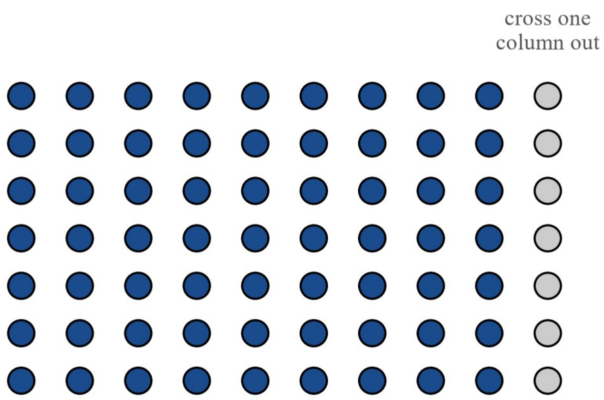
Working	Comment
$3 \times 8 = 24$	A known 3 fact.

Working	Comment
24 doubled is 48	Six is two 3s, so 6 rows of 8 is double 3 rows of 8.

6 × 8 = **48**. And the family comes with it: 48 ÷ 6 = 8 and 48 ÷ 8 = 6.

Example 2 — the 9 facts from the 10 facts

Find 9 × 7.



10 × 7 = 70, take away one column of 7: 70 − 7 = 63

so 9 × 7 = 63

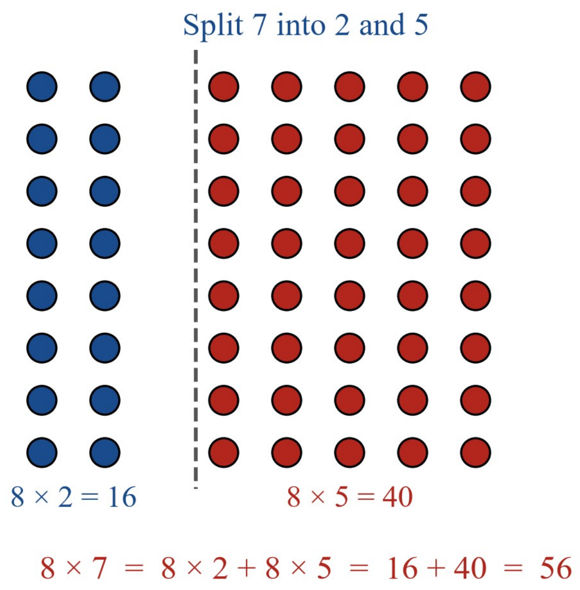
An array of 7 rows of 10 dots with the last column grey, and the working 10 × 7 = 70, take away one column of 7: 70 − 7 = 63, so 9 × 7 = 63.

Working	Comment
10 × 7 = 70	A known 10 fact: 7 rows of 10.
70 − 7 = 63	Cross out one column of 7: that leaves 9 columns.

9 × 7 = **63**. The division facts follow: 63 ÷ 9 = 7 and 63 ÷ 7 = 9.

Example 3 — splitting 7 into 2 and 5

Find 8 × 7.



An array of 8 rows of 7 dots split by a dashed line into 8 rows of 2 blue dots and 8 rows of 5 red dots, with the working 8 × 7 = 8 × 2 + 8 × 5 = 16 + 40 = 56.

Working	Comment
$8 \times 2 = 16$	A known 2 fact.
$8 \times 5 = 40$	A known 5 fact.
$16 + 40 = 56$	Put the two parts of the array back together.

$8 \times 7 =$ **56**, and $56 \div 8 = 7$, $56 \div 7 = 8$.

Practice questions

Questions with help

Q1. Use the multiplication table to find: (a) 6 × 7; (b) 7 × 7; (c) 9 × 6.

Q2. Look at the array of dots with 4 rows of 6. (a) How many dots are in each row? (b) How many rows are there? (c) Write the multiplication fact the array shows.

Q3. You know 4 × 6 = 24. What is 6 × 4? Give a reason using the turning picture.

Q4. The fact 6 × 7 = 42 belongs to a fact family. Write the two division facts of the family.

Q5. You know 5 × 8 = 40. Write 40 ÷ 5 and 40 ÷ 8.

Q6. 3 × 7 = 21. Double 21. Which 6 fact does this give you?

Q7. Finish the strategy for 9 × 6: 10 × 6 = 60, then take away one group of 6: 60 − 6 = ____, so 9 × 6 = ____.

Q8. 10 × 8 = 80, and half of 80 is 40. Which 5 fact does this show?

Questions on your own

Q9. Write the answers: (a) 7 × 8; (b) 6 × 9; (c) 8 × 8; (d) 9 × 9.

Q10. Write the two division facts related to 7 × 9 = 63.

Q11. True or false: 8 × 6 has the same answer as 6 × 8. Explain your answer using the idea of an array.

Q12. Find 9 × 8 using your 10 facts. Show your working.

Q13. Find 6×9 by doubling a 3 fact. Show your working.

Q14. What is $56 \div 8$? Say which multiplication fact helps you.

Q15. Split 7 into 2 and 5 to find 7×7. Show your working.

Q16. Here are the 9 facts: 9, 18, 27, 36, 45, 54, 63, 72, 81, 90. Describe the pattern in the ones digits, and explain why the pattern works.

Q17. Explain why every 8 fact is an even number.

Q18. Give two different multiplication facts with the answer 36, then write a division fact for each of them.

Q19. A box holds 6 eggs. How many eggs are in 9 boxes? Write the fact.

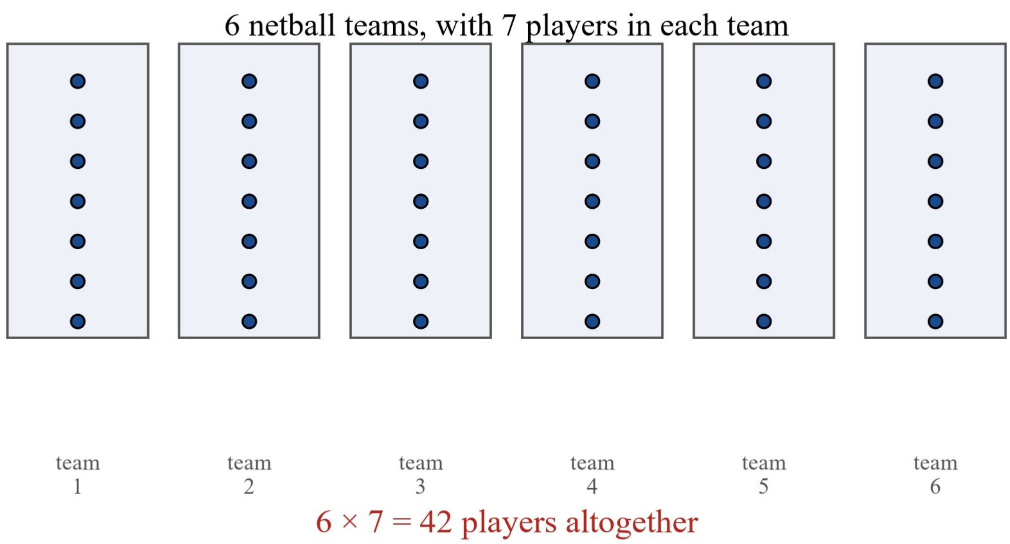
Q20. Which is greater: 7×9 or 8×8? Show how you know.

Applied

Q21. In netball, each team has 7 players on the court.

> Source: Wikipedia, *Netball*, en.wikipedia.org, retrieved 2026-08-20. Source: Wikipedia, *Melbourne Vixens*, en.wikipedia.org, retrieved 2026-08-20.

The Melbourne Vixens, based in Melbourne, play their home games in Victoria's top netball competition, and netball clubs across Victoria run teams of 7 on the court.



Six light boxes in a row, labelled team 1 to team 6, each holding 7 blue dots in a column, with the fact $6 \times 7 = 42$ players altogether below.

(a) Six teams are on the court, with 7 players in each team. How many players are on the court altogether? Write the multiplication fact.

(b) Write the two division facts from the same three numbers.

(c) A Melbourne netball club has 42 players at training. They split into teams of 7 for a game. How many teams do they make?

(d) A player warms up by counting her 7 facts. Use your 2 and 5 facts to find 7×8. Show your working.

Answers

Q1. (a) 42; (b) 49; (c) 54. **Q2.** (a) 6; (b) 4; (c) 4 × 6 = 24. **Q3.** 24. **Q4.** 42 ÷ 6 = 7 and 42 ÷ 7 = 6. **Q5.** 40 ÷ 5 = 8 and 40 ÷ 8 = 5. **Q6.** 42; 6 × 7 = 42. **Q7.** 54; 54. **Q8.** 5 × 8 = 40. **Q9.** (a) 56; (b) 54; (c) 64; (d) 81. **Q10.** 63 ÷ 7 = 9 and 63 ÷ 9 = 7. **Q11.** True. **Q12.** 72. **Q13.** 54. **Q14.** 7; 7 × 8 = 56. **Q15.** 49. **Q16.** See worked answers. **Q17.** See worked answers. **Q18.** For example 6 × 6 = 36 and 4 × 9 = 36; 36 ÷ 6 = 6 and 36 ÷ 4 = 9. **Q19.** 54; 6 × 9 = 54. **Q20.** 8 × 8. **Q21.** (a) 42; 6 × 7 = 42; (b) 42 ÷ 6 = 7 and 42 ÷ 7 = 6; (c) 6; (d) 56.

Worked answers

Q1. Read straight off the table: (a) the 6 row and 7 column meet at **42**; (b) 7 × 7 = **49**; (c) the 9 row and 6 column meet at **54**.

Q2. (a) **6** dots in each row. (b) **4** rows. (c) **4 × 6 = 24**.

Q3. 24. Turning the 4-by-6 array gives 6 rows of 4 with the same 24 dots, so 6 × 4 = 24 as well.

Q4. 42 ÷ 6 = 7 and **42 ÷ 7 = 6** — the two division facts of the 6, 7, 42 family.

Q5. 40 ÷ 5 = **8** and 40 ÷ 8 = **5**.

Q6. 21 doubled is 42, so **6 × 7 = 42** — the 6 fact is double the matching 3 fact.

Q7. 60 − 6 = **54**, so 9 × 6 = **54**.

Q8. Half the rows of 10 × 8 = 80 is 5 rows, so **5 × 8 = 40**.

Q9. (a) 7 × 8 = **56**; (b) 6 × 9 = **54**; (c) 8 × 8 = **64**; (d) 9 × 9 = **81**.

Q10. 63 ÷ 7 = 9 and **63 ÷ 9 = 7**.

Q11. True. An array of 8 rows of 6 dots, turned, is 6 rows of 8 dots with the same number of dots, so 8 × 6 = 6 × 8 = 48.

Q12. 10 × 8 = 80, then take away one group of 8: 80 − 8 = **72**. So 9 × 8 = 72.

Q13. 3 × 9 = 27, and 27 doubled is **54**. So 6 × 9 = 54.

Q14. 56 ÷ 8 = **7**, because 7 × 8 = 56 — division undoes multiplication.

Q15. 7 × 2 = 14 and 7 × 5 = 35, then 14 + 35 = **49**. So 7 × 7 = 49.

Q16. The ones digits step down 9, 8, 7, 6, 5, 4, 3, 2, 1, 0. Each new 9 fact adds 9, which is adding 10 and taking away 1, so the ones digit gets 1 less each step.

Q17. 8 is even, and the first 8 fact, 8 itself, is even. Adding 8 to an even number always gives an even number, so counting on by 8s never lands on an odd number.

Q18. 6 × 6 = 36 and 4 × 9 = 36. The division facts: 36 ÷ 6 = 6 and 36 ÷ 4 = 9. (9 × 4 = 36 with 36 ÷ 9 = 4 is also fine.)

Q19. 9 boxes of 6 eggs is 9 × 6 = **54 eggs**.

Q20. 7 × 9 = 63 and 8 × 8 = 64, so **8 × 8 is greater**, by 1.

Q21. (a) 6 teams of 7 players: 6 × 7 = **42 players**. (b) **42 ÷ 6 = 7** and **42 ÷ 7 = 6**. (c) 42 players split into teams of 7: 42 ÷ 7 = **6 teams**. (d) 7 is 2 and 5, so 7 × 8 = 2 × 8 + 5 × 8 = 16 + 40 = **56**.

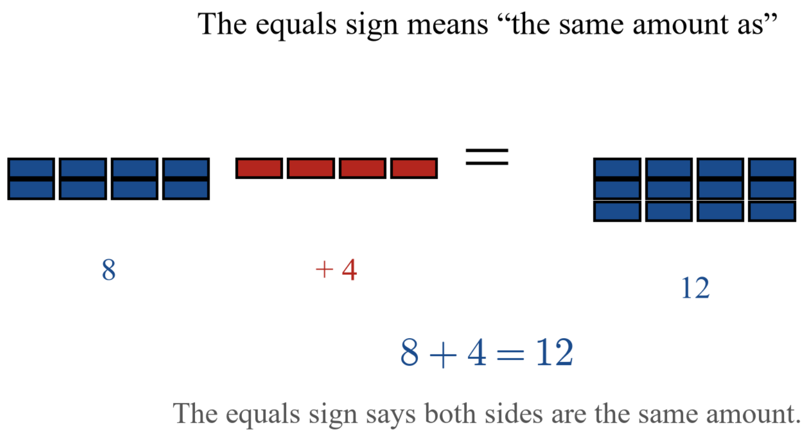
Finding unknown values in numerical equations

Code `VC2M4A01` (Victorian Curriculum F–10 Version 2.0, Mathematics, Level 4; authority file `maths_4.json`): "find unknown values in numerical equations involving addition and subtraction, using the properties of numbers and operations". This section draws on elaborations `VC2M4A01.E01`, `.E02` and `.E03`.

What you need to know

In Year 3 you learned your addition and subtraction facts to 20, and you found that addition and subtraction undo each other. This section uses both of those ideas to find missing numbers in equations.

The equals sign. In an equation like $8+4=12$, the equals sign does not mean "the answer comes next". It means "is the same amount as". Read $8+4=12$ as *eight plus four is the same amount as twelve*.

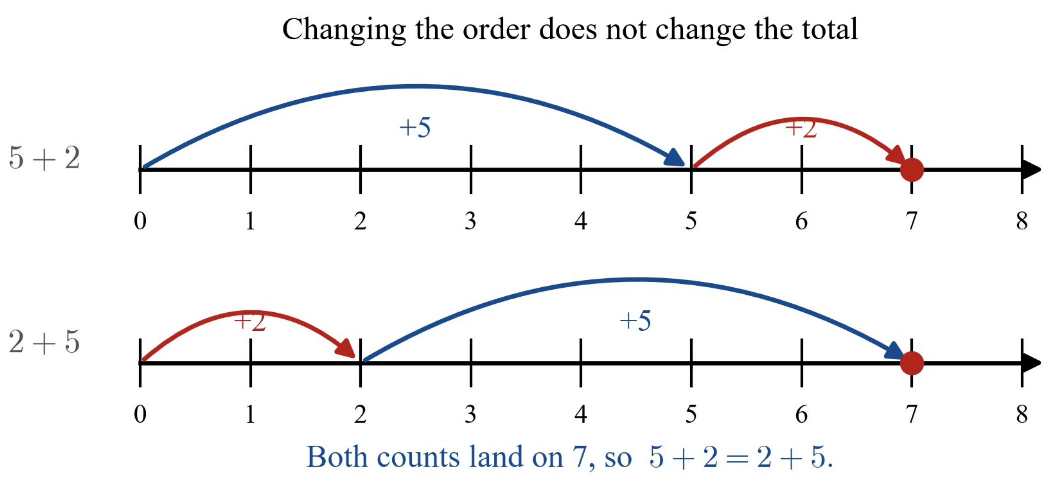


Two collections of blocks. On the left are 8 blue blocks and 4 red blocks. On the right are 12 blue blocks. The label says 8 + 4 = 12, and the equals sign says both sides are the same amount.

Both sides of an equation are always the same amount. That one idea runs through this whole section.

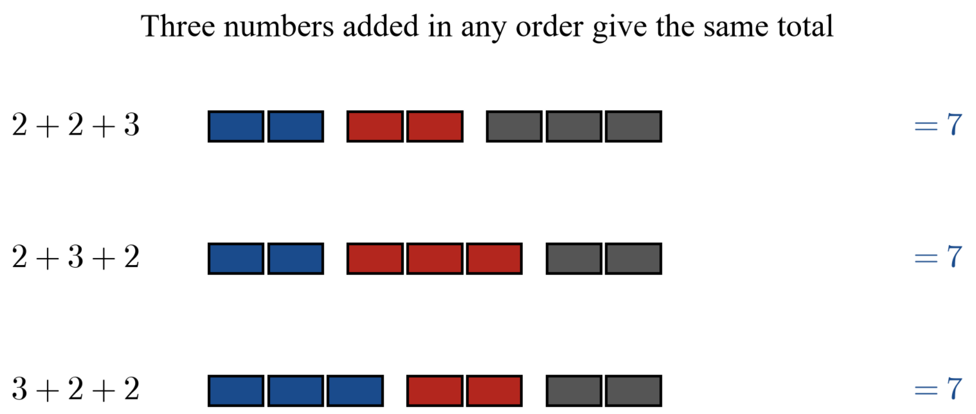
The unknown: a box. Sometimes one number in an equation is missing. We write a box, □, in its place. In $\square+6=10$ the box is the missing number. Ask: *what number added to 6 gives 10?* The box is 4, because $4+6=10$.

The order in addition does not matter. Count 5 then add 2, or count 2 then add 5. On a number line, both counts land on 7:



Two number lines from 0 to 8. The top line shows a jump of 5 then a jump of 2, landing on 7. The bottom line shows a jump of 2 then a jump of 5, also landing on 7. The label says changing the order does not change the total.

So $5+2=2+5$, and both sides are 7. This is the **commutative property of addition**: changing the order of the numbers being added does not change the total. It works for three numbers too:



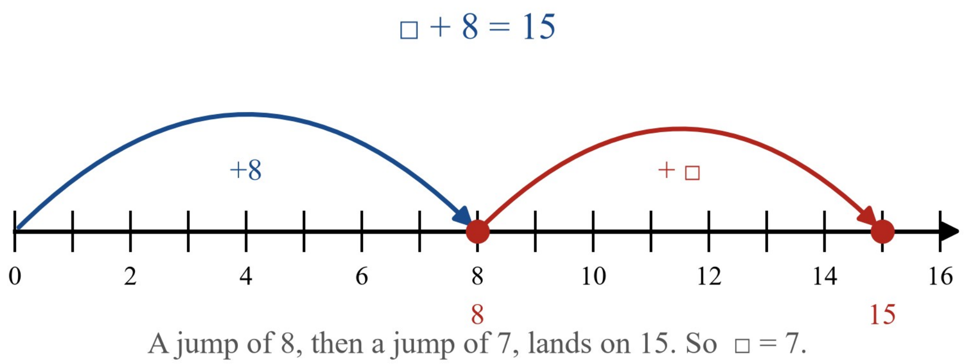
Three rows of 7 blocks, each row made from groups of 2, 2 and 3 in a different order. The first row is 2 + 2 + 3, the second is 2 + 3 + 2 and the third is 3 + 2 + 2. Each row ends with = 7.

$2+2+3=7$, $2+3+2=7$ and $3+2+2=7$. The same three numbers, added in any order, give the same total.

But the order in subtraction does matter. $7-2=5$, yet $2-7$ is not 5. Swapping the order in subtraction changes the answer, so there is no commutative property for subtraction.

Finding an unknown by undoing. Because addition and subtraction undo each other, you can always find a box:

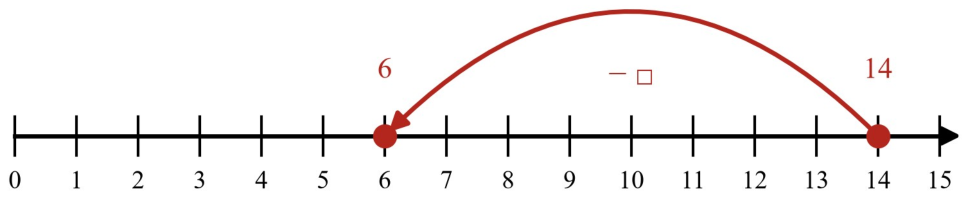
- $\square+8=15$: undo the adding. $15-8=7$, so the box is 7.
- $\square-6=9$: undo the taking away. $9+6=15$, so the box is 15.
- $14-\square=6$: $14-6=8$, so the box is 8.



A number line from 0 to 16. A jump of 8 goes from 0 to 8, then a red jump marked + box goes from 8 to 15. The label says a jump of 8 then a jump of 7 lands on 15, so the box is 7.

The first figure shows $\square+8=15$: after a jump of 8, the red jump that lands on 15 must be 7. The next figure shows $14-\square=6$: jumping back from 14 to 6 is a jump of 8.

$14 - \square = 6$



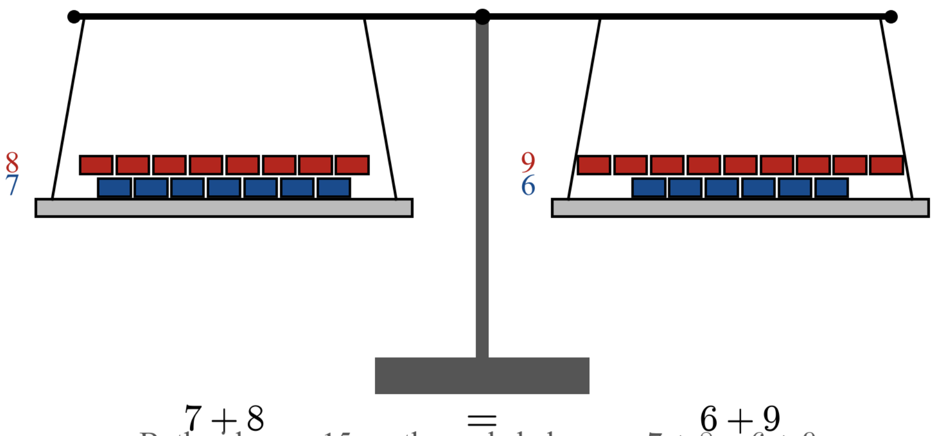
Jumping back from 14 to 6 is a jump of 8. So $\square = 8$.

A number line from 0 to 15. A red arrow jumps back from 14 to 6, marked − box. The label says jumping back from 14 to 6 is a jump of 8, so the box is 8.

Always put your answer back into the equation to check it: $7+8=15$ ✓, $15-6=9$ ✓, $14-8=6$ ✓.

Equal amounts and balance scales. A balance scale sits level when both sides hold the same amount. Here the left side holds 7 blocks and 8 more, and the right side holds 6 blocks and 9 more. Both sides hold 15, so the scale balances:

A balance scale shows equal amounts



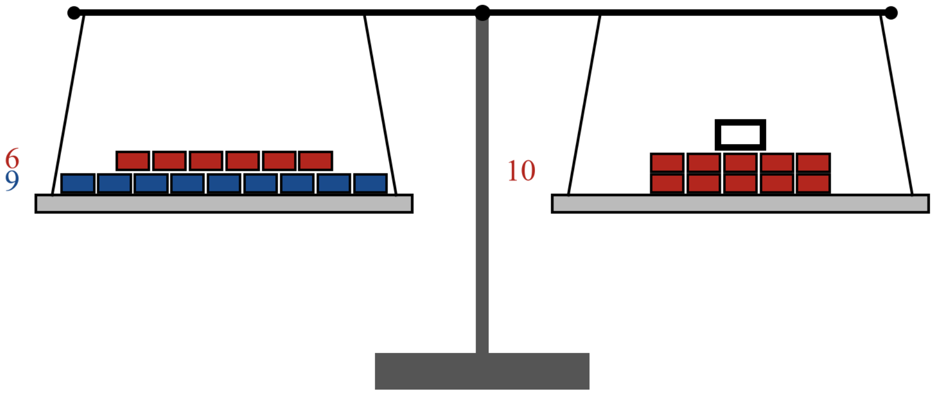
Both sides are 15, so the scale balances: $7+8=6+9$.

A balance scale sitting level. The left pan holds 7 blue blocks and 8 red blocks. The right pan holds 6 blue blocks and 9 red blocks. The label says both sides are 15, so the scale balances: 7 + 8 = 6 + 9.

An equation with numbers on both sides, like $7+8=6+9$, says the same thing as the scale: the left side and the right side are the same amount.

Finding an unknown with a balance scale. Now the right pan holds a hidden box of blocks and 10 more. The scale balances, so the right side must also be 15:

Finding an unknown with a balance scale



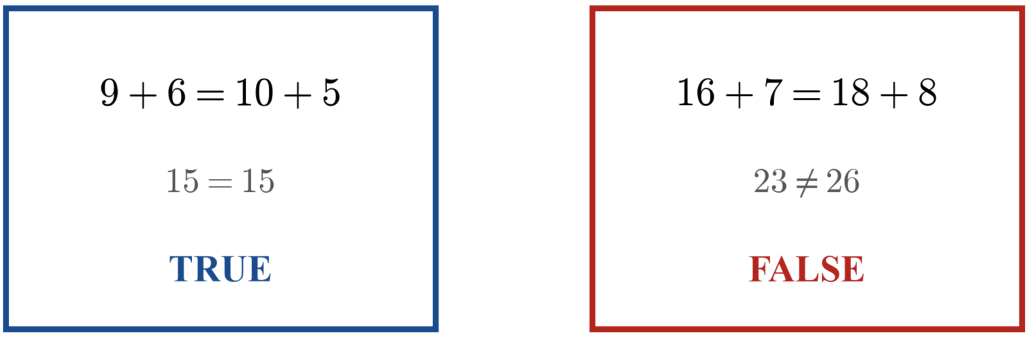
$9 + 6 = \square + 10$

The scale balances. The left side is 15, so $\square + 10 = 15$ and $\square = 5$.

A balance scale sitting level. The left pan holds 9 blue blocks and 6 red blocks. The right pan holds an open box above 10 red blocks. The label says 9 + 6 = box + 10, and the box must be 5.

Work out the side with no box first: $9+6=15$. Then $\square+10=15$, so $\square=15-10=5$.

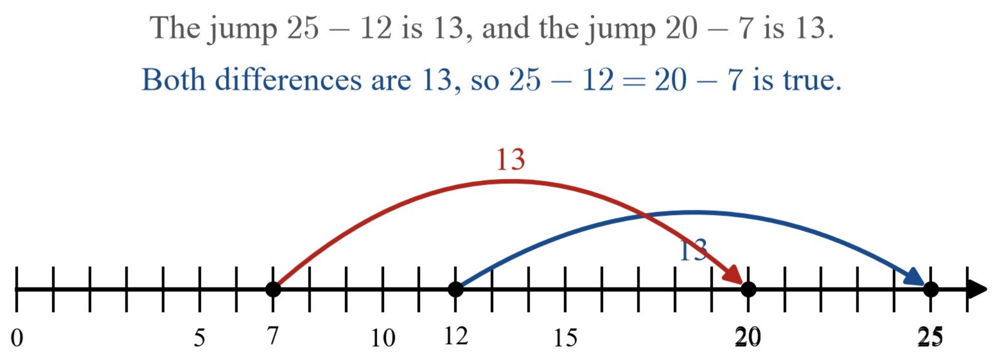
True or false equations. To decide whether an equation is true, work out both sides and compare them. $9+6=10+5$ is true, because $15=15$. $16+7=18+8$ is false, because 23 is not 26.



Work out both sides, then compare them.

Two cards. The first card shows 9 + 6 = 10 + 5, with 15 = 15 under it and the word TRUE. The second card shows 16 + 7 = 18 + 8, with 23 not equal to 26 under it and the word FALSE.

Sometimes you can see that an equation is true without working out both sides. Look at $25-12=20-7$. On the number line, both differences are jumps of 13:



A number line from 0 to 26. A blue jump of 13 goes from 12 to 25, and a red jump of 13 goes from 7 to 20. The label says both differences are 13, so 25 − 12 = 20 − 7 is true.

Notice why: 25 is 5 more than 20, and 12 is 5 more than 7, so the two jumps are the same length. That way of thinking about equations — comparing the sides instead of just calculating — is called relational thinking.

Where this section stops. In this section the unknown is only ever in an addition or a subtraction equation, and it is always a box or a blank. Finding unknowns in multiplication and division equations comes in Year 5, and letters that stand for numbers come much later. You have everything you need with your addition and subtraction facts.

Worked examples

Example 1 — step by step: find the unknown

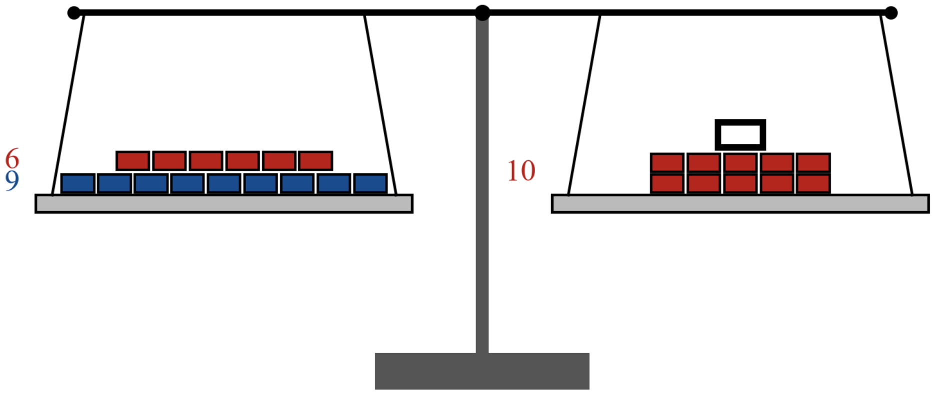
Find the number that goes in the box. (a) $\square + 9 = 17$ (b) $\square - 6 = 11$ (c) $23 - \square = 15$.

Working	Comment
(a) $\square + 9 = 17$. Undo the adding: $17 - 9 = 8$.	Addition and subtraction undo each other.
Check: $8 + 9 = 17$ ✓	Put 8 back in the box. Both sides match.
(b) $\square - 6 = 11$. Undo the taking away: $11 + 6 = 17$.	6 taken away from the box gives 11. So the box is 11 and 6 more.
Check: $17 - 6 = 11$ ✓	Put 17 back in the box.
(c) $23 - \square = 15$. $23 - 15 = 8$, so the box is 8.	23, take away 8, lands on 15.
Check: $23 - 8 = 15$ ✓	Put 8 back in the box.

Example 2 — step by step: an unknown with numbers on both sides

The scale balances. Find the box: $9 + 6 = \square + 10$.

Finding an unknown with a balance scale



$9 + 6 = \square + 10$

The scale balances. The left side is 15, so $\square + 10 = 15$ and $\square = 5$.

A balance scale sitting level. The left pan holds 9 blue blocks and 6 red blocks. The right pan holds an open box above 10 red blocks. The label says 9 + 6 = box + 10, and the box must be 5.

Working	Comment
Left side: $9+6=15$.	Work out the side with no box first.
So $\square+10=15$.	The scale balances, so both sides are the same amount.
$15-10=5$, so $\square=5$.	Undo the adding.
Check: $9+6=15$ and $5+10=15$ ✓	Both sides are 15, so the equation is true.

Example 3 — step by step: true or false?

(a) Is $25-12=20-7$ true? (b) Is $16+7=18+8$ true?

Working	Comment
(a) Left: $25-12=13$. Right: $20-7=13$.	Work out each side.
$13=13$, so the equation is true.	Both sides are the same amount.
(b) Left: $16+7=23$. Right: $18+8=26$.	Work out each side.
23 is not 26, so the equation is false.	The two sides are not the same amount.
Think: in (a), 25 is 5 more than 20 and 12 is 5 more than 7.	So the two differences must match, even before you work them out.

Practice questions

Questions with help

Q1. Find the number that goes in the box. Undo the adding.

(a) $\square+6=13$
(b) $\square+9=17$

Q2. Find the number that goes in the box.

(a) $8+\square=15$
(b) $\square+7=12$

Q3. Find the number that goes in the box. Undo with the other operation.

(a) $\square-5=9$
(b) $16-\square=8$

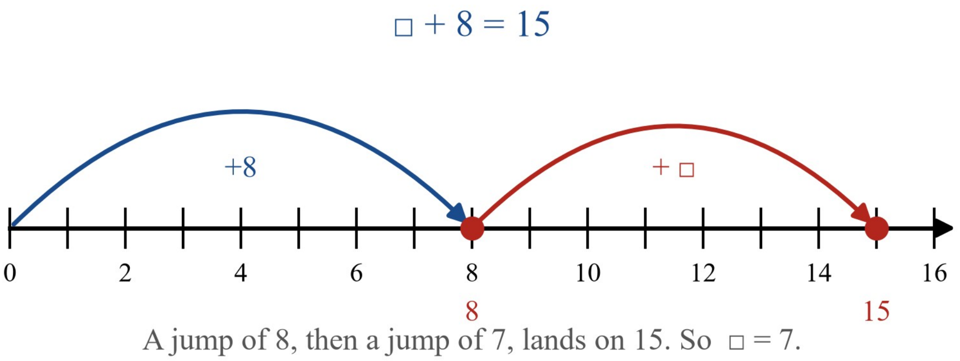
Q4. Fill in the missing number: $5+2=2+$ ____ . What is the name of the property of addition this shows?

Q5. A balance scale sits level with 7 blocks and 8 more on the left, and 6 blocks and a hidden box on the right. Find the box: $7+8=6+\square$. (Hint: work out the left side first.)

Q6. True or false? $9+6=10+5$. Work out both sides and compare them.

Q7. Find the box. Both sides must be 16: $12+4=\square+7$.

Q8. The jumps below show an equation with a box. Write the equation, then find the box.



A number line from 0 to 16. A jump of 8 goes from 0 to 8, then a red jump marked + box goes from 8 to 15. The label says a jump of 8 then a jump of 7 lands on 15, so the box is 7.

Questions on your own

Q9. Find the box.

(a) $\square+14=25$
(b) $\square+27=50$
(c) $36+\square=61$

Q10. Find the box.

(a) $\square-13=24$
(b) $48-\square=19$
(c) $\square-25=25$

Q11. Find the box.

(a) $17+\square=42$
(b) $\square-18=36$
(c) $72-\square=35$

Q12. Fill in the missing number.

(a) $8+3=$ ____ $+8$
(b) $6+9=9+$ ____
(c) Is $8-3=3-8$ true? Explain your answer.

Q13. $4+1+5=10$. Write two other orders for 4, 1 and 5 that also give 10.

Q14. A balance scale sits level. Find the box.

(a) $8+7=\square+10$
(b) $13+6=9+\square$

Q15. Write an equation with the same total as $9+5$, but with different numbers on both sides.

Q16. True or false? Work out both sides.

(a) $24 - 9 = 18 - 3$
(b) $15 + 8 = 17 + 7$
(c) $30 - 12 = 25 - 7$

Q17. Without working out both sides, explain why $34 - 14 = 28 - 8$ is true.

Q18. The same number goes in each box. What is it? $\square + \square = 18$.

Q19. Liam had some marbles. He won 8 more. Now he has 21. Write an equation with a box, then find how many marbles Liam had to start.

Q20. Put 3, 8 and 11 into the boxes to make a true equation: $\square + \square = \square$.

Applied

Q21. In Australian rules football (AFL), a goal is worth 6 points and a behind is worth 1 point. A team's score is the points from goals plus the points from behinds.

Source: Australian Football League, *Laws of Australian Football* (13 February 2026), afl.com.au, retrieved 2026-08-20.

Scoreboard

A goal is 6 points, so 4 goals is 24 points: $24 + \square = 29$.

How many behinds (1 point each) is the box?

A scoreboard for Mia's team. Goals shows 4, behinds shows an open box, and total shows 29. The label says a goal is 6 points, so 4 goals is 24 points: 24 + box = 29.

(a) Mia's team kicked 4 goals and some behinds. Their score is 29 points. Four goals is 24 points. Write an equation with a box for the behinds, and find the box.

(b) The other team kicked 3 goals and 7 behinds. Find their score. Is $29 = 18 + 7$ true or false? Which team is ahead, and by how many points?

(c) In another match, one team kicked 5 goals and 2 behinds, and the other team kicked 4 goals and 8 behinds. Is $30 + 2 = 24 + 8$ true or false? What does that tell you about that match?

Answers

Q1. (a) 7; (b) 8. **Q2.** (a) 7; (b) 5. **Q3.** (a) 14; (b) 8. **Q4.** 5; the commutative property of addition. **Q5.** 9. **Q6.** True: $15=15$. **Q7.** 9. **Q8.** $\square+8=15$; the box is 7. **Q9.** (a) 11; (b) 23; (c) 25. **Q10.** (a) 37; (b) 29; (c) 50. **Q11.** (a) 25; (b) 54; (c) 37. **Q12.** (a) 3; (b) 6; (c) no — $8-3=5$ but $3-8$ is not 5, so the equation is false. The order matters in subtraction. **Q13.** Any two other orders, for example $1+4+5=10$ and $5+1+4=10$. **Q14.** (a) 5; (b) 10. **Q15.** Any equation with both sides 14, for example $8+6=7+7$. **Q16.** (a) true ($15=15$); (b) false (23 is not 24); (c) true ($18=18$). **Q17.** 34 is 6 more than 28, and 14 is 6 more than 8, so the two differences are the same (both are 20). **Q18.** 9. **Q19.** $\square+8=21$; Liam had 13 marbles. **Q20.** $3+8=11$ (or $8+3=11$). **Q21.** (a) $24+\square=29$; 5 behinds. (b) 25 points; $29=25$ is false, so Mia's team is ahead, by $29-25=4$ points. (c) true, because $32=32$; the two scores are the same, so that match is level.

Worked answers

Q1. (a) Undo the adding: $13-6=7$, so the box is **7**. (b) $17-9=8$, so the box is **8**.

Q2. (a) $15-8=7$, so the box is **7**. (b) $12-7=5$, so the box is **5**.

Q3. (a) Undo the taking away: $9+5=14$, so the box is **14**. (b) $16-8=8$, so the box is **8**.

Q4. $5+2=7$, and $2+5=7$, so the missing number is **5**. Changing the order in addition does not change the total: this is the **commutative property of addition**.

Q5. The left side is $7+8=15$, so $6+\square=15$ and $\square=15-6=$ **9**.

Q6. Left: $9+6=15$. Right: $10+5=15$. Both sides are 15, so the equation is **true**.

Q7. Left: $12+4=16$. So $\square+7=16$ and $\square=16-7=$ **9**.

Q8. A jump of 8, then a jump of the box, lands on 15: $\square+8=15$. $15-8=7$, so the box is **7**.

Q9. (a) $25-14=11$. (b) $50-27=23$. (c) $61-36=25$.

Q10. (a) $24+13=37$. (b) $48-19=29$. (c) $25+25=50$.

Q11. (a) $42-17=25$. (b) $36+18=54$. (c) $72-35=37$.

Q12. (a) **3**: $8+3=3+8$. (b) **6**: $6+9=9+6$. (c) **No.** $8-3=5$, but $3-8$ is not 5. Swapping the order in subtraction changes the answer, so the equation is false.

Q13. The same three numbers in any order give 10: for example $1+4+5=10$ and $5+1+4=10$.

Q14. (a) Left: $8+7=15$, so $\square=15-10=5$. (b) Left: $13+6=19$, so $\square=19-9=10$.

Q15. $9+5=14$, so any equation with both sides 14 works: for example $8+6=7+7$.

Q16. (a) Left: $24-9=15$; right: $18-3=15$. **True.** (b) Left: $15+8=23$; right: $17+7=24$. **False.** (c) Left: $30-12=18$; right: $25-7=18$. **True.**

Q17. 34 is 6 more than 28, and 14 is 6 more than 8. Both numbers on the left moved up by 6, so the difference between them did not change: both sides are 20. (Checking: $34-14=20$ and $28-8=20$.)

Q18. The box plus itself is 18: $9+9=18$, so the number is **9**.

Q19. Start plus 8 more is 21: $\square+8=21$. $21-8=13$, so Liam had **13** marbles. Check: $13+8=21$ ✓.

Q20. $3+8=11$, so the boxes take 3, 8 and 11: $3+8=11$. ($8+3=11$ also works.)

Q21. (a) Four goals is 24 points, so $24 + \square = 29$ and $\square = 29 - 24 = 5$: **5 behinds**. (b) Three goals is 18 points, and $18 + 7 = 25$, so the other team has **25 points**. $29 = 25$ is **false**; Mia's team is ahead by $29 - 25 = 4$ **points**. (c) $30 + 2 = 32$ and $24 + 8 = 32$, so the equation is **true**: both teams have 32 points, and the match is level.

Test

Chapter test T3 — Algebra: number facts and unknown values

Codes: `VC2M4A02`, `VC2M4A01` · **Total: 12 marks**

This is a classroom check, not an exam. It is **untimed**. The guidance duration is **20 minutes**.

You will need: paper and a pencil.

Calculators: no calculators in Section A (`VC2M4A02` is without a calculator). You do not need a calculator anywhere in this test.

Show your working.

Section A — Multiplication and division facts (`VC2M4A02`) — 6 marks

No calculators in this section. Work out the answers in your head.

Q1. (2 marks) Write the answers:

(a) 8 × 9 = □

(b) 7 × 6 = □

Q2. (2 marks) (a) Use your 10 facts to show how to work out 9 × 4. Show your working.

(b) Use your answer to write the two division facts of the same fact family.

Q3. (1 mark) In Australian rules football (AFL), a goal is worth 6 points and a behind is worth 1 point. A team kicked 7 goals.

Source: Australian Football League, *Laws of Australian Football* (13 February 2026), afl.com.au, retrieved 2026-08-20.

Which working finds the points from the 7 goals?

A 7 + 6

B 7 × 6

C 7 − 6

D 7 ÷ 6

Q4. (1 mark) Count by 8s. Write the next two numbers in the pattern:

8, 16, 24, □, □

Section B — Unknown values in equations (`VC2M4A01`) — 6 marks

Q5. (2 marks) Find the number that goes in the box.

(a) □ + 18 = 32

(b) 45 − □ = 27

Q6. (1 mark) Both sides are the same amount. Find the box:

12 + 9 = □ + 13

Q7. (2 marks) Is this equation true or false? Show how you know.

$31 - 14 = 25 - 8$

Q8. (1 mark) The same number goes in the box: $\square - 9 = 16$. What is it?

A 7

B 23

C 25

D 144

Solutions

Answer key

Q	Answer	Marks
Q1	(a) 72; (b) 42	2
Q2	(a) 36; (b) 36 ÷ 9 = 4 and 36 ÷ 4 = 9	2
Q3	B	1
Q4	32, 40	1
Q5	(a) 14; (b) 18	2
Q6	8	1
Q7	True; both sides are 17	2
Q8	C	1
	Total	**12**

Worked solutions

Q1 (`VC2M4A02`, 2 marks).

(a) 8 × 9 = **72**. (Knowing 9 × 8 = 72 one way round gives it the other way round.)

(b) 7 × 6 = **42**.

Marking: 1 mark for each correct fact.

Q2 (`VC2M4A02`, 2 marks).

(a) 10 × 4 = 40. Nine is 10 take away 1, so take away one group of 4: 40 − 4 = **36**. So 9 × 4 = 36.

(b) **36 ÷ 9 = 4** and **36 ÷ 4 = 9**.

Marking: (a) 1 mark for the 10-fact working (10 × 4 = 40, then 40 − 4) with the answer 36; the answer 36 with no working does not score. (b) 1 mark for both division facts. Other correct ways of showing the same 10-fact strategy score full marks.

Q3 (`VC2M4A02`, 1 mark). B. Seven goals of 6 points each is 7 groups of 6: 7 × 6 = 42 points. Adding (A) gives 13, subtracting (C) gives 1 and dividing (D) does not fit “7 groups of 6”.

Q4 (`VC2M4A02`, 1 mark). Counting on by 8s: 24 + 8 = **32**, then 32 + 8 = **40**.

Marking: 1 mark for both numbers correct.

Q5 (`VC2M4A01`, 2 marks).

(a) □ + 18 = 32. Undo the adding: 32 − 18 = **14**. Check: 14 + 18 = 32 ✓

(b) 45 − □ = 27. 45 − 27 = **18**, so the box is 18. Check: 45 − 18 = 27 ✓

Marking: 1 mark for each correct value of the box.

Q6 (`VC2M4A01`, 1 mark). Left side: 12 + 9 = 21. So □ + 13 = 21, and □ = 21 − 13 = **8**. Check: 8 + 13 = 21 ✓

Q7 (`VC2M4A01`, 2 marks). True.

Work out each side: 31 − 14 = 17 and 25 − 8 = 17. Both sides are 17, so the equation is true.

Marking: 1 mark for the correct judgement (true), 1 mark for working that shows why — either working out both sides (31 − 14 = 17 and 25 − 8 = 17) or a correct relational reason (31 is 6 more than 25, and 14 is 6 more than 8, so the two differences are the same). A correct judgement with no working scores 1 mark only.

Q8 (`VC2M4A01`, 1 mark). C. The box, take away 9, gives 16. Undo the taking away: 16 + 9 = **25**. Check: 25 − 9 = 16 ✓ (A subtracts 9 from 16, and D multiplies 16 × 9.)

Marks by content description

CD	Items	Marks
`VC2M4A02`	Q1 (2), Q2 (2), Q3 (1), Q4 (1)	6
`VC2M4A01`	Q5 (2), Q6 (1), Q7 (2), Q8 (1)	6
Total	8 items	**12**

Every CD assessed in T3 contributes at least one separately scored item (here, 6 marks each). Judgement language follows each CD's achievement-standard extract from the authority file: Section A items show proficiency with multiplication facts (including the × 10 facts) and related division facts used to multiply and divide efficiently; Section B items find unknown values in numerical equations involving addition and subtraction. Multiple-choice items carry 2 of the 12 marks, inside the quarter-of-test cap. Calculators are barred in Section A per D7 (`VC2M4A02` says "without a calculator"); `VC2M4A01` is silent on calculators, so no calculator rule is printed for Section B, and no item in this test needs one.