

Mathematics Level 3

Chapter 3 — Algebra: number facts and unknowns

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Addition and subtraction facts to 20, extended to larger numbers

Code: VC2M3A02 (.E01, .E02, .E03)

In Year 2 you learnt your addition facts to 20. In this topic you will do more with them. You will see how one fact gives you a whole family of facts, how to split a number in every way, and how small facts work with tens and hundreds too. You will work out the answers in your head. There are no calculators in this topic.

You will need: counters, number cards, paper and a pencil.

Learn about facts to 20 and larger numbers

1. Your facts to 20

Your facts to 20 are sums you know quickly, like these:

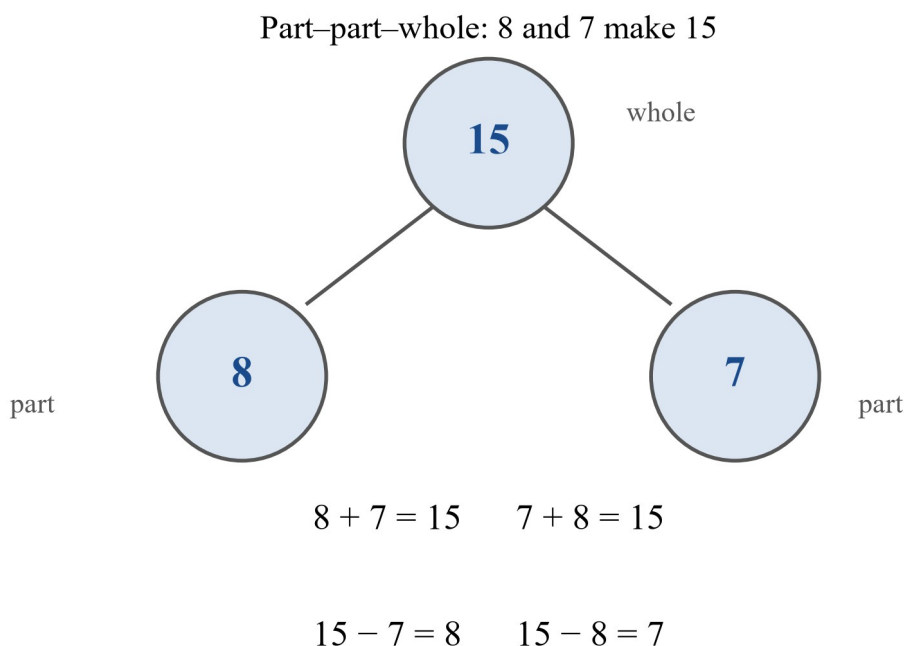
$$8 + 7 = 15 \quad 9 + 6 = 15 \quad 7 + 7 = 14$$

Every addition fact has related take-away facts:

$$15 - 8 = 7 \quad 15 - 7 = 8$$

2. One fact makes a family

Look at $8 + 7 = 15$. The numbers 8 and 7 are the **parts**. The number 15 is the **whole**. A **part-part-whole diagram** shows this.



A part-part-whole diagram. The whole at the top is 15 and the two parts are 8 and 7. Under it are the four facts: $8 + 7 = 15$, $7 + 8 = 15$, $15 - 7 = 8$ and $15 - 8 = 7$.

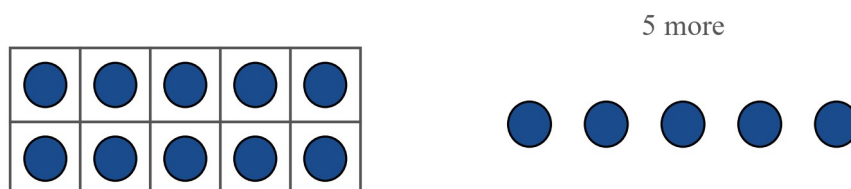
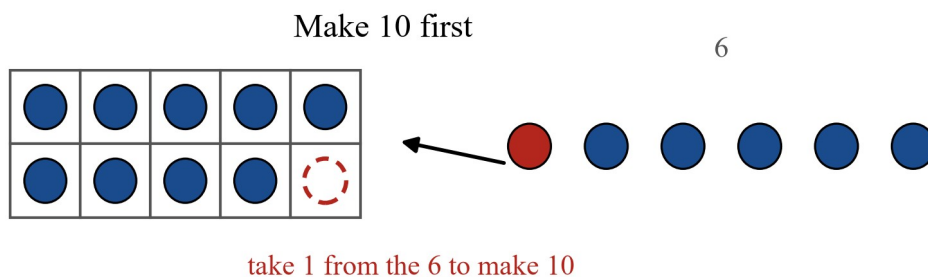
One split gives four facts:

$$8 + 7 = 15 \quad 7 + 8 = 15 \quad 15 - 7 = 8 \quad 15 - 8 = 7$$

If you know one fact, you know the whole family.

3. Make 10 first

$9 + 6$ is a hard one. There is a good way: make 10 first.



$$10 + 5 = 15$$

$$9 + 6 = 9 + 1 + 5 = 10 + 5 = 15$$

A ten-frame with 9 counters, and 6 counters beside it. One counter moves into the frame to make 10, with 5 more left. So $9 + 6 = 9 + 1 + 5 = 10 + 5 = 15$.

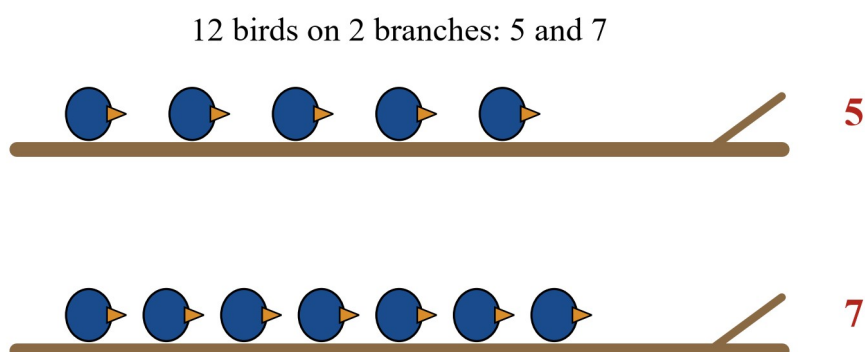
9 needs 1 more to make 10. Take 1 from the 6:

$$9 + 6 = 9 + 1 + 5 = 10 + 5 = 15$$

10 + 5 is easy. So $9 + 6 = 15$.

4. Split a number in all the ways

12 birds sit on 2 branches. Here they are as 5 and 7.



$$5 + 7 = 12$$

Two branches. Five blue birds sit on the top branch and seven blue birds sit on the bottom branch. Under them is the fact $5 + 7 = 12$.

$5 + 7 = 12$, but that is only one way. How many ways can 12 birds sit on 2 branches?

Start with all 12 birds on the first branch. Move 1 bird at a time and write each way:

$12 = 12 + 0$, $12 = 11 + 1$, $12 = 10 + 2$, ...

All the ways: 12 birds on 2 branches		
$12 = 0 + 12$		$12 = 7 + 5$
$12 = 1 + 11$		$12 = 8 + 4$
$12 = 2 + 10$		$12 = 9 + 3$
$12 = 3 + 9$		$12 = 10 + 2$
$12 = 4 + 8$		$12 = 11 + 1$
$12 = 5 + 7$		$12 = 12 + 0$
$12 = 6 + 6$		

move 1 bird each step

13 ways — we stopped when every bird was back on the first branch.

A list of all the ways to split 12, from $12 = 0 + 12$ to $12 = 12 + 0$. An arrow shows that one bird moves each step. There are 13 ways.

There are **13 ways**. How do we know we found them all? We moved 1 bird each step, in order, and we stopped when every bird was back on the first branch. We did not skip any.

5. Small facts work with big numbers

Your facts to 20 work with larger numbers too. You know that $6 + 6 = 12$.

The same fact works with tens and hundreds

$$\boxed{6 + 6 = 12} \xrightarrow{+10 \text{ more}} \boxed{16 + 6 = 22}$$

$$\boxed{6 + 7 = 13} \xrightarrow{+10 \text{ more}} \boxed{16 + 7 = 23}$$

$\boxed{60 + 60 = 120}$ tens	$\boxed{600 + 600 = 1200}$ hundreds
-------------------------------------	--

6 tens + 6 tens = 12 tens. 6 hundreds + 6 hundreds = 12 hundreds.

Cards in rows. The fact $6 + 6 = 12$ grows to $16 + 6 = 22$, and $6 + 7 = 13$ grows to $16 + 7 = 23$. Below them are $60 + 60 = 120$ and $600 + 600 = 1200$.

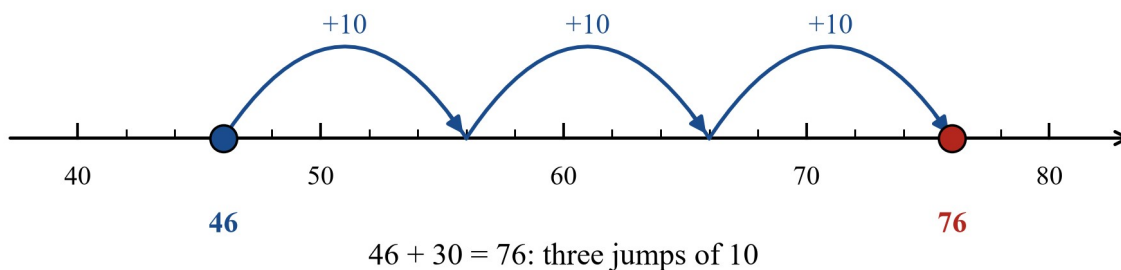
- $16 + 6 = 22$. That is $6 + 6 = 12$, with 10 more.
- $60 + 60 = 120$. That is 6 tens + 6 tens = 12 tens.
- $600 + 600 = 1200$. That is 6 hundreds + 6 hundreds = 12 hundreds.

Same fact — larger numbers!

6. Jump by tens

You can add tens on a number line. To work out $46 + 30$, start at 46 and make 3 jumps of 10.

Jump by tens



A number line from 40 to 80. Three jumps of 10 go from 46 to 56, 66 and 76. So $46 + 30 = 76$.

46, 56, 66, 76 — so $46 + 30 = 76$.

To take away tens, jump back the other way: $76 - 30 = 46$.

Worked examples

Example 1 — with help

Sam knows that $9 + 6 = 15$. Use this fact to find $15 - 6$ and $15 - 9$.

Working

$$9 + 6 = 15$$

$$15 - 6 = 9$$

$$15 - 9 = 6$$

What we did

The fact Sam knows. 9 and 6 are the parts, 15 is the whole.

Took away one part. The other part is left.

Took away the other part.

One addition fact gives you both take-away facts.

Example 2 — with help

Work out $36 + 7$ in your head.

Working

$$36 + 4 = 40$$

$$7 = 4 + 3$$

$$40 + 3 = 43$$

$$\text{Check: } 43 - 7 = 36 \checkmark$$

$$36 + 7 = 43.$$

What we did

Added enough to get to 40 first.

Split the 7 into 4 and 3.

Added what was left.

Checked with the take-away fact.

Example 3 — on your own

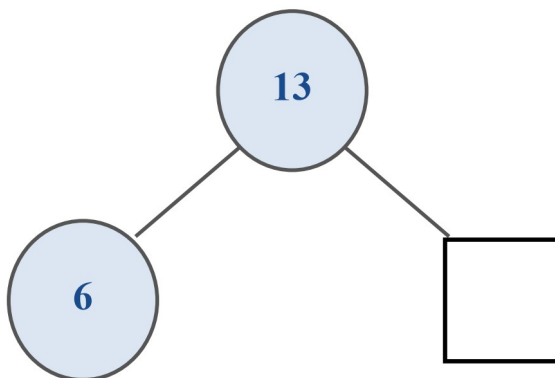
A class library has 46 picture books. The teacher puts 30 more books on the shelf. How many picture books are there now?

30 is 3 tens, so jump by tens: $46 \rightarrow 56 \rightarrow 66 \rightarrow 76$. There are **76** picture books. Check: $76 - 30 = 46$. $\checkmark$

Practice questions

With help

Q1. The whole is 13. One part is 6. What is the missing part?



What is the missing part?

A part-part-whole diagram. The whole at the top is 13 and one part is 6. The other part is a blank box.

Q2. $9 + 6 = 15$. Use the fact family to find: $15 - 6 = \square$ and $15 - 9 = \square$.

Q3. Make 10 first. Fill in the boxes: $8 + 6 = 8 + \square + \square = 10 + \square = \square$.

Q4. $7 + 5 = 12$. Use this fact to find: $17 + 5 = \square$ and $70 + 50 = \square$.

Q5. Match each addition card to its subtraction partner.

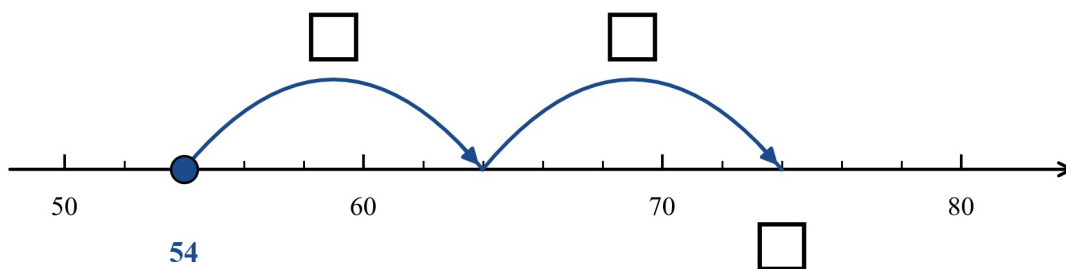
Match each addition fact to its subtraction partner

9 + 6	12 - 5
8 + 7	15 - 6
7 + 5	15 - 7

Two rows of cards. The left cards are $9 + 6$, $8 + 7$ and $7 + 5$. The right cards are $12 - 5$, $15 - 6$ and $15 - 7$.

Q6. Start at 54. Make 2 jumps of 10. Fill in each jump and where you land.

$54 + 20$: fill in each jump and where you land



A number line from 50 to 80. It starts at 54, with two jumps of 10. Each jump has a blank label, and there is a blank box where you land.

$$54 + 20 = \square$$

Q7. Use the double $6 + 6 = 12$ to find: $12 - 6 = \square$ and $16 + 6 = \square$.

Q8. Write the missing numbers: $14 = 9 + \square$ and $14 = \square + 6$.

On your own

Q9. Write all four facts for 7, 9 and 16.

Q10. Make 10 first to find: $9 + 7$ and $8 + 7$.

Q11. $8 + 6 = 14$. Use this fact to find: $18 + 6 = \square$, $80 + 60 = \square$ and $14 - 8 = \square$.

Q12. Jump by tens: $35 + 40 = \square$ and $63 + 20 = \square$.

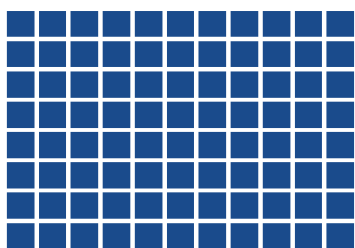
Q13. Jump back by tens: $48 - 20 = \square$ and $76 - 30 = \square$.

Q14. Work these out in your head: $27 + 6$, $45 + 8$, $64 + 9$.

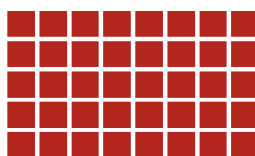
- Q15.** Tom had 27 marbles. He won 6 more. How many marbles does he have now?
- Q16.** A bus had 52 people on it. At the stop, 20 people got off. How many people are on the bus now?
- Q17.** How many ways can 10 stickers be split between 2 pages? Write each way like this: $10 = \square + \square$. How do you know you found them all?
- Q18.** Zoe says $15 - 7 = 9$, because $7 + 9 = 16$. Is Zoe right? Find $15 - 7$ and check your answer.
- Q19.** The Parliament of Victoria has two houses. There are 88 members in the Legislative Assembly and 40 members in the Legislative Council.

Source: Wikipedia, *Parliament of Victoria*, retrieved 2026-08-20.

Seats in the Parliament of Victoria



Legislative Assembly
88 seats



Legislative Council
40 seats

Two grids of seats. The blue grid shows the 88 seats of the Legislative Assembly and the red grid shows the 40 seats of the Legislative Council.

- How many members are there in all? Show how you can work out $88 + 40$ in your head.
- How many more members are in the Legislative Assembly than in the Legislative Council?

Answers

Q1. 7. **Q2.** 9; 6. **Q3.** 2, 4, 4, 14. **Q4.** 22; 120. **Q5.** 9 + 6 matches 15 - 6; 8 + 7 matches 15 - 7; 7 + 5 matches 12 - 5. **Q6.** 64, 74; 54 + 20 = 74. **Q7.** 6; 22. **Q8.** 5; 8. **Q9.** 7 + 9 = 16; 9 + 7 = 16; 16 - 7 = 9; 16 - 9 = 7. **Q10.** 16; 15. **Q11.** 24; 140; 6. **Q12.** 75; 83. **Q13.** 28; 46. **Q14.** 33; 53; 73. **Q15.** 33 marbles. **Q16.** 32 people. **Q17.** 11 ways. **Q18.** No — 15 - 7 = 8. **Q19.** (a) 128 members (b) 48 members.

Worked answers

Q1. The whole is 13 and one part is 6. The missing part is $13 - 6 = 7$. Check: $6 + 7 = 13$. ✓

Q2. $15 - 6 = 9$ and $15 - 9 = 6$. The parts are 9 and 6, and the whole is 15.

Q3. 8 needs 2 to make 10. Split 6 into 2 and 4: $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$.

Q4. $17 + 5 = 22$ (that is $7 + 5 = 12$, with 10 more). $70 + 50 = 120$ (7 tens + 5 tens = 12 tens).

Q5. $9 + 6 = 15$, so it matches $15 - 6 = 9$. $8 + 7 = 15$, so it matches $15 - 7 = 8$. $7 + 5 = 12$, so it matches $12 - 5 = 7$.

Q6. Start at 54. Jump to 64, then to 74. Each jump is +10, so $54 + 20 = 74$.

Q7. $12 - 6 = 6$. For $16 + 6$: $16 + 6 = 22$, because $6 + 6 = 12$ with 10 more.

Q8. $14 = 9 + 5$ and $14 = 8 + 6$.

Q9. $7 + 9 = 16$; $9 + 7 = 16$; $16 - 7 = 9$; $16 - 9 = 7$.

Q10. $9 + 7 = 9 + 1 + 6 = 10 + 6 = 16$. $8 + 7 = 8 + 2 + 5 = 10 + 5 = 15$.

Q11. $18 + 6 = 24$ ($8 + 6 = 14$, with 10 more). $80 + 60 = 140$ (8 tens + 6 tens = 14 tens). $14 - 8 = 6$.

Q12. 35 + 40: 35, 45, 55, 65, 75 — so 75. 63 + 20: 63, 73, 83 — so 83.

Q13. 48 - 20: 48, 38, 28 — so 28. 76 - 30: 76, 66, 56, 46 — so 46.

Q14. $27 + 6 = 27 + 3 + 3 = 30 + 3 = 33$. $45 + 8 = 45 + 5 + 3 = 50 + 3 = 53$. $64 + 9 = 64 + 6 + 3 = 70 + 3 = 73$.

Q15. $27 + 6 = 33$. Tom has 33 marbles. Check: $33 - 6 = 27$. ✓

Q16. $52 - 20 = 32$. There are 32 people on the bus. Check: $32 + 20 = 52$. ✓

Q17. $10 = 0 + 10$, $10 = 1 + 9$, $10 = 2 + 8$, $10 = 3 + 7$, $10 = 4 + 6$, $10 = 5 + 5$, $10 = 6 + 4$, $10 = 7 + 3$, $10 = 8 + 2$, $10 = 9 + 1$, $10 = 10 + 0$. That is 11 ways. You know you found them all because you moved 1 sticker each step, in order, from one side to the other.

Q18. Zoe is not right. $7 + 9 = 16$, so that fact gives $16 - 7 = 9$, not $15 - 7$. The right answer is $15 - 7 = 8$. Check: $8 + 7 = 15$. ✓

Q19. (a) $88 + 40$: jump by tens — 88, 98, 108, 118, 128. There are 128 members in all. (b) $88 - 40 = 48$. There are 48 more members in the Legislative Assembly than in the Legislative Council.

Addition and subtraction as inverse operations; finding unknown values

Code: VC2M3A01 (.E01, .E02)

In 3A you learnt your addition and subtraction facts. This section has a new idea: addition and subtraction are **inverse operations**. *Inverse* means opposite — one job undoes the other. When you add and then take away the same number, you get back to where you started. You will use this to split numbers into parts and to find unknown numbers in boxes.

You will need: counters, paper for part-whole diagrams, and a calculator for some parts.

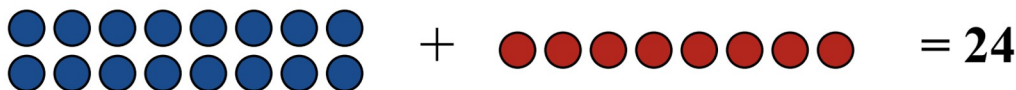
Learn about inverse operations

1. Adding and taking away are opposite jobs

Adding puts two parts together to make a whole. Taking away undoes adding.

$16 + 8 = 24$, so $24 - 8 = 16$.

Opposite jobs


$$\begin{array}{cccccccc} \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \\ \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \end{array} + \begin{array}{cccccccc} \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet & \bullet \end{array} = 24$$

adding puts 8 in: $16 + 8 = 24$



16 left

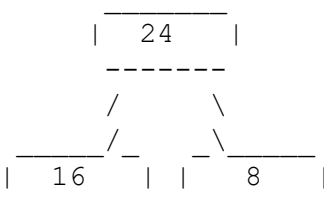
8 taken away

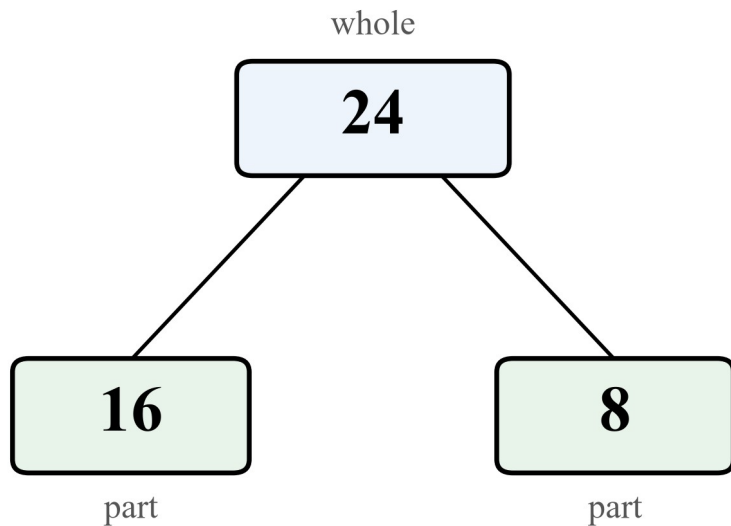
taking away undoes it: $24 - 8 = 16$

Two rows of counters. Adding 8 counters to 16 makes 24; taking 8 away from 24 gets back to 16.

2. Split a number into a whole and two parts

We can split 24 into 16 and 8. A part-whole diagram shows the whole on top and the two parts below.





A part-whole diagram. The whole on top is 24, and the two parts below are 16 and 8.

3. One split gives a family of four facts

The split of 24 into 16 and 8 gives four number sentences:

$$16 + 8 = 24 \quad 8 + 16 = 24 \quad 24 - 8 = 16 \quad 24 - 16 = 8$$

These go together as a **fact family**. If you know one of them, you know all four.

Four facts from one split



$$16 + 8 = 24$$

$$8 + 16 = 24$$

$$24 - 8 = 16$$

$$24 - 16 = 8$$

A bar model with a 16 part and an 8 part making a whole bar of 24, with the four fact-family sentences under it.

4. A box stands for an unknown number

In $27 + \square = 63$, the box $\square$ is the number we do not know yet. The box can sit in different places in the sentence:

$$27 + \square = 63 \quad \square + 27 = 63 \quad 63 - \square = 27$$

The right number in the box makes the sentence true.

the unknown: the number to find

A diagram showing an addition equation: a box containing the number 27, followed by a plus sign, then a red-outlined box containing a smaller white box, followed by an equals sign, and finally a box containing the number 63. A red arrow points down to the red-outlined box.

$$\boxed{27} + \boxed{\square} = \boxed{63}$$

The box holds the number we do not know yet.

Three number sentences, each with a box: 27 plus the box equals 63, the box plus 27 equals 63, and 63 take away the box equals 27.

5. Use the inverse to find the box

Ask: is the box a part, or the whole?

- If the box is a **part**, take away: $9 + \square = 16$ gives $\square = 16 - 9 = 7$.
- If the box is the **whole**, add: $\square - 8 = 16$ gives $\square = 16 + 8 = 24$.



- 7 undoes + 7

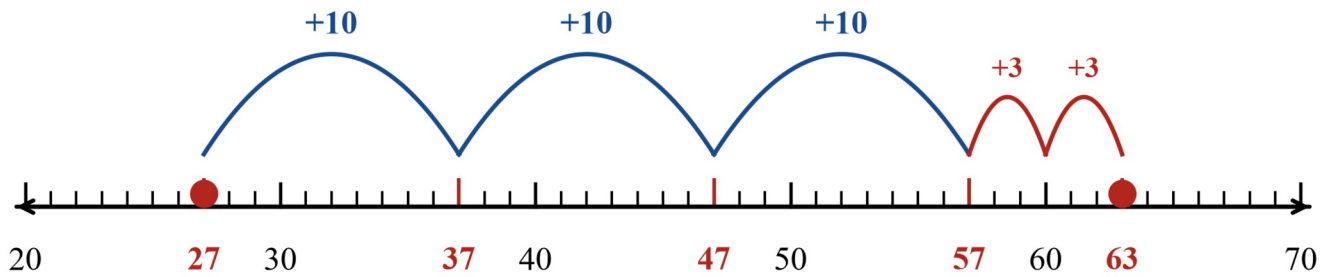


Two number machines. The top machine adds 7, so 8 goes in and 15 comes out. The bottom machine takes away 7, so 15 goes in and 8 comes out. Taking away 7 undoes adding 7.

6. Count on, or use a calculator

To find the box in $27 + \square = 63$, count on from 27: 37, 47, 57, 60, 63. The hops are $10 + 10 + 10 + 3 + 3 = 36$, so the box is 36.

A calculator does the same job: press $63 - 27 =$ and the screen shows 36.



3 tens and 6 ones make 36, so $27 + 36 = 63$

A number line from 20 to 70. Hops go from 27 to 37, 47, 57, 60 and 63. The hops are 10, 10, 10, 3 and 3, which add to 36.

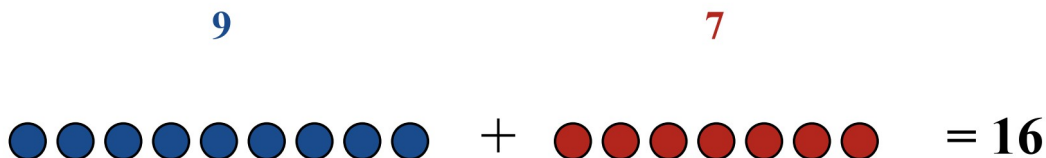
7. Check with the other job

Put your answer back in the box and see if the sentence is true. If $\square - 8 = 16$ gave the answer 24, check: $24 - 8 = 16$. True — the answer is right.

Worked examples

Example 1 — with help

There are 9 blue counters and 7 red counters. How many counters are there in all? Write the fact family for your answer.



$$9 + 7 = 16$$

9 blue counters in a line, then 7 red counters, making 16 counters in all. Under it, the sentence $9 + 7 = 16$.

Working

$$9 + 7 = 16$$

$$7 + 9 = 16$$

$$16 - 9 = 7$$

$$16 - 7 = 9$$

What we did

Added the two parts to find the whole.

Added the parts in the other order.

Took away one part to find the other part.

Took away the other part. The four sentences are the fact family.

Example 2 — with help

Find the unknown number: $27 + \square = 63$.



Working

The box is a part.

$$\square = 63 - 27 = 36$$

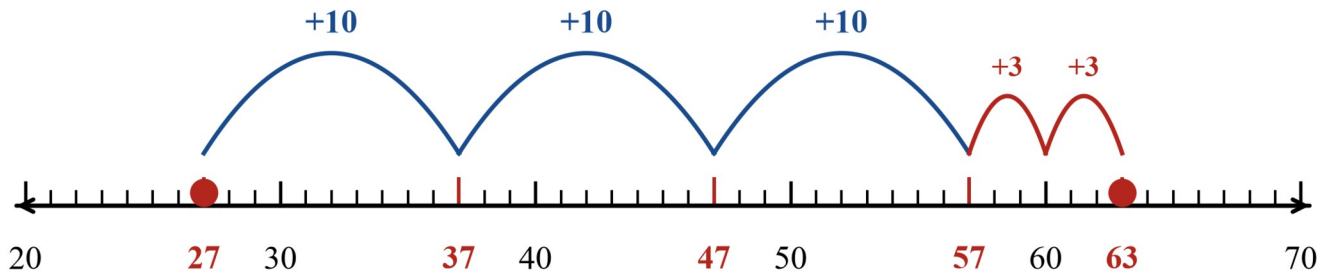
Count on from 27: 37, 47, 57, 60, 63.

What we did

The whole is 63 and one part is 27.

Used the inverse: took away the known part.

Checked by counting on. The hops add to 36. ✓



3 tens and 6 ones make 36, so $27 + 36 = 63$

A number line from 20 to 70. Hops go from 27 to 37, 47, 57, 60 and 63. The hops are 10, 10, 10, 3 and 3, which add to 36.

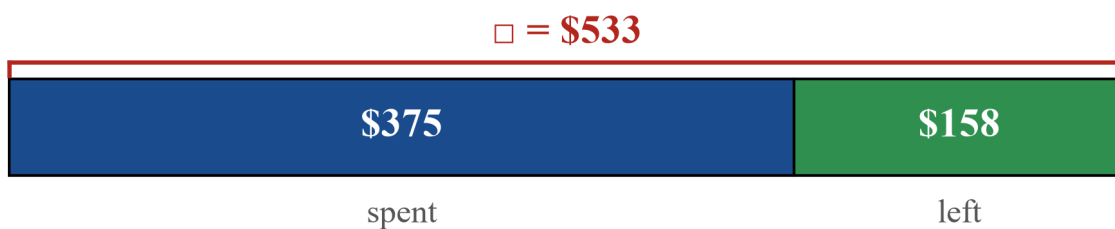
The box is 36.

Example 3 — on your own

Mia went to a bike shop. She spent \$375 and now has \$158 left. How much money did Mia have at the start?

The money at the start is the whole, so the box is the whole: $\square - \$375 = \158 . The whole is the box, so add: $\square = \$375 + \$158 = \$533$. Check with the other job: $\$533 - \$375 = \$158$. ✓ Mia had **\$533** at the start.

Find the whole: add the parts



$$\mathbf{\$375 + \$158 = \$533}$$

A bar model. The spent part is \$375 and the left-over part is \$158, so the whole is \$533: $\$375 + \$158 = \$533$.

$$\square - 375 = 158$$

the box is \$533



$$\text{\$}533 - \text{\$}375 = \text{\$}158$$



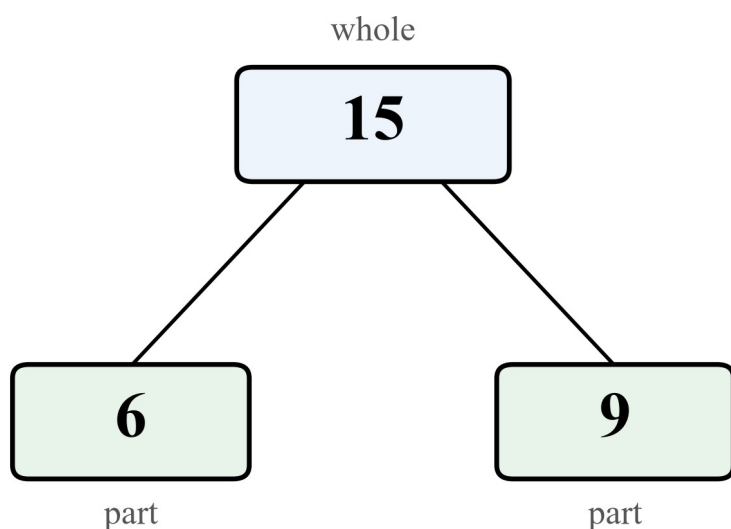
Put \$533 back: the sentence is true.

The sentence 'box take away \$375 equals \$158' is checked by putting \$533 in the box: $\text{\$}533 - \text{\$}375 = \text{\$}158$, with a tick to show it is true.

Practice questions

With help

Q1. The parts are 6 and 9. Use the diagram to write the answers: $6 + 9 = \square$, $15 - 6 = \square$, $15 - 9 = \square$.



A part-whole diagram. The whole on top is 15, and the two parts below are 6 and 9.

Q2. $8 + 5 = 13$. Use the fact family to find: $13 - 5 = \square$ and $13 - 8 = \square$.

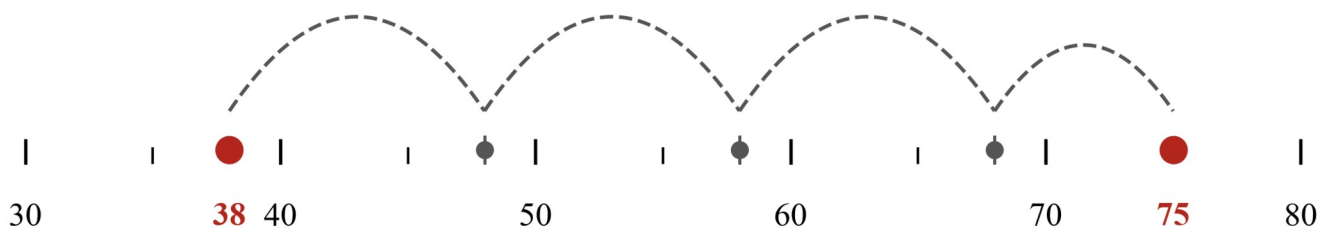
Q3. Find the unknown number: $\square + 4 = 12$.

Q4. Find the unknown number: $9 + \square = 17$.

Q5. Find the unknown number: $15 - \square = 6$.

Q6. Find the unknown number: $\square - 10 = 25$.

Q7. Count on to find the box: $38 + \square = 75$.



Count on from 38 to 75. How much do the hops add?

A number line from 30 to 80. Hops go from 38 to 48, 58, 68 and 75. Count on from 38 to 75: how much do the hops add?

Q8. A book costs \$27. You pay with a \$50 note. Your change is $\square$: $\square + \$27 = \50 . Find the change.

On your own

Q9. Write the fact family for 7, 8 and 15.

Q10. Find the unknown number: $24 + \square = 61$.

Q11. Find the unknown number: $\square - 18 = 35$.

Q12. Find the unknown number: $83 - \square = 46$.

Q13. Find the unknown number: $\square + 125 = 378$.

Q14. Find the unknown number: $\square - 118 = 245$.

Q15. A bus has some people on it. At the first stop, 14 more people get on. Now there are 42 people on the bus. How many people were on the bus at the start? ($\square + 14 = 42$)

Q16. Noah has \$50. He buys a kite and has \$14 left. The kite is $\square$: $\$50 - \square = \14 . What did the kite cost?

Q17. Find the unknown number: $56 + \square = 83$.

Q18. Ben says the box in $\square - 9 = 15$ is 6, because $15 - 9 = 6$. Is Ben right? If not, find the box and check your answer.

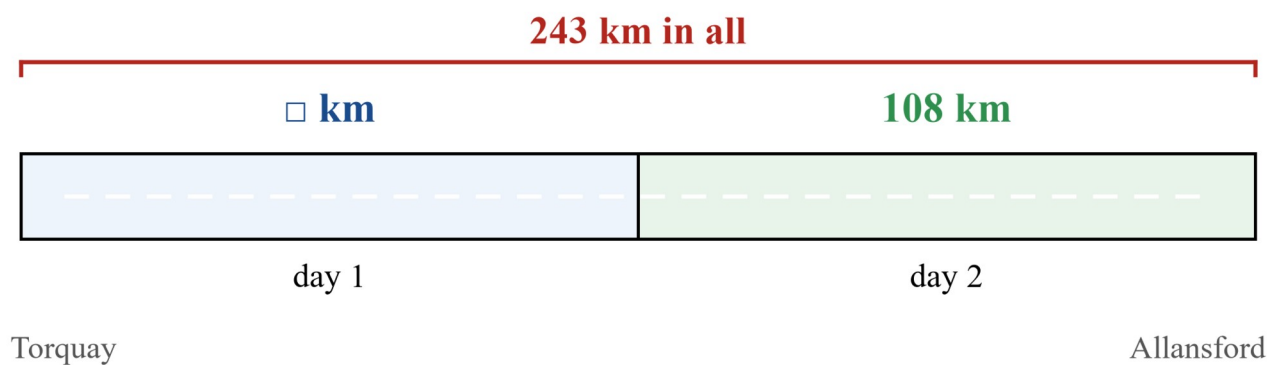
Q19. The Great Ocean Road runs along the Victoria coast from Torquay to Allansford. It is 243 km long.

Source: Wikipedia, *Great Ocean Road*, opened 2026-08-20.

A family drives the road over two days. On day 2 they drive 108 km.

(a) Write a number sentence with a box for day 1, then find the box: $\square + 108 = 243$.

(b) Check your answer with the other job.



A bar model of the 243 km road from Torquay to Allansford. The day 1 part is a box in km and the day 2 part is 108 km; the whole is 243 km in all.

Answers

Q1. 15; 9; 6. **Q2.** 8; 5. **Q3.** 8. **Q4.** 8. **Q5.** 9. **Q6.** 35. **Q7.** 37. **Q8.** \$23. **Q9.** $7 + 8 = 15$; $8 + 7 = 15$; $15 - 7 = 8$; $15 - 8 = 7$. **Q10.** 37. **Q11.** 53. **Q12.** 37. **Q13.** 253. **Q14.** 363. **Q15.** 28 people. **Q16.** \$36. **Q17.** 27. **Q18.** No — the box is 24. **Q19.** (a) 135 km (b) $135 + 108 = 243$. ✓

Worked answers

- Q1.** The whole is 15: $6 + 9 = 15$. Taking away a part finds the other part: $15 - 6 = 9$ and $15 - 9 = 6$.
- Q2.** The fact family for $8 + 5 = 13$ also has $13 - 5 = 8$ and $13 - 8 = 5$.
- Q3.** The box is a part: $\square = 12 - 4 = 8$. Check: $8 + 4 = 12$. ✓
- Q4.** The box is a part: $\square = 17 - 9 = 8$. Check: $9 + 8 = 17$. ✓
- Q5.** The box is a part: $\square = 15 - 6 = 9$. Check: $15 - 9 = 6$. ✓
- Q6.** The box is the whole: $\square = 25 + 10 = 35$. Check: $35 - 10 = 25$. ✓
- Q7.** Count on from 38: 48, 58, 68, 75. The hops are $10 + 10 + 10 + 7 = 37$, so the box is 37. Check: $75 - 38 = 37$. ✓
- Q8.** The change is a part: $\square = 50 - 27 = 23$. The change is \$23. Check: $23 + 27 = 50$. ✓
- Q9.** $7 + 8 = 15$; $8 + 7 = 15$; $15 - 7 = 8$; $15 - 8 = 7$.
- Q10.** The box is a part: $\square = 61 - 24 = 37$. Check: $24 + 37 = 61$. ✓
- Q11.** The box is the whole: $\square = 35 + 18 = 53$. Check: $53 - 18 = 35$. ✓
- Q12.** The box is a part: $\square = 83 - 46 = 37$. Check: $83 - 37 = 46$. ✓
- Q13.** The box is a part: $\square = 378 - 125 = 253$. Check: $253 + 125 = 378$. ✓
- Q14.** The box is the whole: $\square = 245 + 118 = 363$. Check: $363 - 118 = 245$. ✓
- Q15.** The number at the start is a part: $\square = 42 - 14 = 28$. There were 28 people on the bus. Check: $28 + 14 = 42$. ✓
- Q16.** The kite is a part: $\square = 50 - 14 = 36$. The kite cost \$36. Check: $50 - 36 = 14$. ✓
- Q17.** The box is a part: $\square = 83 - 56 = 27$. Check: $56 + 27 = 83$. ✓
- Q18.** Ben is not right. In $\square - 9 = 15$ the box is the whole, so add: $\square = 15 + 9 = 24$. Check: $24 - 9 = 15$. ✓ (Ben took away, but taking away finds a part, not the whole.)
- Q19.** (a) The day 1 part is the box: $\square = 243 - 108 = 135$ km. (b) Check with the other job: $135 + 108 = 243$. ✓ The two days add to the whole road.

Multiplication facts for 3, 4, 5 and 10 and the related division facts

Code: VC2M3A03 (.E01, .E02, .E03, .E04)

In Year 2 you learned your 2 times facts. Now you will learn the times facts for **3, 4, 5 and 10**, and the division facts that go with them. By the end of this topic you will be able to say these facts quickly, without counting one by one.

You will need: counters, connecting cubes, and a calculator for some parts.

Learn the facts

1. Multiplication means equal groups

3 groups of 4 is the same as 3 fours.

Group 1 Group 2 Group 3
● ● ● ● ● ● ● ● ● ● ● ●

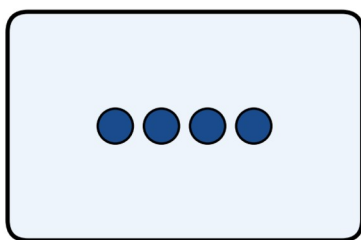
3 fours are 12. We write:

$$3 \times 4 = 12$$

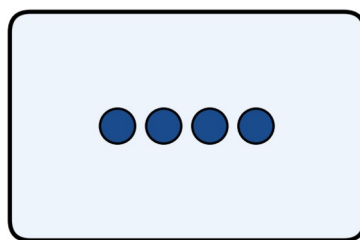
Repeated addition gives the same answer:

$$4 + 4 + 4 = 12$$

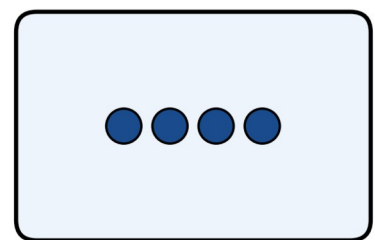
Equal groups



Group 1



Group 2



Group 3

3 groups of 4 is 12

$$3 \times 4 = 12$$

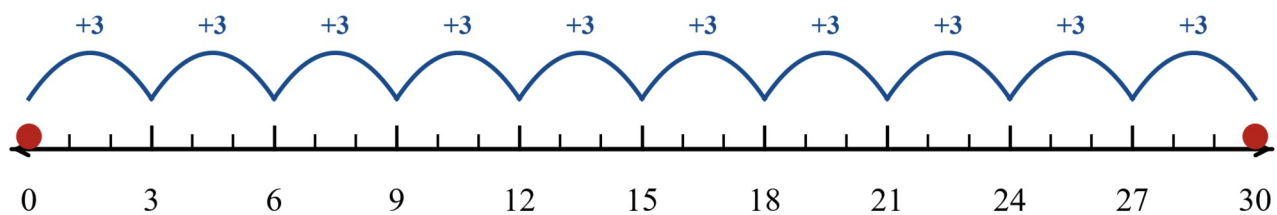
$$4 + 4 + 4 = 12$$

Three groups of 4 counters. There are 12 counters in all, so $3 \times 4 = 12$ and $4 + 4 + 4 = 12$.

You can make every fact in this topic by making equal groups with counters or cubes first, then saying the fact.

2. The 3 times facts

Start at 3 and keep adding 3. Each step is one more group of 3.



Start at 0 and keep adding 3. Each hop is one more group of 3.

A number line from 0 to 30 that counts on by 3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30. Each jump is one more group of 3.

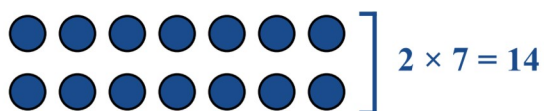
$3 \times 1 = 3$	$3 \times 6 = 18$
$3 \times 2 = 6$	$3 \times 7 = 21$
$3 \times 3 = 9$	$3 \times 8 = 24$
$3 \times 4 = 12$	$3 \times 9 = 27$
$3 \times 5 = 15$	$3 \times 10 = 30$

A way to build a 3 times fact is to use a 2 times fact you know, then add one more group:

$$3 \times 7 = 2 \times 7 + 7 = 14 + 7 = 21$$

That is two sevens, and one more seven.

3×7 from a 2 times fact



$$3 \times 7 = 2 \times 7 + 7 = 14 + 7 = 21$$

Two sevens, and one more seven.

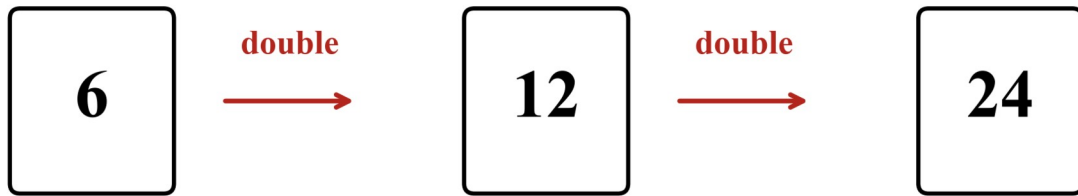
Two rows of 7 blue counters and one more row of 7 red counters. Two sevens are 14, and one more seven makes 21.

3. The 4 times facts — double, then double again

4 groups is 2 groups, twice. So to find a 4 times fact, double it, then double it again.

4×6 : double 6 is 12, double 12 is 24. So $4 \times 6 = 24$.

Double, then double again



4×6 : double 6 is 12, double 12 is 24

4 groups is 2 groups, twice.

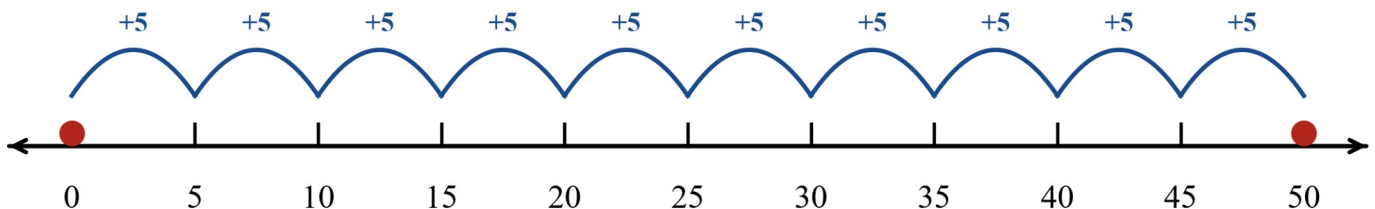
Three cards in a line: 6, then 12, then 24. Double 6 is 12, and double 12 is 24, so $4 \times 6 = 24$.

$4 \times 1 = 4$	$4 \times 6 = 24$
$4 \times 2 = 8$	$4 \times 7 = 28$
$4 \times 3 = 12$	$4 \times 8 = 32$
$4 \times 4 = 16$	$4 \times 9 = 36$
$4 \times 5 = 20$	$4 \times 10 = 40$

4. The 5 times facts — they end in 5 or 0

Every answer in the 5 times facts ends in 5 or 0.

$5 \times 1 = 5$	$5 \times 6 = 30$
$5 \times 2 = 10$	$5 \times 7 = 35$
$5 \times 3 = 15$	$5 \times 8 = 40$
$5 \times 4 = 20$	$5 \times 9 = 45$
$5 \times 5 = 25$	$5 \times 10 = 50$



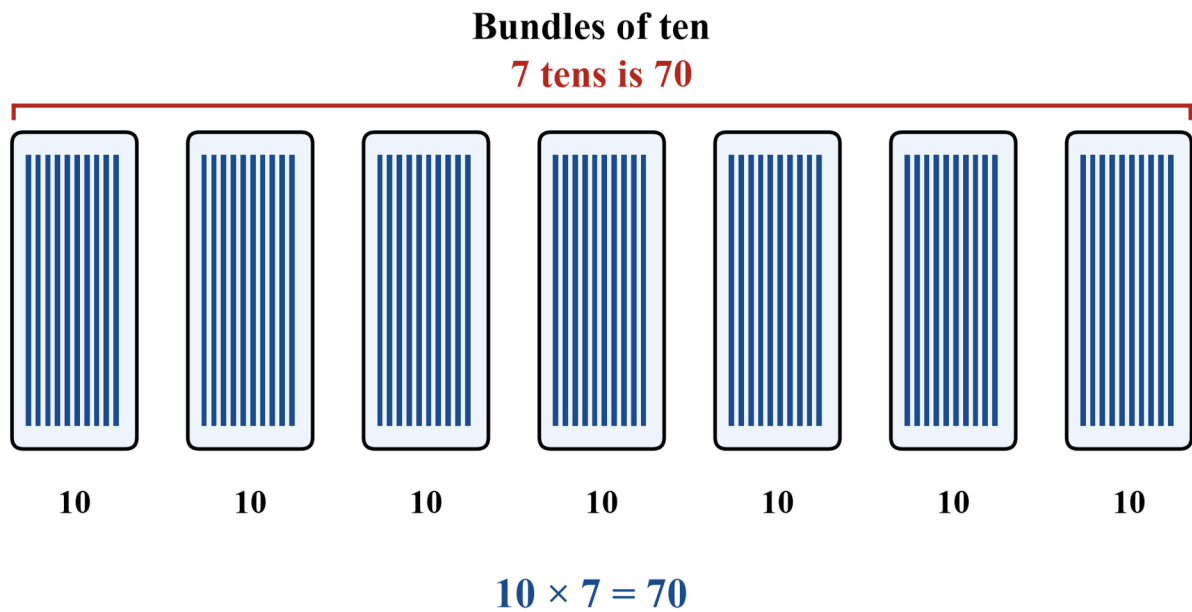
Count on by 5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50 — every answer ends in 5 or 0.

A number line from 0 to 50 that counts on by 5: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50. Every answer ends in 5 or 0.

You may use a calculator in this topic. Try this: type $5 + 5 =$, then keep pressing $=$. The answers count on by 5: 10, 15, 20, 25 ... You can do the same for 3, 4 and 10.

5. The 10 times facts — the answers end in 0

10×7 means 7 tens, which is 70.



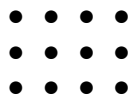
Seven bundles of 10 sticks. Seven tens is 70, so $10 \times 7 = 70$.

$10 \times 1 = 10$	$10 \times 6 = 60$
$10 \times 2 = 20$	$10 \times 7 = 70$
$10 \times 3 = 30$	$10 \times 8 = 80$
$10 \times 4 = 40$	$10 \times 9 = 90$
$10 \times 5 = 50$	

The pattern keeps going: $10 \times 10 = 100$.

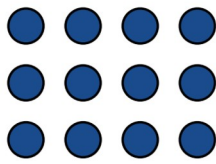
6. Division undoes multiplication

Multiplication and division are opposite jobs. Look at this array of 12 counters.



It shows 3 rows of 4, so $3 \times 4 = 12$. Turn the array around and it shows 4 rows of 3, so $4 \times 3 = 12$.

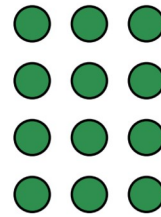
Turn the array around



3 rows of 4

$$3 \times 4 = 12$$

turn it around



4 rows of 3

$$4 \times 3 = 12$$

Same 12 counters.

The same 12 counters turned around: 3 rows of 4 becomes 4 rows of 3. Both arrays make 12.

The same three numbers — 3, 4 and 12 — make a **fact family**:

$$3 \times 4 = 12 \quad 4 \times 3 = 12 \quad 12 \div 3 = 4 \quad 12 \div 4 = 3$$

A fact family: 3, 4 and 12



$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

$$12 \div 3 = 4$$

$$12 \div 4 = 3$$

The same three numbers make four facts.

A bar model: 12 made of 3 equal parts of 4, with the four facts of the fact family.

Division shares 12 into 3 equal groups, with 4 in each group. If you know the times fact, you know the division fact: $12 \div 3$ asks “3 times what makes 12?”

7. Build a fact from one you know

If you are not sure of a fact yet, build it from one you know:

- **Use the 2 times facts:** $3 \times 8 = 2 \times 8 + 8 = 16 + 8 = 24$
- **Double and double again:** $4 \times 7 = \text{double } 7 \text{ is } 14, \text{ double } 14 \text{ is } 28$

- Use 10, then take one group away: $4 \times 9 = 4 \times 10 - 4 = 40 - 4 = 36$

Practise saying the facts until they come quickly.

Worked examples

Example 1 — with help

Find 4×6 . Use a 2 times fact to help.

Working

$$2 \times 6 = 12$$

4 sixes is two lots of 2 sixes

$$12 + 12 = 24$$

$$4 \times 6 = 24 \checkmark$$

• • • • • • } 2 rows = 12
 • • • • • • }
 • • • • • • } 2 rows = 12
 • • • • • • }

What we did

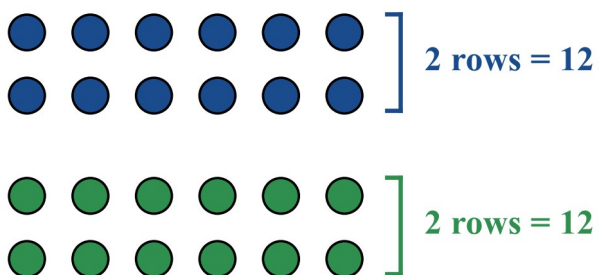
Start with a 2 times fact you know.

4×6 is double 2×6 .

Double 12.

Check by counting the array: 4 rows of 6.

4×6 is double 2×6



$$12 + 12 = 24$$

$$4 \times 6 = 24$$

An array of 4 rows of 6 counters, split into two lots of 2 rows: 12 and 12 make 24, so $4 \times 6 = 24$.

Example 2 — with help

Find $30 \div 5$.

Working

$$30 \div 5 = \square$$

5, 10, 15, 20, 25, 30

30 is 6 fives, so $5 \times 6 = 30$

$$30 \div 5 = 6 \checkmark$$

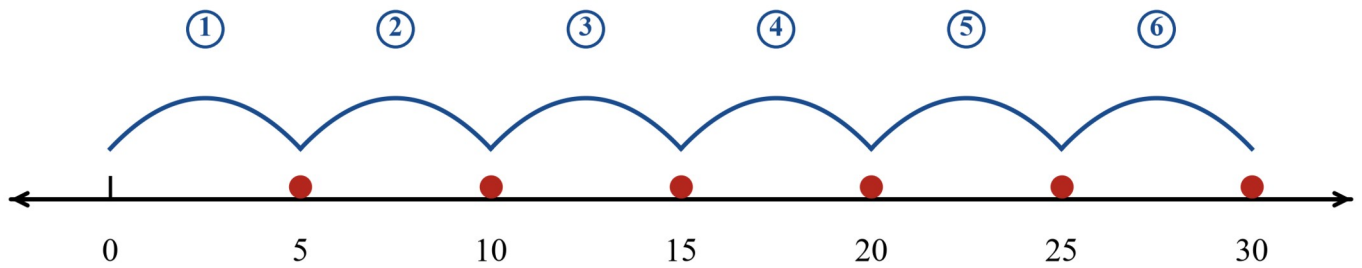
What we did

Ask: 5 times what makes 30?

Count on by 5 until you reach 30.

There are 6 jumps of 5.

Check: $6 \times 5 = 30$.



6 jumps of 5 make 30, so $30 \div 5 = 6$

A number line from 0 to 30 with six jumps of 5, numbered 1 to 6. Six jumps of 5 make 30, so $30 \div 5 = 6$.

Example 3 — on your own

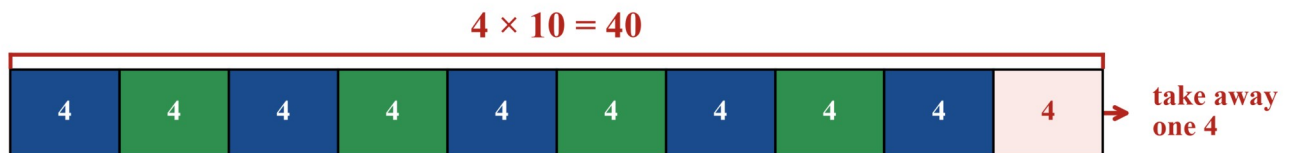
Find 4×9 .

Use the 10 times fact you know: $4 \times 10 = 40$. That is one group of 4 too many, so take one 4 away:

$$40 - 4 = 36$$

So $4 \times 9 = 36$.

4×9 from the 10 times fact



$$40 - 4 = 36, \text{ so } 4 \times 9 = 36$$

A bar of 10 parts of 4 makes 40. Take away one part of 4: $40 - 4 = 36$, so $4 \times 9 = 36$.

Practice questions

With help

Q1. There are 3 groups of 4 counters.

• • • • • • • • • • • •

Complete: 3 groups of $4 = \square$, so $3 \times 4 = \square$.

Q2. Count on by 5 to fill the gaps: 5, 10, $\square$, $\square$, 25, 30.

Q3. $10 \times 4 = \square$. Think: 4 tens.

Q4. You know $2 \times 7 = 14$. Double 14 to find $4 \times 7 = \square$.

Q5. You know $3 \times 5 = 15$. So $15 \div 3 = \square$.

Q6. What number is missing? $4 \times \square = 20$.

Q7. You know $5 \times 6 = 30$. So $30 \div 5 = \square$.

Q8. Every answer in the 5 times facts ends in 5 or 0. Which of these numbers are answers in the 5 times facts? 15, 22, 35, 41, 50.

On your own

Q9. $3 \times 7 = \square$

Q10. $5 \times 8 = \square$

Q11. $4 \times 6 = \square$

Q12. $10 \times 9 = \square$

Q13. $24 \div 3 = \square$

Q14. $40 \div 5 = \square$

Q15. $30 \div 10 = \square$

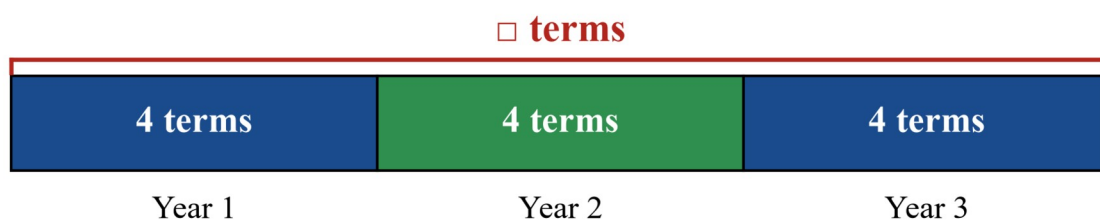
Q16. $\square \times 4 = 16$

Q17. $12 \div \square = 4$

Q18. Write all four facts in the fact family for 4, 5 and 20.

Q19. In Victoria, the school year has 4 terms.

Source: Department of Education (Victoria), *School term dates*, opened 2026-08-19.



In Victoria, the school year has 4 terms.

A bar model with 3 equal parts, one for each school year. Each part is 4 terms, and the whole is a box.

(a) How many terms are there in 3 school years?

(b) Jack has been at school for 20 terms. How many school years has he finished?

Answers

Q1. 12; 12. **Q2.** 15, 20. **Q3.** 40. **Q4.** 28. **Q5.** 5. **Q6.** 5. **Q7.** 6. **Q8.** 15, 35, 50. **Q9.** 21. **Q10.** 40. **Q11.** 24. **Q12.** 90. **Q13.** 8. **Q14.** 8. **Q15.** 3. **Q16.** 4. **Q17.** 3. **Q18.** $4 \times 5 = 20$, $5 \times 4 = 20$, $20 \div 4 = 5$, $20 \div 5 = 4$. **Q19.** (a) 12 terms, (b) 5 school years.

Worked answers

Q1. 3 groups of 4: $4 + 4 + 4 = 12$, so $3 \times 4 = 12$.

Q2. Counting on by 5: 5, 10, **15, 20**, 25, 30.

Q3. 10×4 is 4 tens: 10, 20, 30, 40. So $10 \times 4 = 40$.

Q4. 4×7 is double 2×7 . Double 14 is 28, so $4 \times 7 = 28$.

Q5. $3 \times 5 = 15$, so $15 \div 3 = 5$. Check: $5 \times 3 = 15$. ✓

Q6. $4 \times 5 = 20$, so the missing number is 5.

Q7. $5 \times 6 = 30$, so $30 \div 5 = 6$. Check: $6 \times 5 = 30$. ✓

Q8. Numbers that end in 5 or 0: 15, 35 and 50. ($15 = 5 \times 3$, $35 = 5 \times 7$, $50 = 5 \times 10$.)

Q9. 3×7 : two sevens are 14, one more seven makes 21. So $3 \times 7 = 21$.

Q10. Count by 5s eight times: 5, 10, 15, 20, 25, 30, 35, 40. So $5 \times 8 = 40$.

Q11. 4×6 : double 6 is 12, double 12 is 24. So $4 \times 6 = 24$.

Q12. 10×9 is 9 tens. So $10 \times 9 = 90$.

Q13. $24 \div 3$ asks: 3 times what makes 24? $3 \times 8 = 24$, so $24 \div 3 = 8$.

Q14. $40 \div 5$ asks: 5 times what makes 40? $5 \times 8 = 40$, so $40 \div 5 = 8$.

Q15. $30 \div 10$ asks: 10 times what makes 30? $10 \times 3 = 30$, so $30 \div 10 = 3$.

Q16. $4 \times 4 = 16$, so the missing number is 4.

Q17. $3 \times 4 = 12$, so $12 \div 3 = 4$. The missing number is 3.

Q18. $4 \times 5 = 20$, $5 \times 4 = 20$, $20 \div 4 = 5$, $20 \div 5 = 4$.

Q19. (a) Each year has 4 terms, so 3 years: $3 \times 4 = 12$ terms. (b) 20 terms shared into groups of 4: $20 \div 4 = 5$ school years. Check: $5 \times 4 = 20$. ✓

Test

Chapter test T3 — Algebra: number facts and unknowns

Codes: VC2M3A02, VC2M3A01, VC2M3A03 · **Total: 15 marks**

This is a classroom check, not an exam. It is **untimed**. The guidance duration is **25 minutes**.

You will need: paper and a pencil. You may use counters if they help.

Calculators: no calculators in Section A (VC2M3A02 is without a calculator). You may use a calculator in Sections B and C.

Show your working.

Section A — Addition and subtraction facts (VC2M3A02) — 5 marks

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

Q1. (2 marks) You know that $9 + 4 = 13$. Use the fact family to find:

$$13 - 9 = \square \text{ and } 13 - 4 = \square$$

Q2. (2 marks) You know that $5 + 8 = 13$. Use this fact to find:

$$15 + 8 = \square \text{ and } 50 + 80 = \square$$

Q3. (1 mark) To work out $8 + 6$ in your head, you make 10 first. Which do you split the 6 into?

A 1 and 5

B 2 and 4

C 3 and 3

D 4 and 2

Section B — Inverse operations and unknown numbers (VC2M3A01) — 5 marks

You may use a calculator in this section if you want one.

Q4. (1 mark) Find the unknown number: $46 + \square = 82$

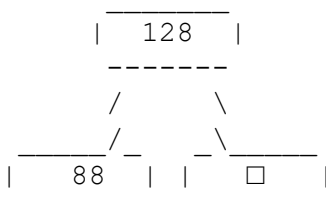
Q5. (1 mark) Find the unknown number: $\square - 8 = 17$

Q6. (1 mark) Find the unknown number: $72 - \square = 35$

Q7. (2 marks) The Parliament of Victoria has 128 members in all. 88 members are in the Legislative Assembly. The rest are in the Legislative Council.

Source: Wikipedia, *Parliament of Victoria*, retrieved 2026-08-23.

A part-whole diagram shows the whole and the two parts:



- (a) Write a number sentence with a box for the number of members in the Legislative Council, then find the box.
- (b) Check your answer with the other job.
-

Section C — Multiplication and division facts (VC2M3A03) — 5 marks

You may use a calculator in this section if you want one.

Q8. (2 marks) Find:

(a) $3 \times 9 = \square$

(b) $45 \div 5 = \square$

Q9. (1 mark) Which fact helps you find $24 \div 3$?

A $3 \times 8 = 24$

B $24 - 3 = 21$

C $3 + 8 = 11$

D $24 + 3 = 27$

Q10. (2 marks) In Victoria, the school year has 4 terms.

Source: Department of Education (Victoria), *School term dates*, retrieved 2026-08-23.

1 school year:

[term] [term] [term] [term]

(a) How many terms are there in 6 school years? Show how you work it out.

(b) Mia has been at school for 28 terms. How many school years has she finished? Show how you work it out.

Solutions

Answer key

Q	Answer	Marks
Q1	$13 - 9 = 4$; $13 - 4 = 9$	2
Q2	$15 + 8 = 23$; $50 + 80 = 130$	2
Q3	B	1
Q4	36	1
Q5	25	1
Q6	37	1
Q7	(a) $88 + \square = 128$, $\square = 40$; (b) $88 + 40 = 128$ ✓	2
Q8	(a) 27; (b) 9	2
Q9	A	1
Q10	(a) 24 terms; (b) 7 school years	2
	Total	15

Worked solutions

Q1 (VC2M3A02, 2 marks). The parts are 9 and 4, and the whole is 13. Taking away one part leaves the other part:

$$13 - 9 = 4 \text{ and } 13 - 4 = 9.$$

Marking: 1 mark for each correct fact.

Q2 (VC2M3A02, 2 marks). $15 + 8$ is the fact $5 + 8 = 13$, with 10 more, so $15 + 8 = 23$. $50 + 80$ is 5 tens + 8 tens = 13 tens, so $50 + 80 = 130$.

Marking: 1 mark for each correct answer. Other correct mental ways to the same answers score full marks.

Q3 (VC2M3A02, 1 mark). B. 8 needs 2 more to make 10, so split the 6 into 2 and 4: $8 + 6 = 8 + 2 + 4 = 10 + 4 = 14$.

Q4 (VC2M3A01, 1 mark). The box is a part. The whole is 82 and one part is 46, so use the inverse: $\square = 82 - 46 = 36$. Check: $46 + 36 = 82$. ✓

Q5 (VC2M3A01, 1 mark). The box is the whole. Add the parts: $\square = 17 + 8 = 25$. Check: $25 - 8 = 17$. ✓

Q6 (VC2M3A01, 1 mark). The box is a part: $\square = 72 - 35 = 37$. Check: $72 - 37 = 35$. ✓

Q7 (VC2M3A01, 2 marks).

(a) The Legislative Council members are a part, so the box is a part: $88 + \square = 128$. Use the inverse: $\square = 128 - 88 = 40$. There are 40 members in the Legislative Council. (The sentence $128 - 88 = \square$ scores the same way.)

(b) Check with the other job: $88 + 40 = 128$. ✓ The two parts add back to the whole.

Marking: (a) 1 mark for a correct number sentence with a box and the correct answer; (b) 1 mark for a correct check using the other job. The check must be shown, not just stated.

Q8 (VC2M3A03, 2 marks).

(a) 3×9 : two nines are 18, and one more nine makes 27. So $3 \times 9 = 27$.

(b) $45 \div 5$ asks: *5 times what makes 45?* $5 \times 9 = 45$, so $45 \div 5 = 9$. Check: $9 \times 5 = 45$. ✓

Marking: 1 mark for each correct answer.

Q9 (VC2M3A03, 1 mark). A. Division undoes multiplication. $24 \div 3$ asks “*3 times what makes 24?*”, and $3 \times 8 = 24$.

Q10 (VC2M3A03, 2 marks).

- (a) Each school year has 4 terms, so 6 school years: $6 \times 4 = 24$ terms. ($4 \times 6 = 24$ also scores.)
- (b) 28 terms shared into groups of 4: $28 \div 4 = 7$ school years. Check: $7 \times 4 = 28$. ✓ Mia has finished 7 school years.

Marking: 1 mark for each part. A correct number sentence with the answer is required for the mark.

Marks by content description

CD	Items	Marks
VC2M3A02	Q1 (2), Q2 (2), Q3 (1)	5
VC2M3A01	Q4 (1), Q5 (1), Q6 (1), Q7 (2)	5
VC2M3A03	Q8 (2), Q9 (1), Q10 (2)	5
Total	10 items	15

Every CD assessed in T3 contributes at least 3 separately scored marks. Multiple-choice items carry 2 of the 15 marks, inside the quarter-of-test cap. Calculators are barred in Section A per D7 (VC2M3A02 says “without a calculator”) and permitted in Sections B and C per D7’s note on VC2M3A01 .E02 and VC2M3A03 .E02.