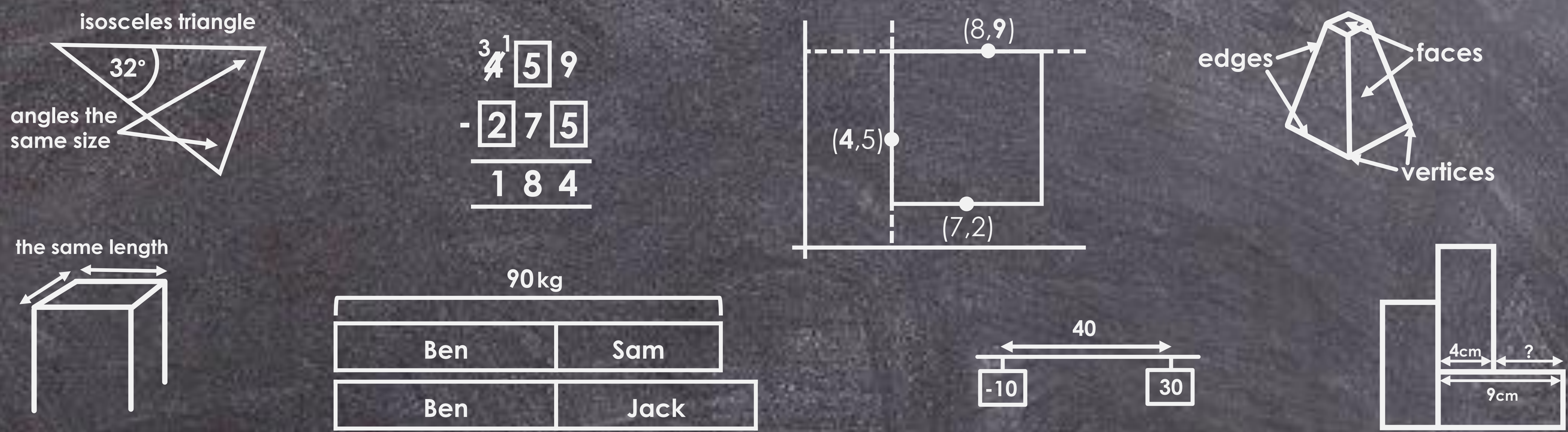
I SEE PROBLEM-SOLVING – UKS2

WORKED EXAMPLES



GARETH METCALFE

Available as PowerPoint and PDF from www.iseemaths.com

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Task 1: Sum of the digits

To make the **smallest** possible number:

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To make the **smallest** possible number:

- Must be a **2-digit number**
- Make the **tens** value as **small** as possible

Task 1: Sum of the digits

To make the **smallest** possible number:

- Must be a **2-digit number**
- Make the **tens** value as **small** as possible

15

Task 1: Sum of the digits

To make the **largest** possible number:

Task 1: Sum of the digits

To make the **largest** possible number:

- Use **as many digits** as possible
- Use the digit **0**

Task 1: Sum of the digits

To make the **largest** possible number:

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- Use the digit **0**

Use four digits: 0, 1, 2, 3

Task 1: Sum of the digits

To make the **largest** possible number:

- Use **as many digits** as possible
- Use the digit **0**
- **Largest** → **smallest** digits put **left** → **right**

Use four digits: 0, 1, 2, 3

Task 1: Sum of the digits

To make the **largest** possible number:

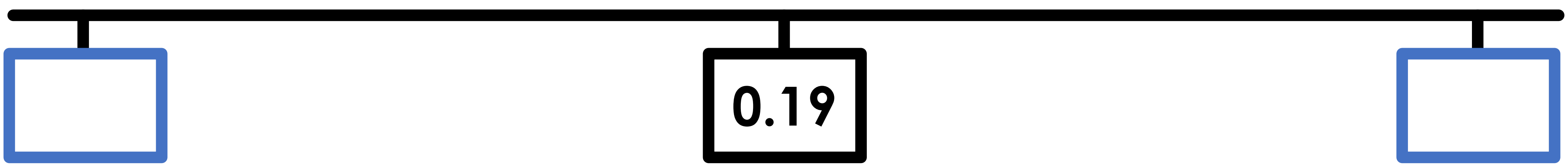
- Use **as many digits** as possible
- Use the digit **0**
- **Largest** → **smallest** digits put **left** → **right**

Use four digits: 0, 1, 2, 3

3210

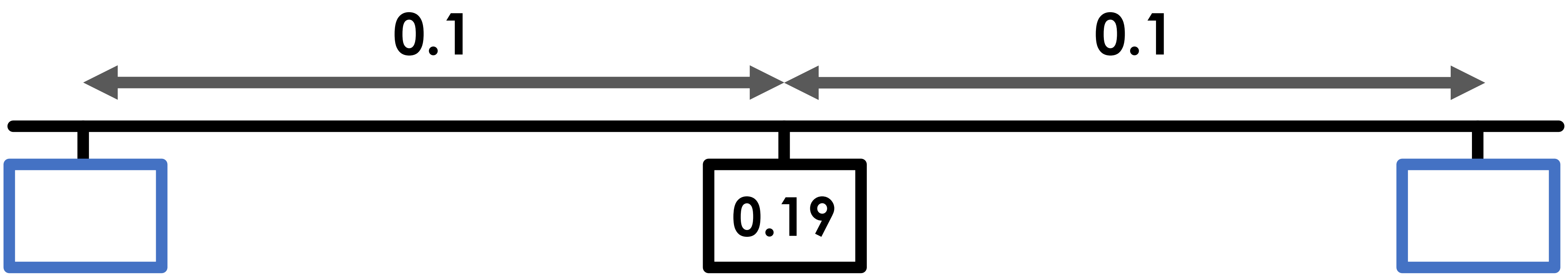
Task 2: Decimal number line

Example 1:



Task 2: Decimal number line

Example 1:



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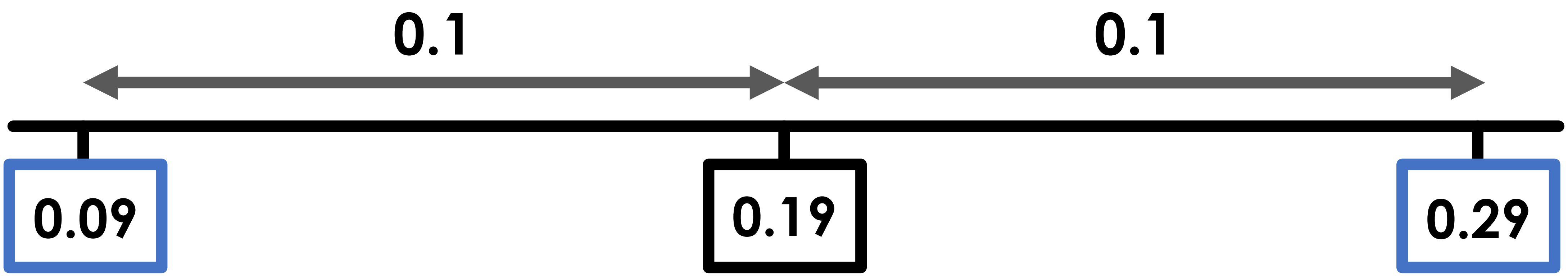
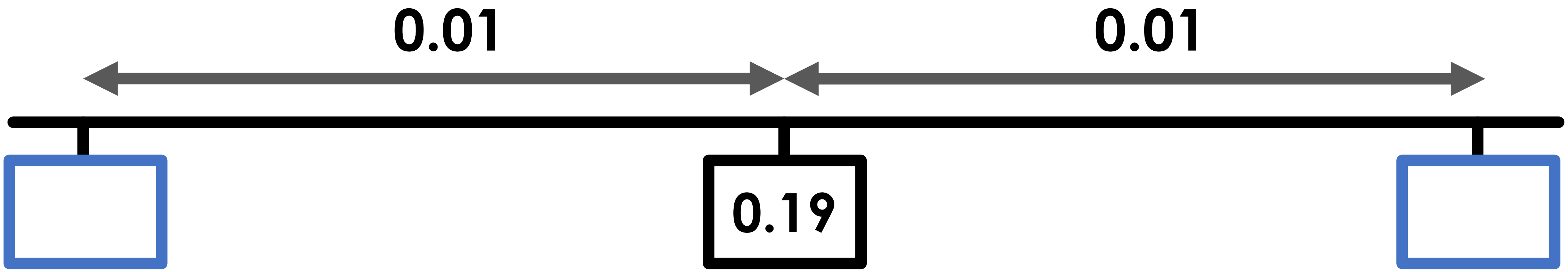


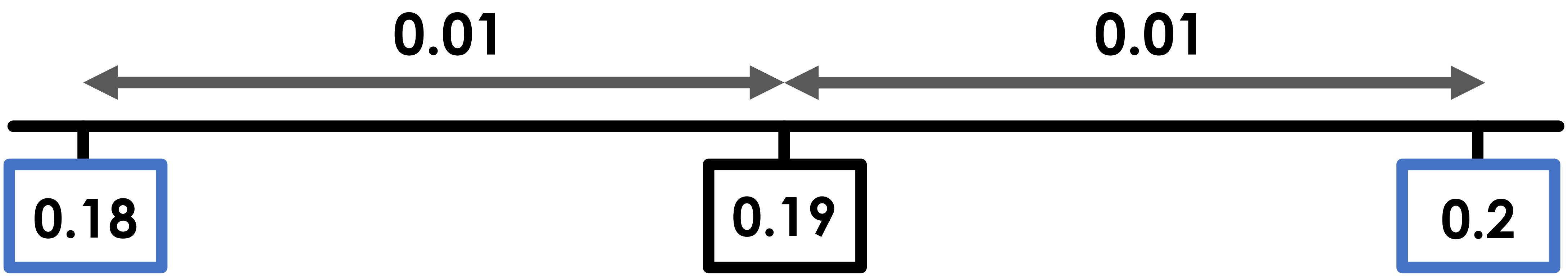
Task 2: Decimal number line

Example 2:



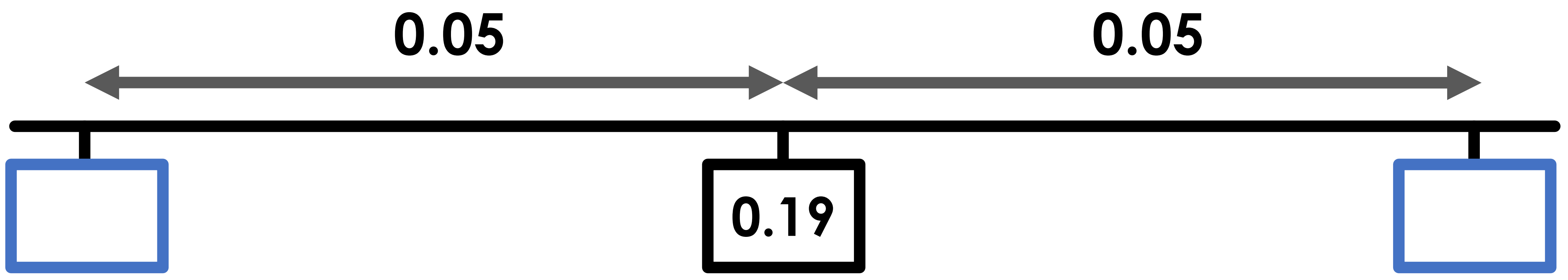
Task 2: Decimal number line

Example 2:



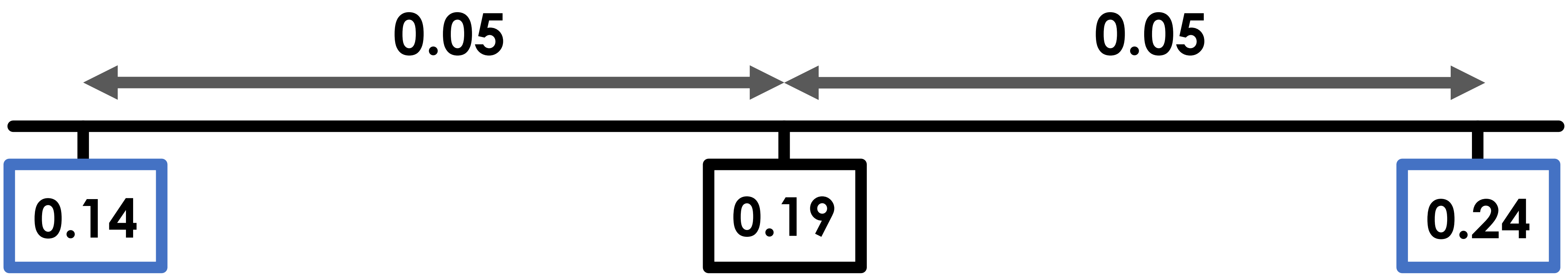
Task 2: Decimal number line

Example 3:



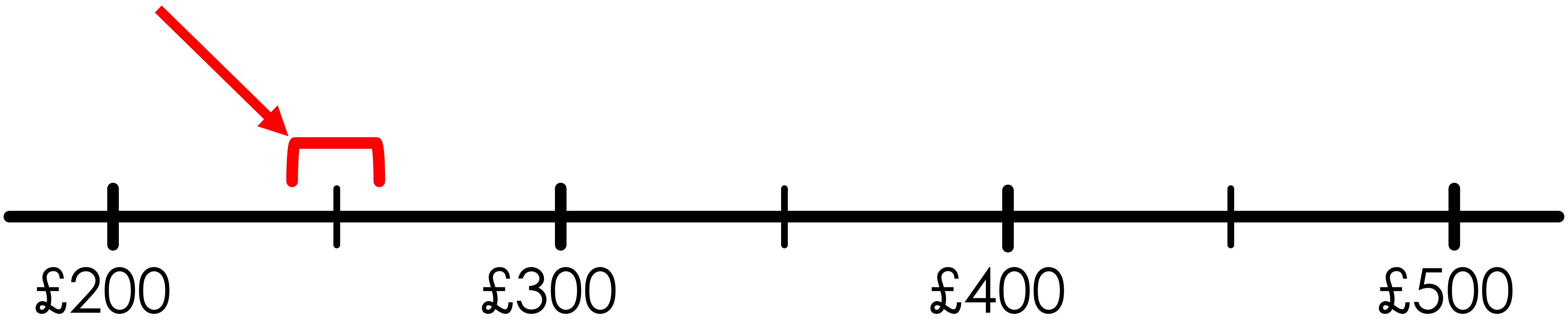
Task 2: Decimal number line

Example 3:



Task 3: Rounding money

Alex has £250, rounded to the nearest £10

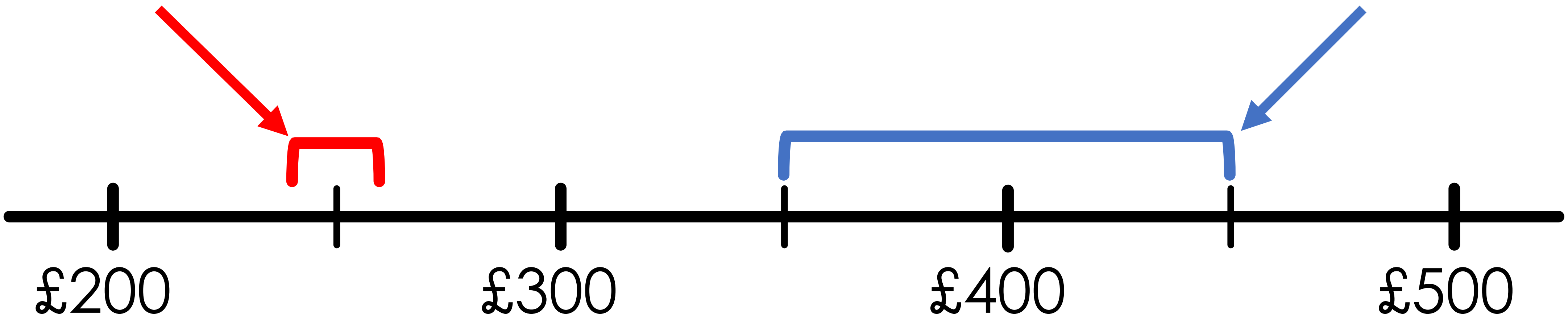


£245→£254

Task 3: Rounding money

Alex has £250, rounded to the nearest £10

Jim has £400, rounded to the nearest £100



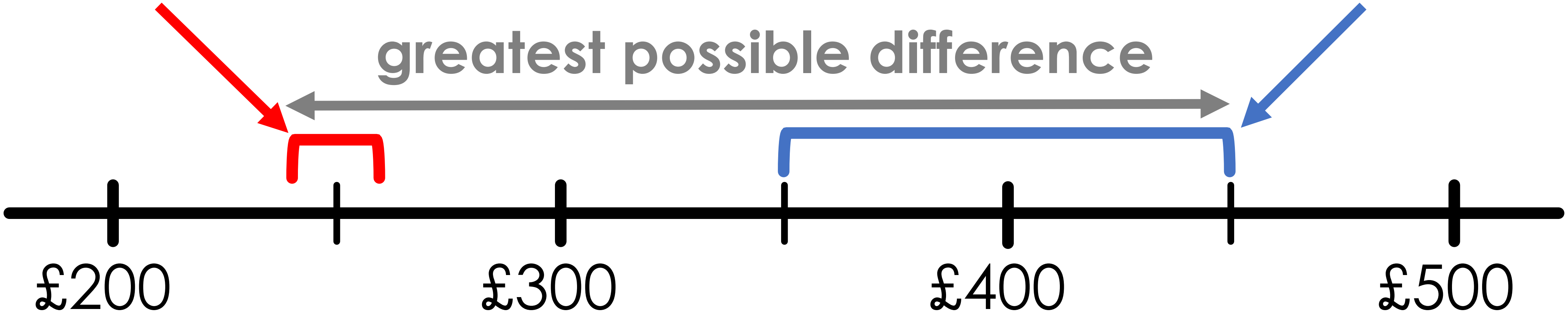
£245→£254

£350→£449

Task 3: Rounding money

Alex has £250, rounded to the nearest £10

Jim has £400, rounded to the nearest £100



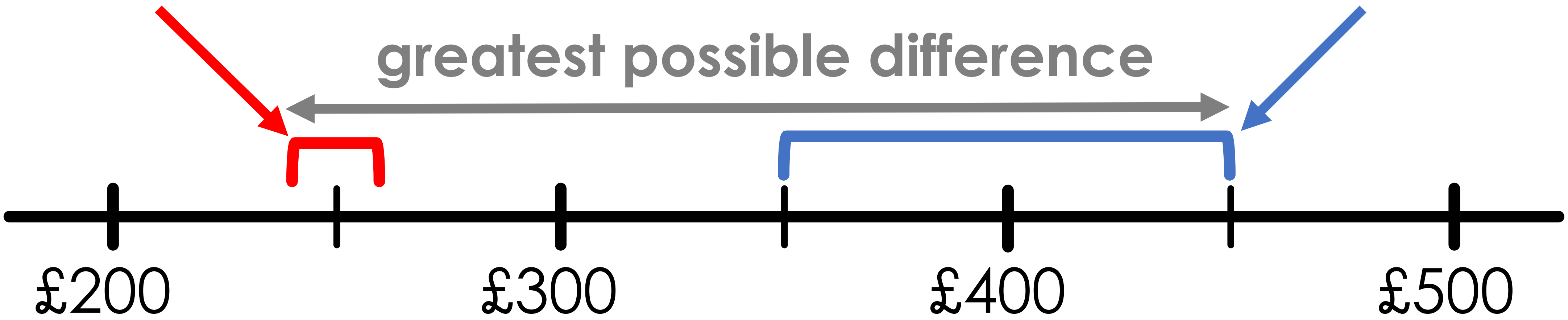
<u>£245</u>→£254

£350→<u>£449</u>

Task 3: Rounding money

Alex has £250, rounded to the nearest £10

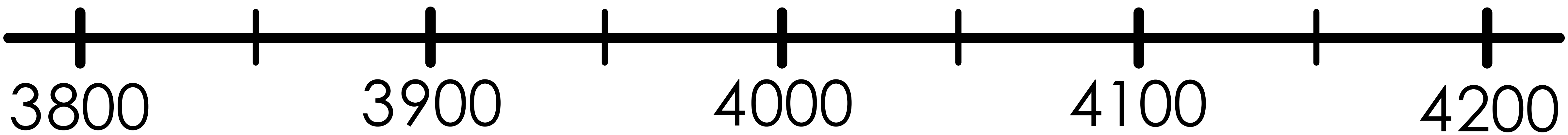
Jim has £400, rounded to the nearest £100



£449 - £245 = <u>£204</u>

Task 4: Rounding puzzles

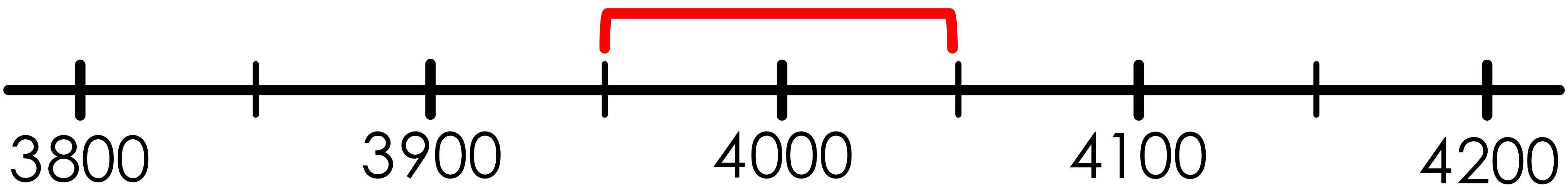
Part 1: nearest 100 is 4000



Task 4: Rounding puzzles

Part 1: nearest 100 is 4000

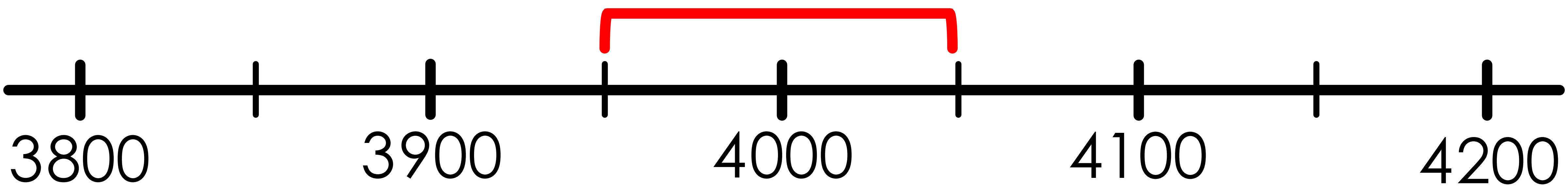
Numbers in this range, to the nearest 100, are 4000



Task 4: Rounding puzzles

Part 1: nearest 100 is 4000

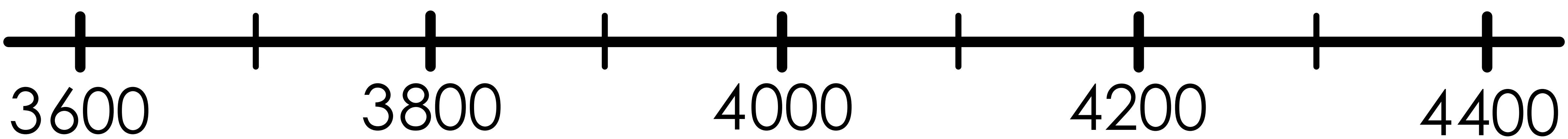
Numbers in this range, to the nearest 100, are 4000



Largest possible whole number = <u>4049</u>

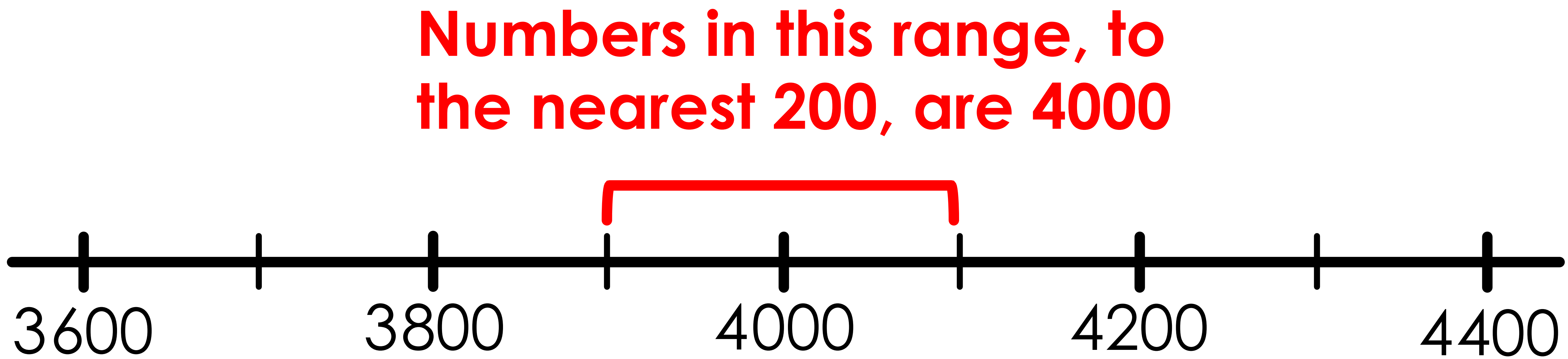
Task 4: Rounding puzzles

Part 2: nearest 200 is 4000



Task 4: Rounding puzzles

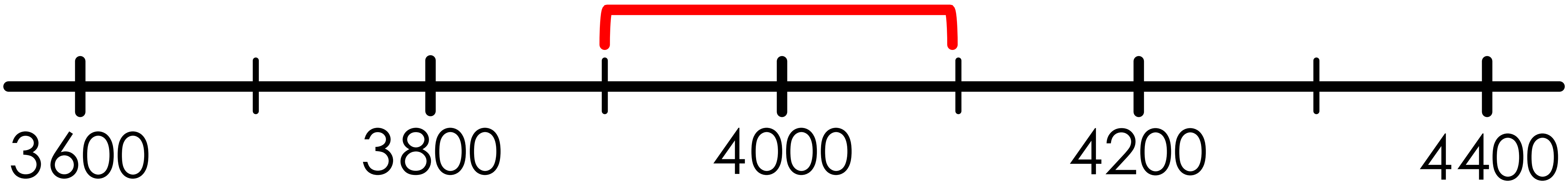
Part 2: nearest 200 is 4000



Task 4: Rounding puzzles

Part 2: nearest 200 is 4000

Numbers in this range, to the nearest 200, are 4000



Largest possible whole number = <u>4099</u>

Task 5: Negatives on number line

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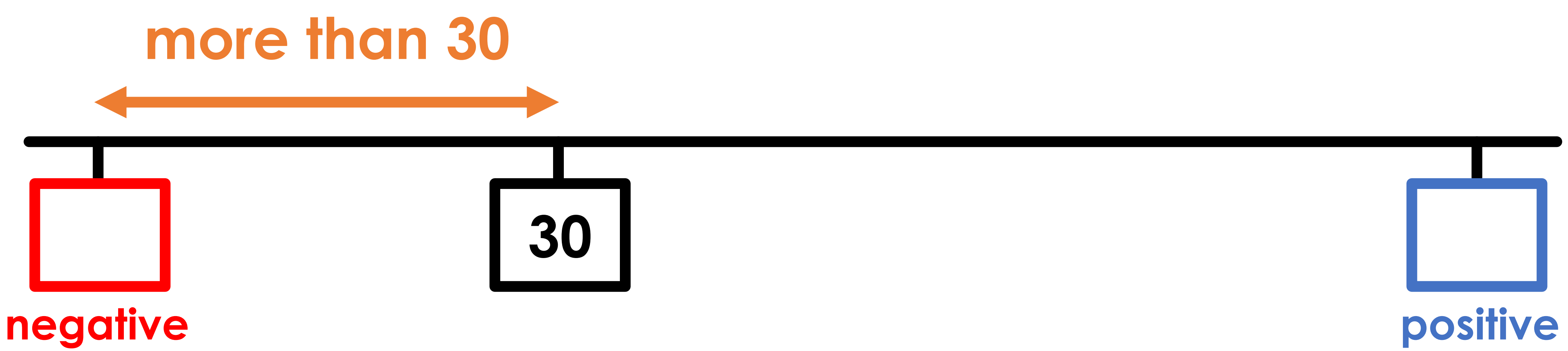
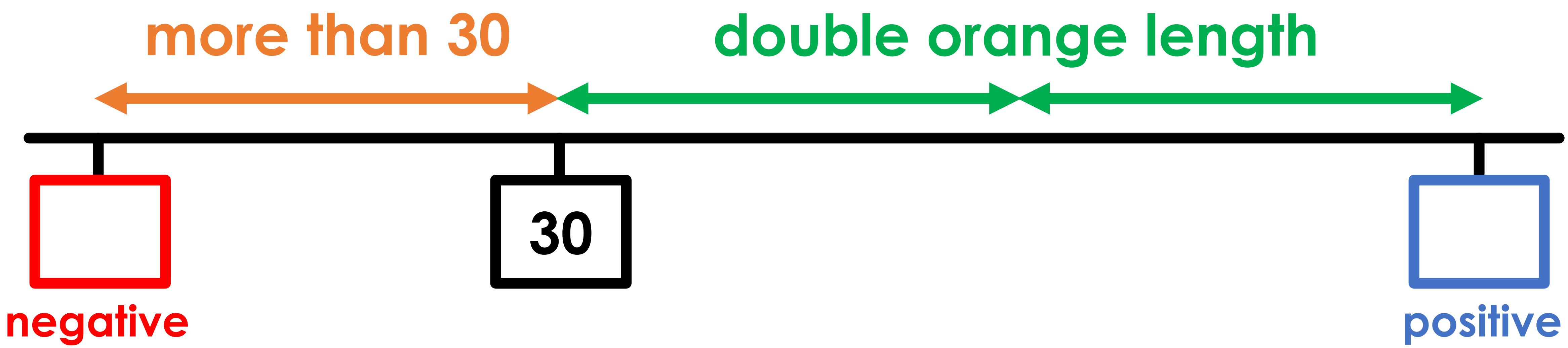
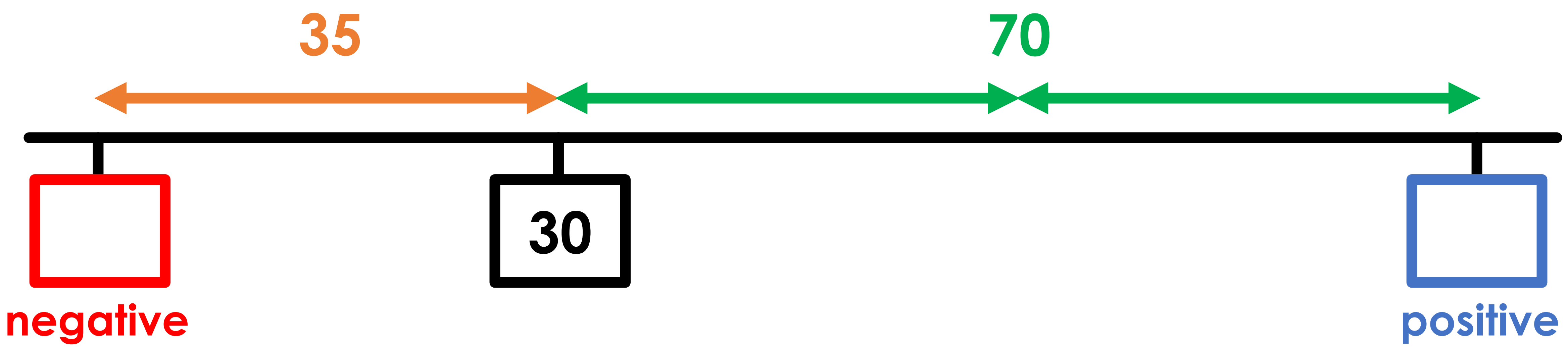


Task 5: Negatives on number line



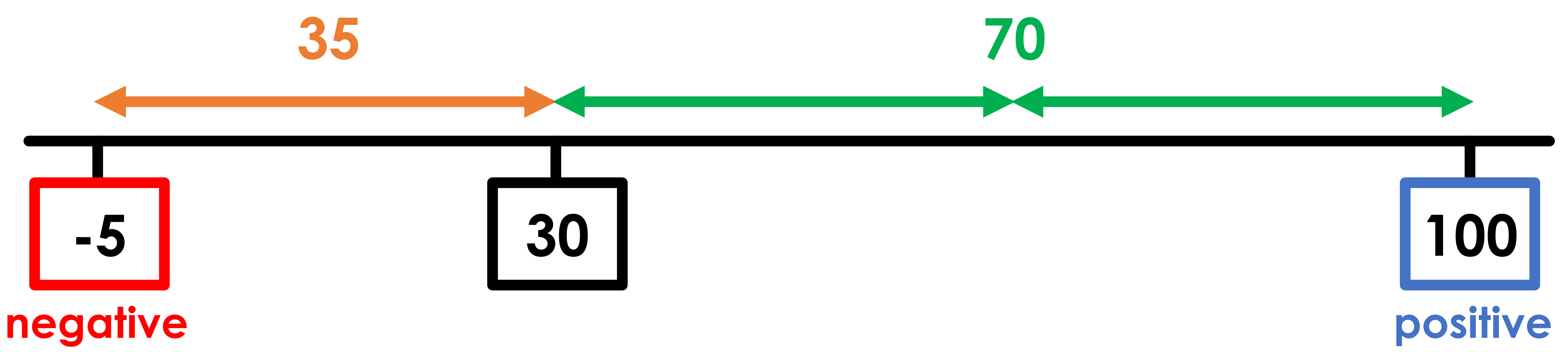
Task 5: Negatives on number line

Example answer 1:



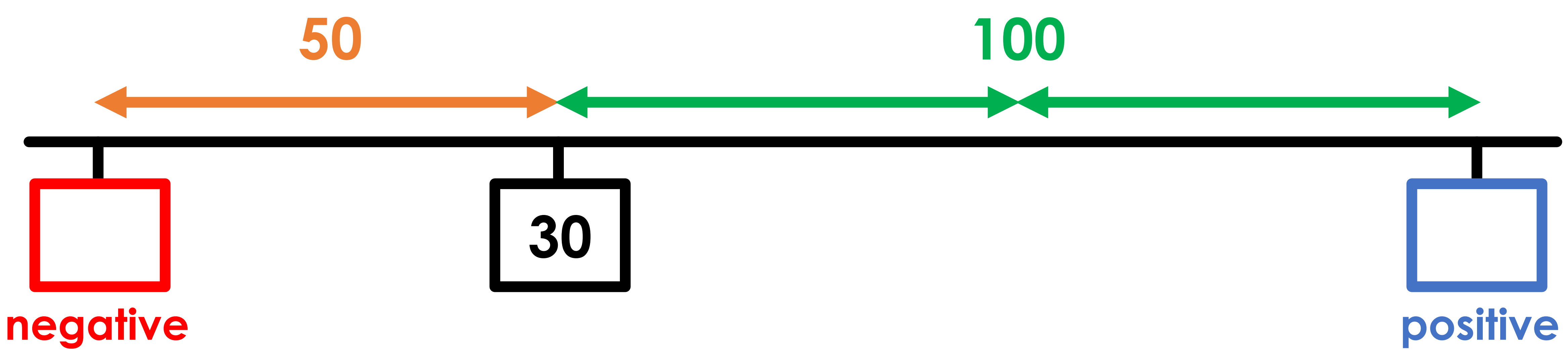
Task 5: Negatives on number line

Example answer 1:



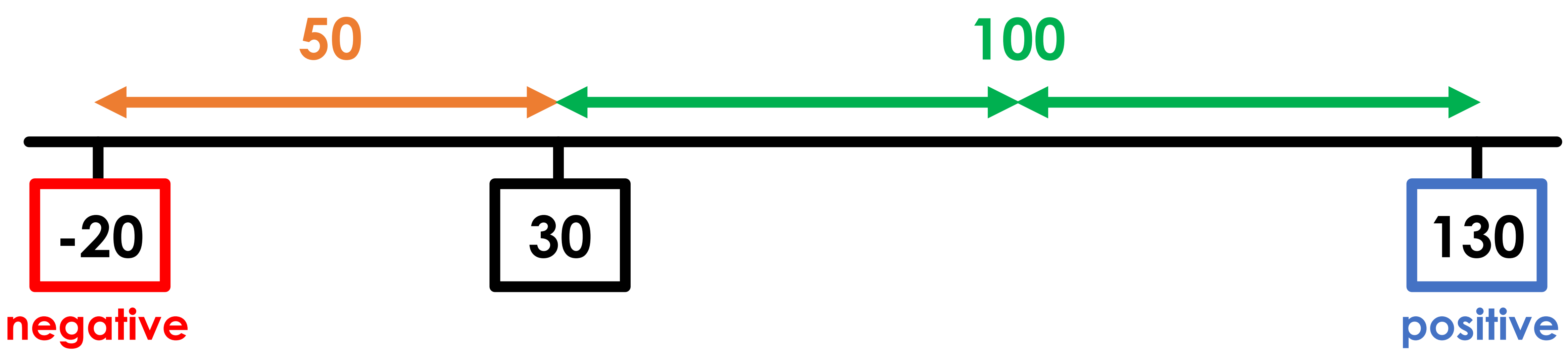
Task 5: Negatives on number line

Example answer 2:



Task 5: Negatives on number line

Example answer 2:



Task 6: Number sequences

Can the **difference** between the numbers in the sequence be **3?**

8, 5, 2...

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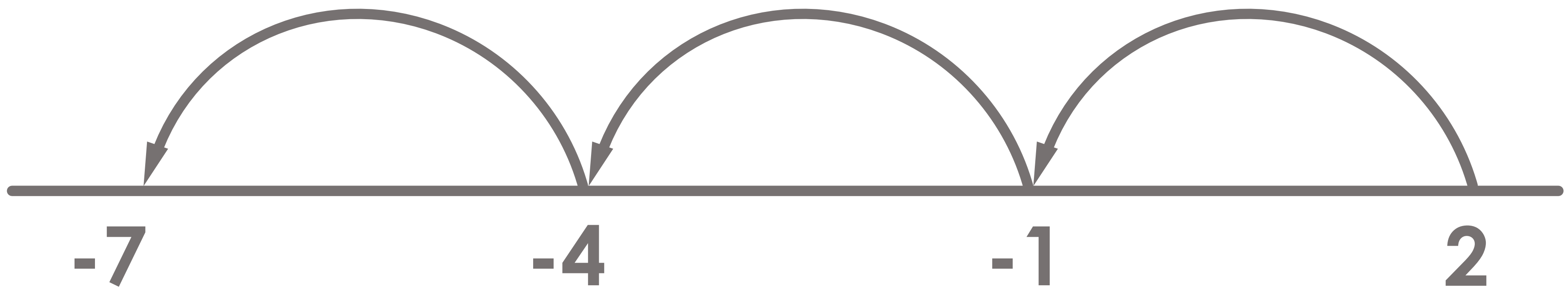
8, 5, 2…



No: -7 is the third negative number in this sequence

Task 6: Number sequences

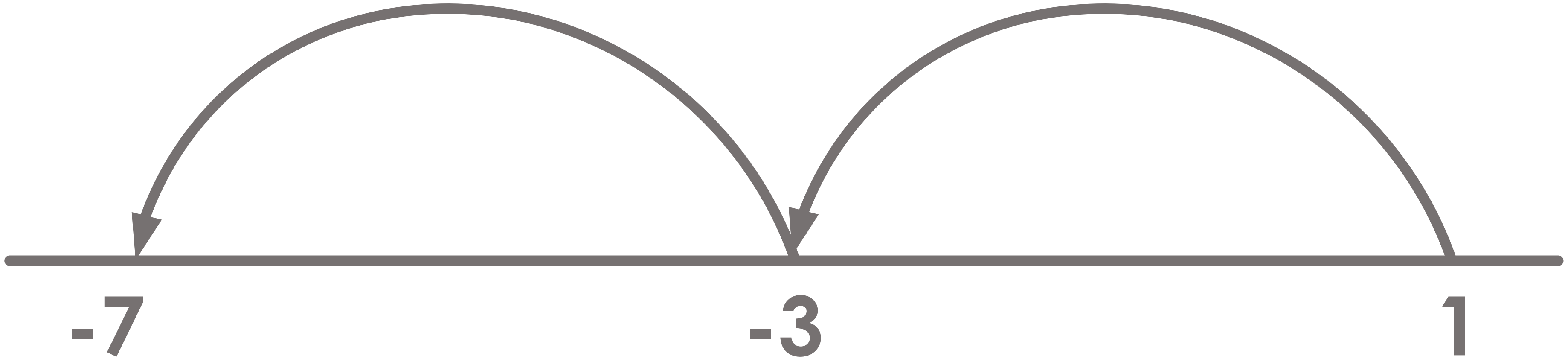
Can the **difference** between the numbers in the sequence be **4?**

9, 5, 1…

Task 6: Number sequences

Can the **difference** between the numbers in the sequence be **4?**

9, 5, 1...



Yes: -7 is the second negative number in this sequence

Task 6: Number sequences

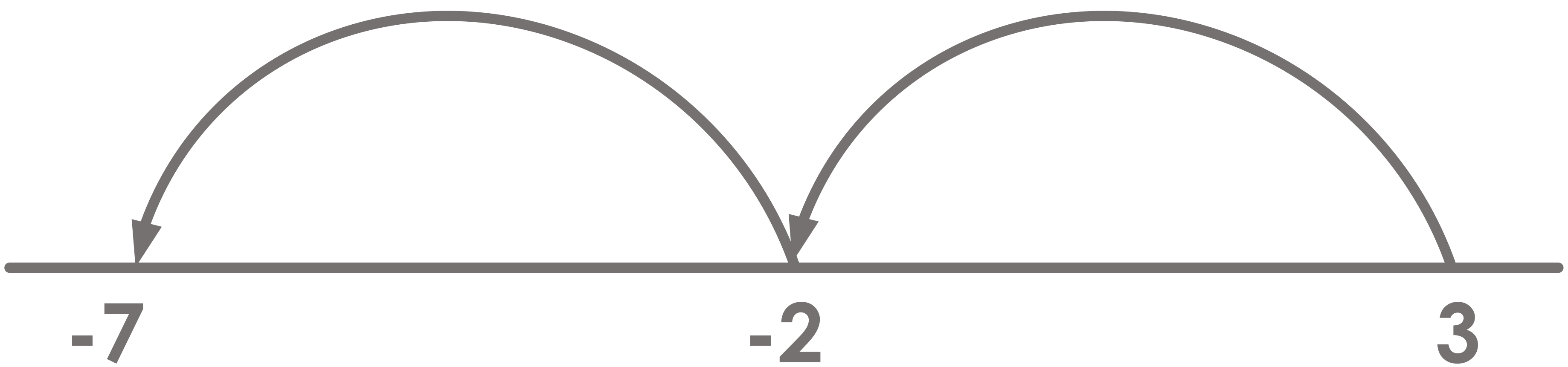
Can the **difference** between the numbers in the sequence be **5?**

13, 8, 3…

Task 6: Number sequences

Can the **difference** between the numbers in the sequence be **5?**

13, 8, 3...



Yes: -7 is the second negative number in this sequence

Task 6: Number sequences

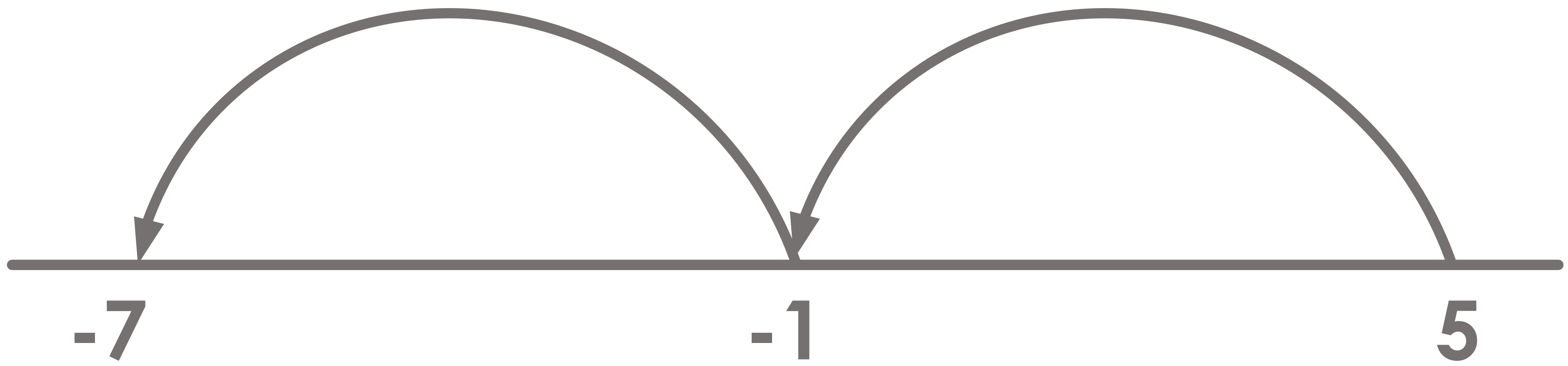
Can the **difference** between the numbers in the sequence be **6?**

17, 11, 5...

Task 6: Number sequences

Can the **difference** between the numbers in the sequence be **6?**

17, 11, 5...



Yes: -7 is the second negative number in this sequence

Task 6: Number sequences

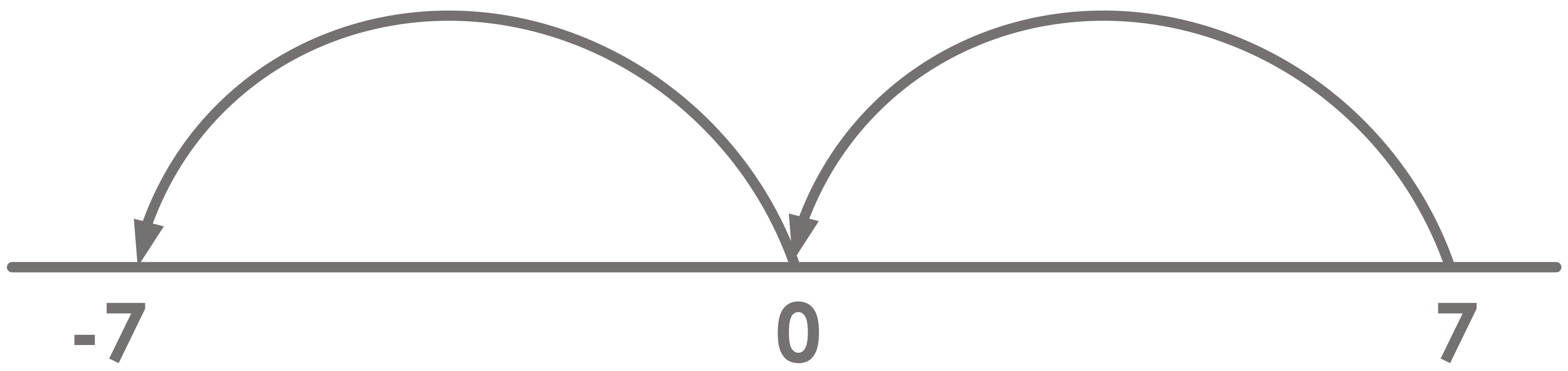
Can the **difference** between the numbers in the sequence be **7?**

21, 14, 7...

Task 6: Number sequences

Can the **difference** between the numbers in the sequence be **7?**

21, 14, 7…



No: -7 is the first negative number in this sequence

Task 7: More, less, equal

4, 5, 6, 7, 8

$10 - 8 < \square - \square$

$20 > \square \times 3$

$\square + 4 = 15 - \square$

Task 7: More, less, equal

4, 5, 6, 7, 8

Where can 8 go?

$$10 - 8 < \square - \square$$

$$20 > \square \times 3$$

$$\square + 4 = 15 - \square$$

Task 7: More, less, equal

4, 5, 6, 7, 8

$10 - 8 < \boxed{8} - \boxed{}$

$20 > \boxed{} \times 3$

$\boxed{} + 4 = 15 - \boxed{}$

This is the **only** place the 8 can go, so it **must** go there.

Where can 7 go?

Task 7: More, less, equal

4, 5, 6, 7

$10 - 8 < \boxed{8} - \boxed{}$

$20 > \boxed{} \times 3$

$\boxed{7} + 4 = 15 - \boxed{4}$

The 7 can't go in the top two lines. It **must** go on the bottom line.

4 **must** be in the other bottom box to make the number sentence balance.

The 7 and 4 can go in either bottom box.

Where can 6 go?

Task 7: More, less, equal

This is solution 1

$10 - 8 < \boxed{8} - \boxed{5}$

$20 > \boxed{6} \times 3$

$\boxed{7} + 4 = 15 - \boxed{4}$

6 **must** go in the middle line space.

This leaves a space for 5. The top number sentence is now correct.

Task 7: More, less, equal

This is solution 2

$10 - 8 < \boxed{8} - \boxed{5}$

$20 > \boxed{6} \times 3$

$\boxed{4} + 4 = 15 - \boxed{7}$

Task 8: Four number sentences

3, 6, 7, 8, 9

$\square \times 3 = 18 + \square$

$2 < 9 - \square$

$\square \div 2 < 4$

$2 \times 2 \times 2 \times 2 < \square + 8$

Task 8: Four number sentences

3, 6, 7, 8, 9

Which number can go in the orange box?

$$\square \times 3 = 18 + \square$$

$$2 < 9 - \square$$

$$\square \div 2 < 4$$

$$2 \times 2 \times 2 \times 2 < \square + 8$$

Task 8: Four number sentences

3, 6, 7, 8

$\square \times 3 = 18 + \square$

$2 < 9 - \square$

$\square \div 2 < 4$

$2 \times 2 \times 2 \times 2 < \boxed{9} + 8$

9 is the **only number** that can go in the orange box.

Where can 8 go?

Task 8: Four number sentences

3, 7

$\boxed{8} \times 3 = 18 + \boxed{6}$

$2 < 9 - \boxed{}$

$\boxed{} \div 2 < 4$

$2 \times 2 \times 2 \times 2 < \boxed{9} + 8$

This is the **only** place that the 8 can go.

To complete the number sentence, 6 must go in the other box on the top line.

Where can 7 go?

Task 8: Four number sentences

This is the solution

$\boxed{8} \times 3 = 18 + \boxed{6}$

$2 < 9 - \boxed{3}$

$\boxed{7} \div 2 < 4$

$2 \times 2 \times 2 \times 2 < \boxed{9} + 8$

This is the **only** place that the 7 can go.

This leaves a space for 3. The second number sentence is now correct.

Task 9: Subtraction number sentences

$H - 25 < 35$

$80 - H < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $60 - 25 = 35$

$80 - H < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$

$80 - H < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$ $80 - 41 = 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$ $80 - 42 < 39$

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$ $80 - 42 < 39$ **H is 42 or more**

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$ $80 - 42 < 39$ **H is 42 or more**

H is a multiple of 6

Task 9: Subtraction number sentences

$H - 25 < 35$ $59 - 25 < 35$ **H is 59 or less**

$80 - H < 39$ $80 - 42 < 39$ **H is 42 or more**

H is a multiple of 6 **42, 48, 54**

Task 10: Missing digits addition

$$
\begin{array}{r@{\quad}c@{\quad}c@{\quad}c@{\quad}c}
 & & \boxed{} & 8 & \boxed{} \\
+ & & 3 & \boxed{} & 5 \\
\hline
 & 1 & 0 & 5 & 2 \\
\hline
\end{array}
$$

Task 10: Missing digits addition

$$\begin{array}{ccccc} & \square & 8 & \boxed{7} \\ + & 3 & \square & 5 \\ \hline 1 & 0 & 5 & 2 \\ \hline & & 1 & \end{array}$$

Task 10: Missing digits addition

$$
\begin{array}{cccc}
 & \boxed{} & 8 & \boxed{7} \\
+ & 3 & \boxed{6} & 5 \\
\hline
1 & 0 & 5 & 2 \\
\hline
 & 1 & 1 &
\end{array}
$$

Task 10: Missing digits addition

$$
\begin{array}{r@{\quad}c@{\quad}c@{\quad}c@{\quad}c}
 & & \boxed{6} & 8 & \boxed{7} \\
+ & & 3 & \boxed{6} & 5 \\
\hline
 & 1 & 0 & 5 & 2 \\
\hline
 & & 1 & 1 &
\end{array}
$$

Task 11: Missing digits subtraction

$$
\begin{array}{r}
6\ \boxed{}\ 2 \\
-\ \boxed{}\ 3\ \boxed{} \\
\hline
2\ 4\ 3 \\
\hline
\end{array}
$$

Task 11: Missing digits subtraction

$$\begin{array}{cccc} & 6 & \cancel{\boxed{}} & {}^{1}2 \\ - & \boxed{} & 3 & \boxed{9} \\ \hline & 2 & 4 & 3 \\ \hline \end{array}$$

Task 11: Missing digits subtraction

$$\begin{array}{cccc} & & 7 & \\ & 6 & \boxed{\cancel{8}} & {}^{1}2 \\ - & \boxed{} & 3 & \boxed{9} \\ \hline & 2 & 4 & 3 \\ \hline \end{array}$$

Task 11: Missing digits subtraction

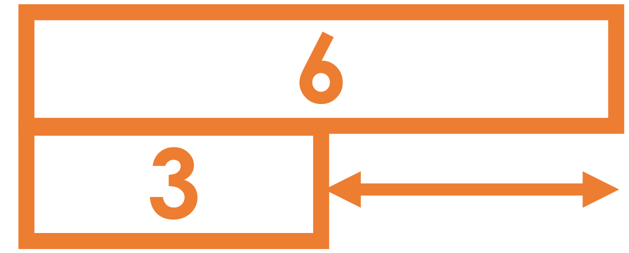
$$\begin{array}{cccc}
 & & 7 & \\
 & 6 & \boxed{\cancel{8}} & {}^{1}2 \\
- & \boxed{4} & 3 & \boxed{9} \\
\hline
 & 2 & 4 & 3 \\
\hline
\end{array}$$

Task 12: Sum and difference

Two numbers: sum = 9, difference = 4

6 and 3

sum = 9 ✓



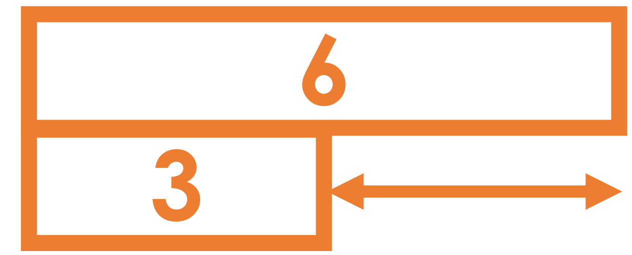
difference = 3 ✗

Task 12: Sum and difference

Two numbers: sum = 9, difference = 4

6 and 3

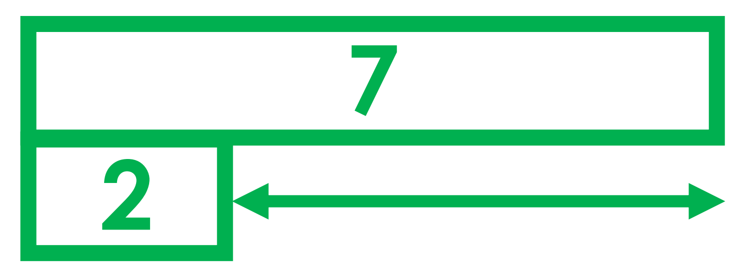
sum = 9 ✓



difference = 3 ✗

7 and 2

sum = 9 ✓

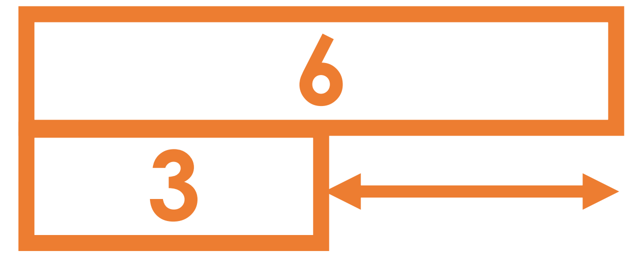


difference = 5 ✗

Two numbers: sum = 9, difference = 4

6 and 3

sum = 9 ✓



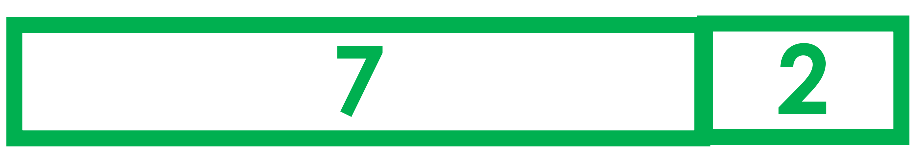
difference = 3 ✗

6.5 and 2.5

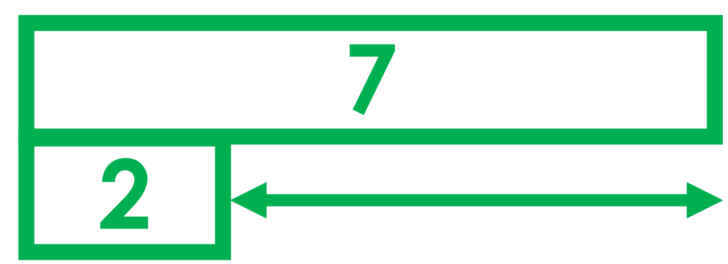
sum = 9 ✓

difference = 4 ✓

7 and 2

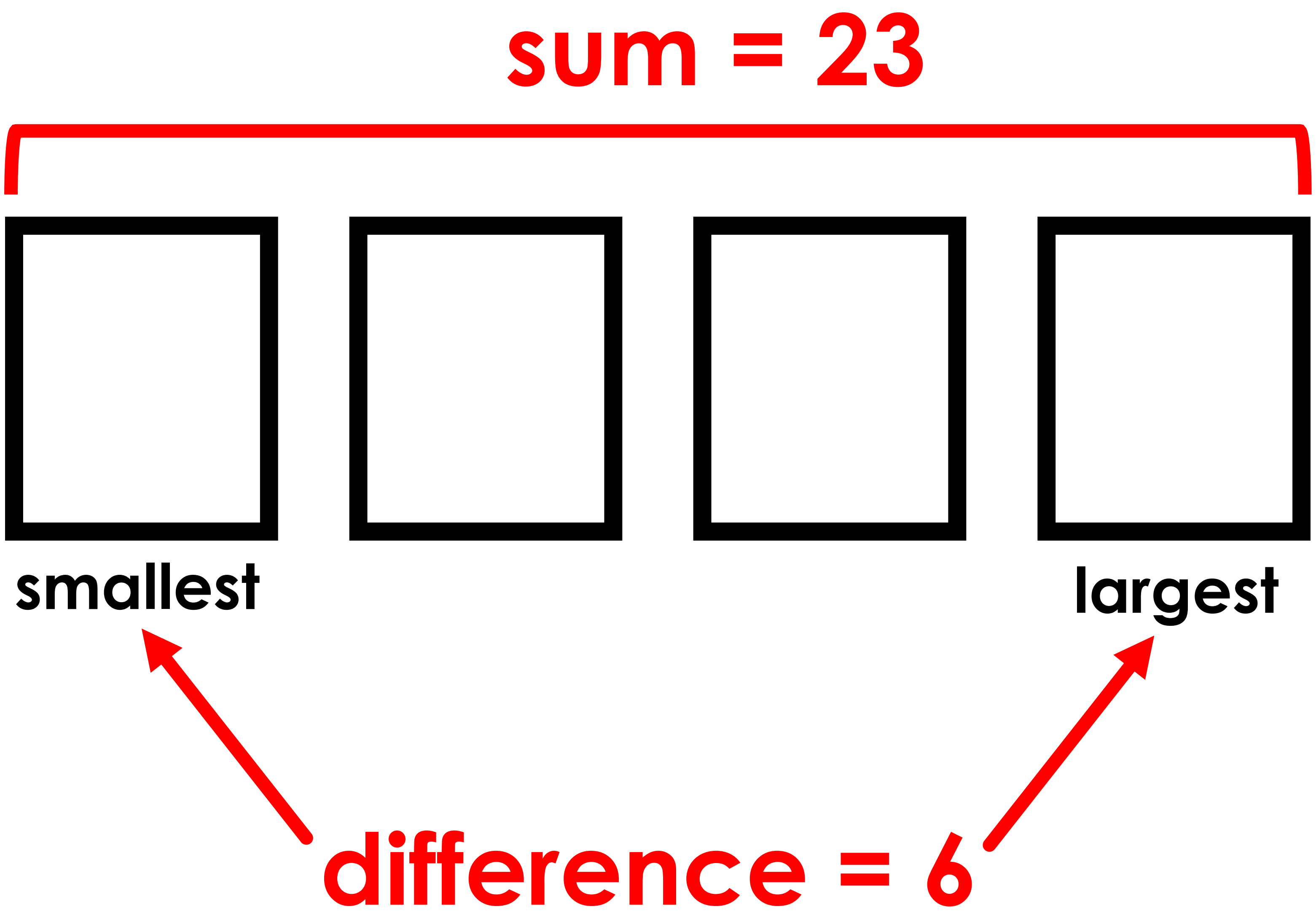


sum = 9 ✓



difference = 5 ✗

Task 13: Four numbers challenge



Task 13: Four numbers challenge

sum = 23

1			7
smallest			largest

difference = 6

Task 13: Four numbers challenge

sum = 23

1			7

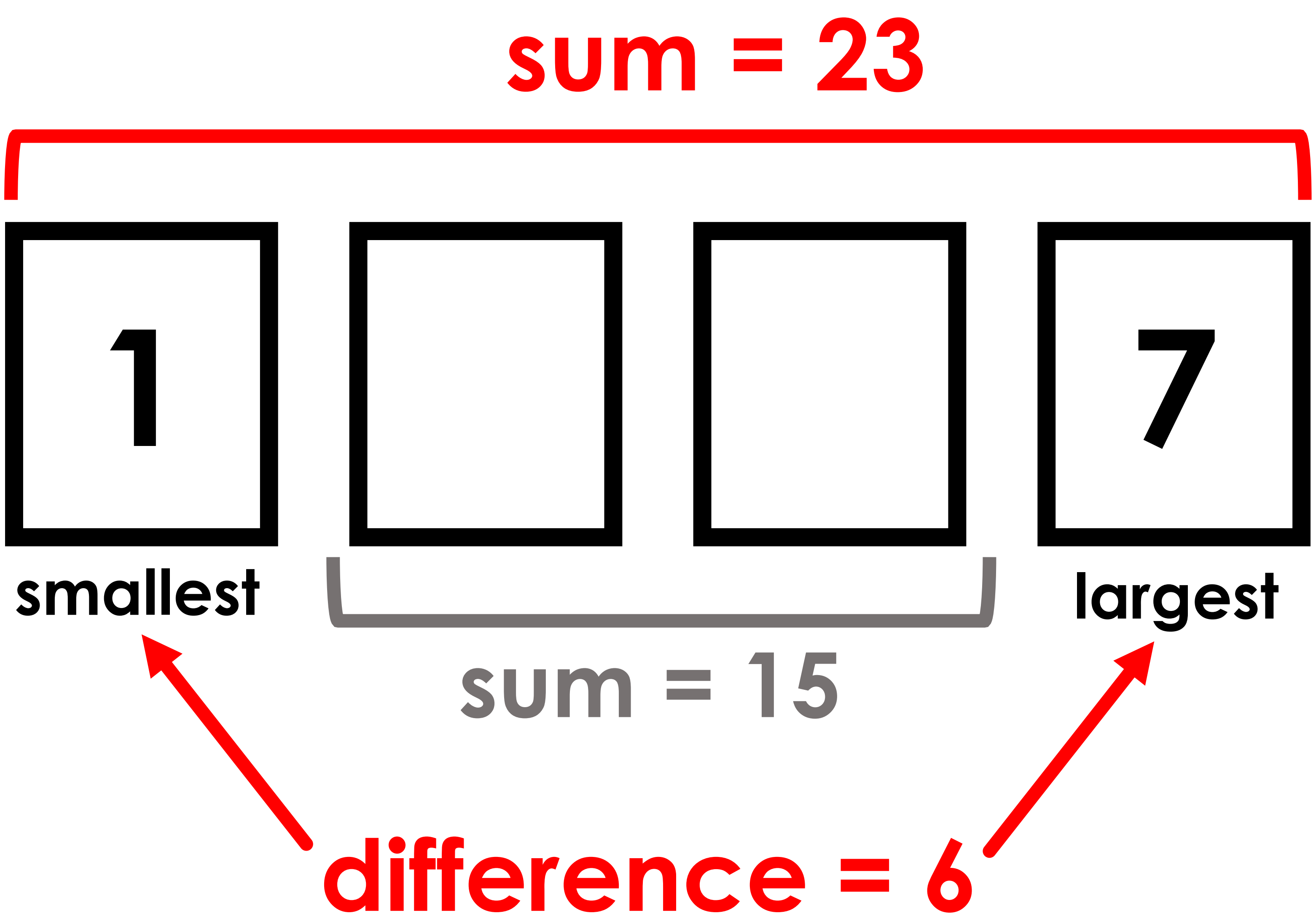
smallest

sum = 15

largest

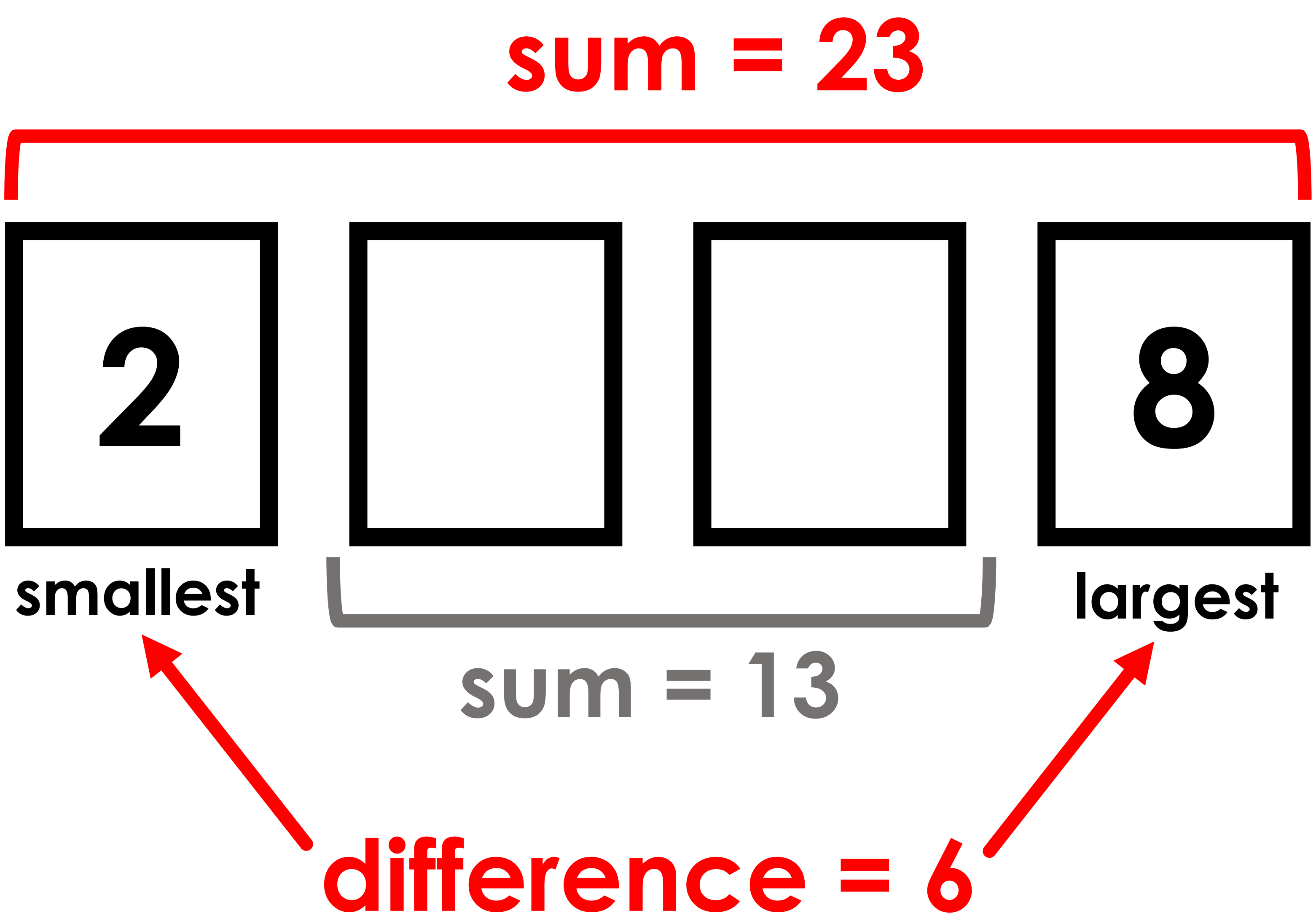
difference = 6

Task 13: Four numbers challenge

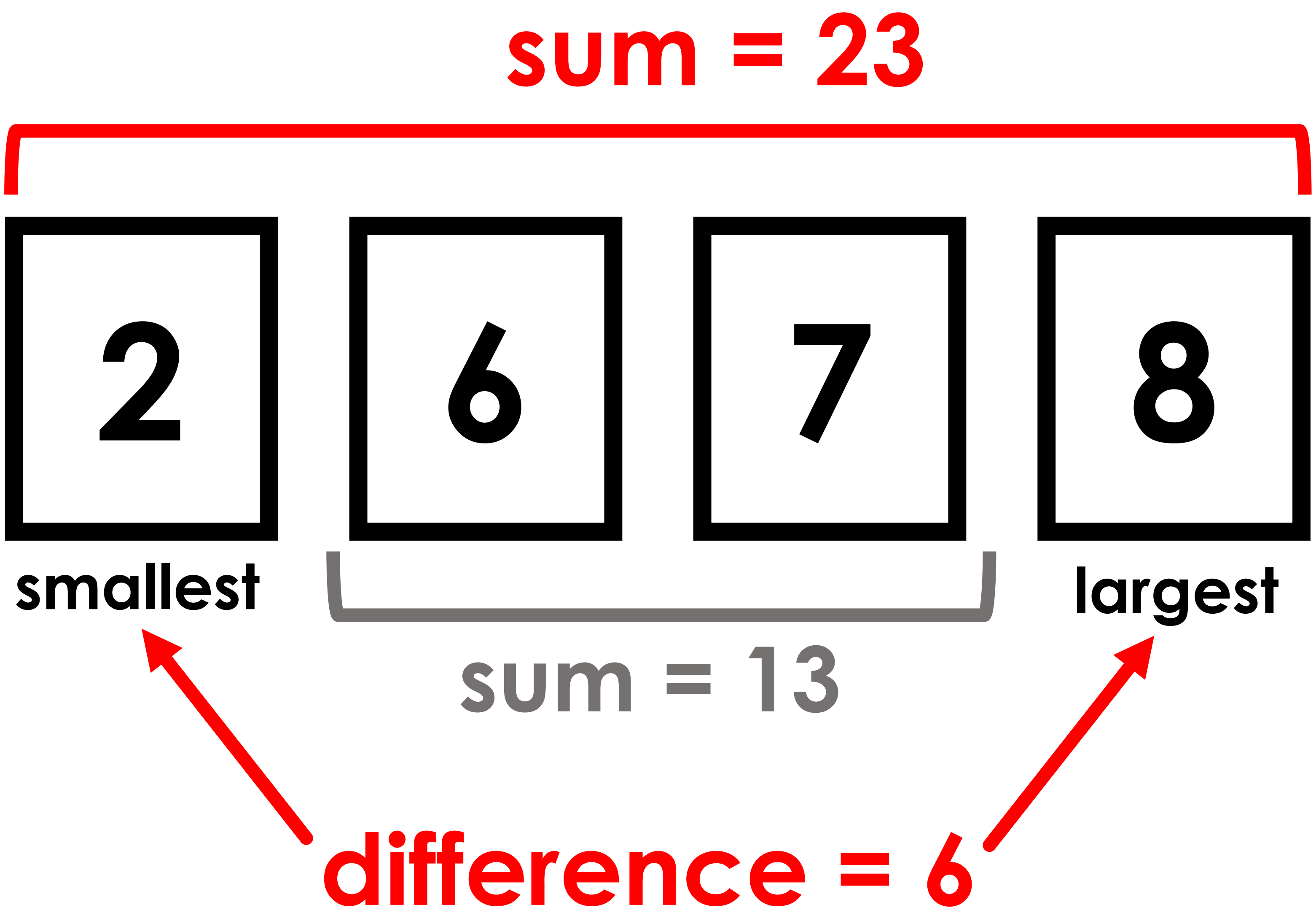


Not possible with two whole numbers less than 7

Task 13: Four numbers challenge



Task 13: Four numbers challenge



Answers

2, 6, 7, 8

Task 13: Four numbers challenge

sum = 23

2 6 7 8

smallest

largest

sum = 13

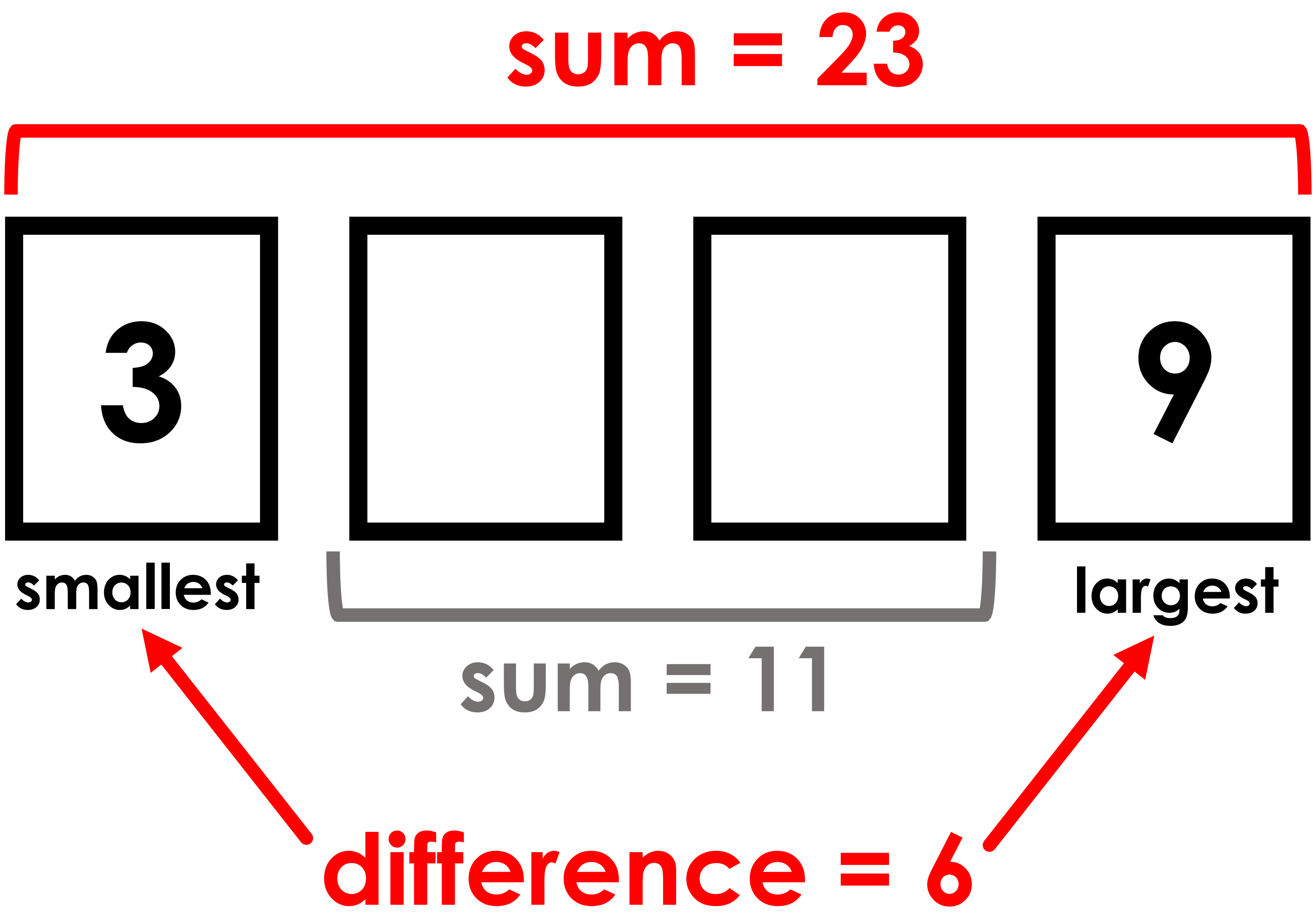
difference = 6

Answers

2, 6, 7, 8

7 and 6 only numbers less than 8 with sum of 13

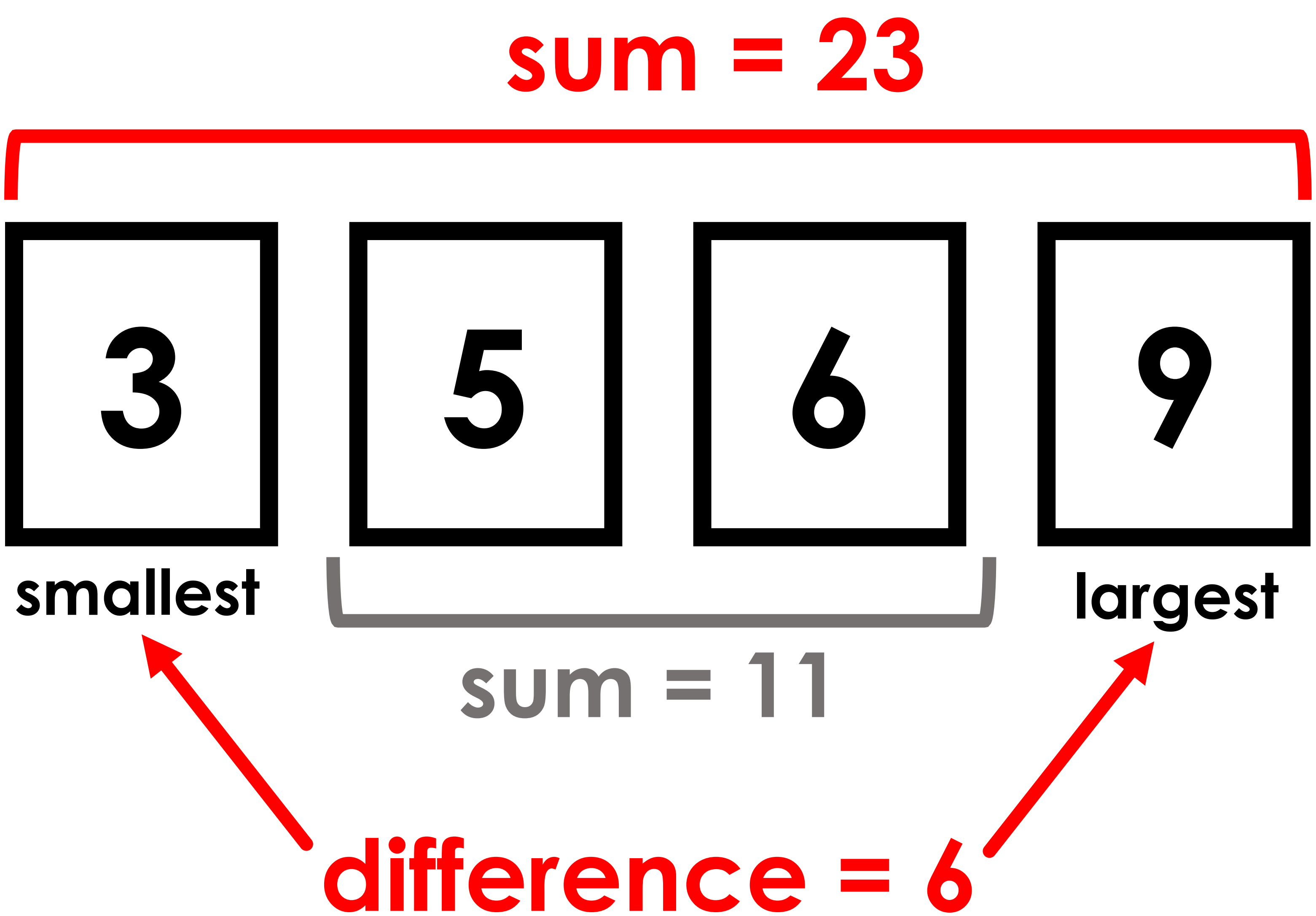
Task 13: Four numbers challenge



Answers

2, 6, 7, 8

Task 13: Four numbers challenge

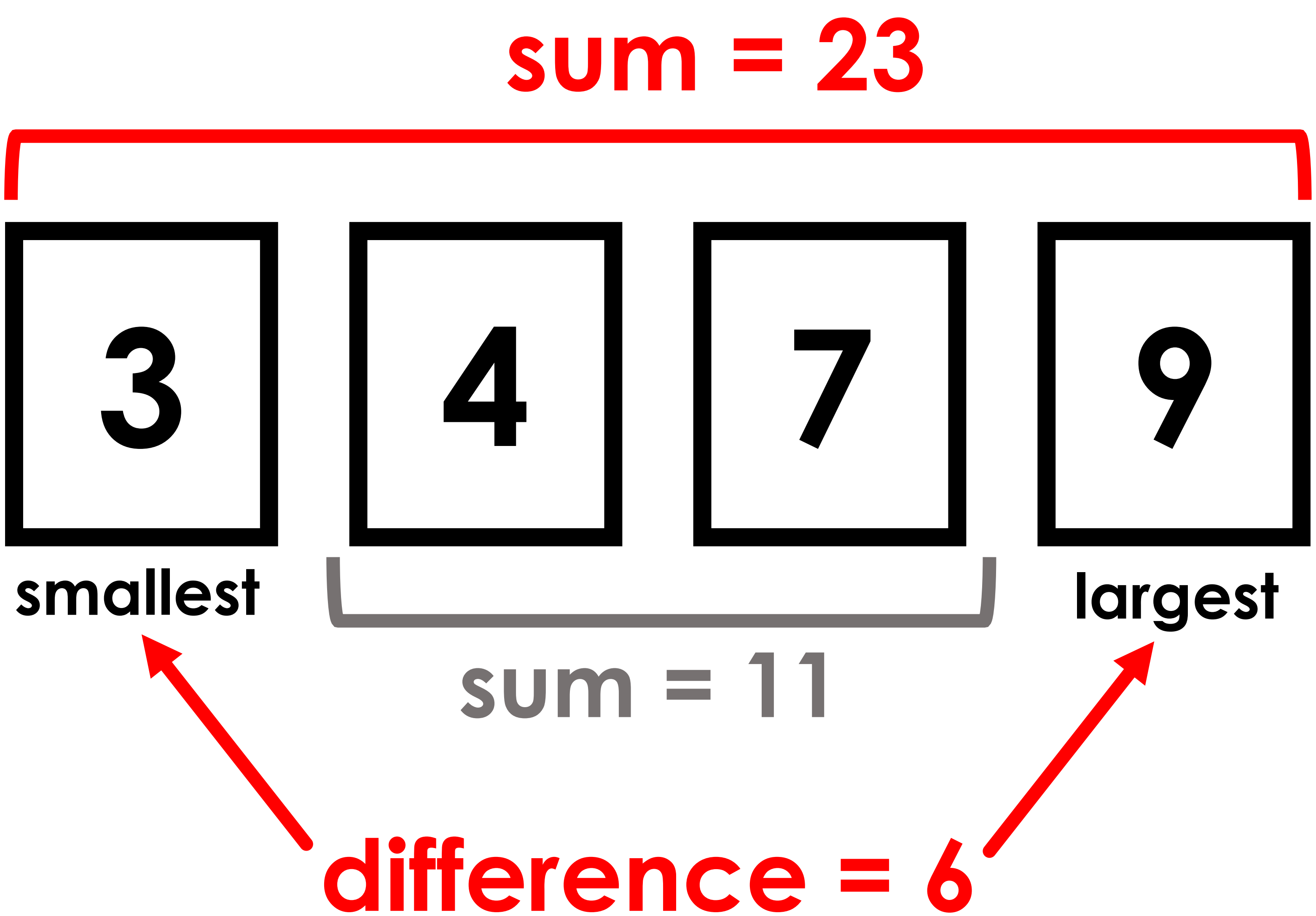


Answers

2, 6, 7, 8

3, 5, 6, 9

Task 13: Four numbers challenge



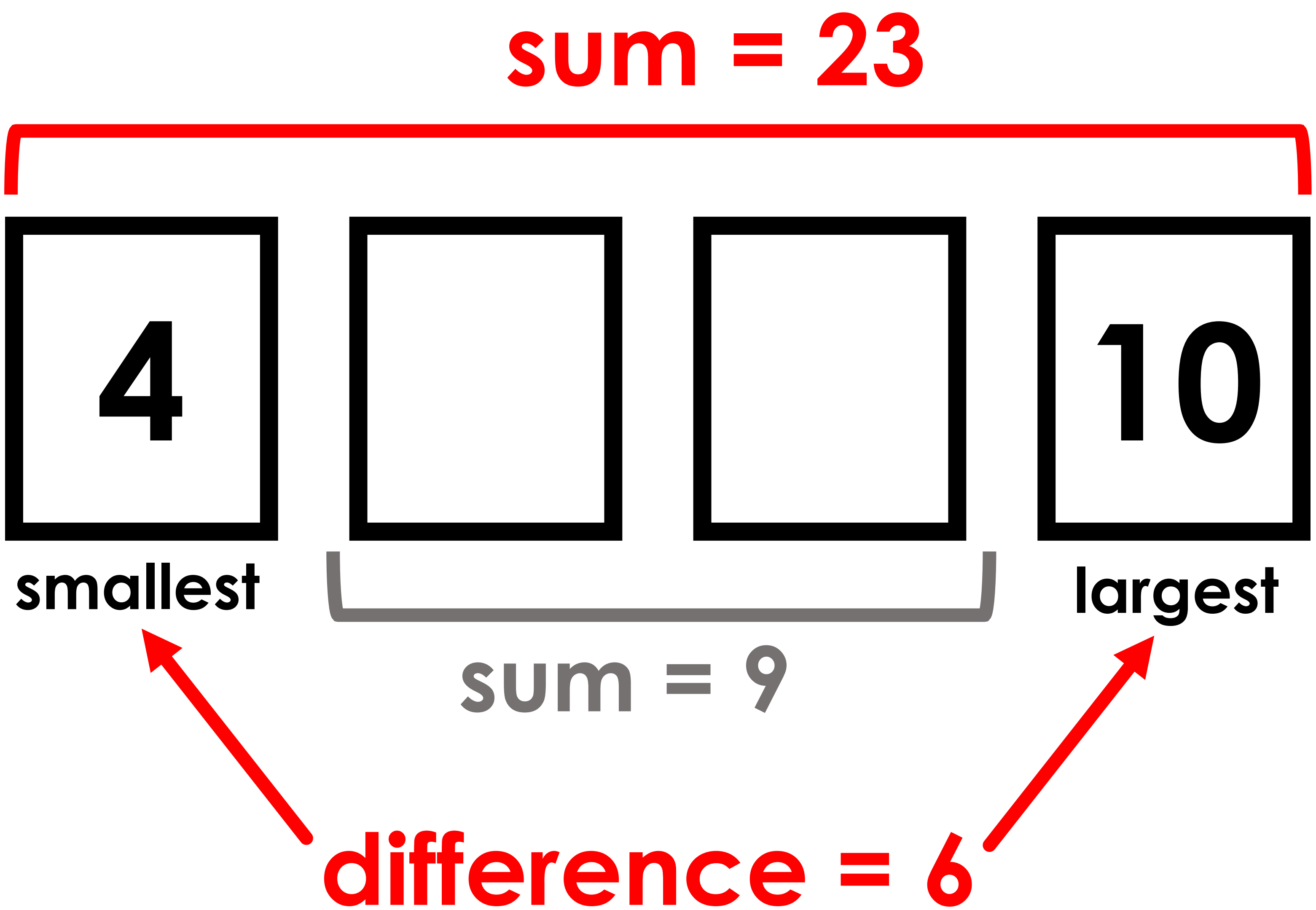
Answers

2, 6, 7, 8

3, 5, 6, 9

3, 4, 7, 9

Task 13: Four numbers challenge



Answers

2, 6, 7, 8

3, 5, 6, 9

3, 4, 7, 9

Task 13: Four numbers challenge

sum = 23

4			10
smallest			largest

sum = 9

difference = 6

Answers

2, 6, 7, 8

3, 5, 6, 9

3, 4, 7, 9

Not possible with two whole numbers greater than 4

Task 13: Four numbers challenge

sum = 23

4			10
smallest			largest

sum = 9

difference = 6

Answers

2, 6, 7, 8

3, 5, 6, 9

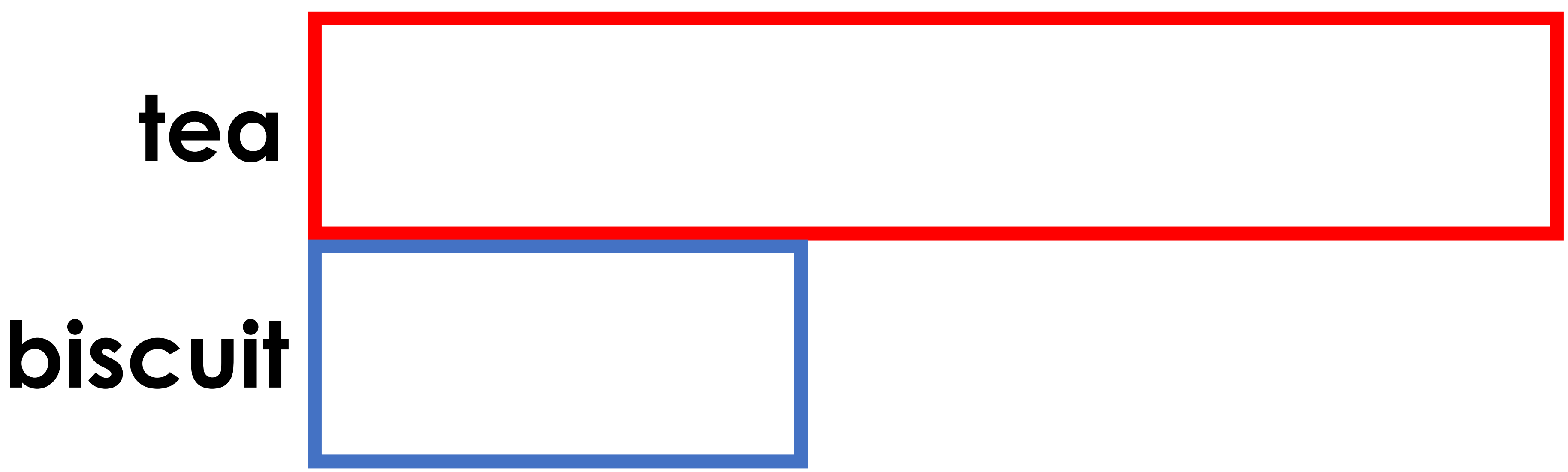
3, 4, 7, 9

All possible answers

Not possible with two whole numbers greater than 4

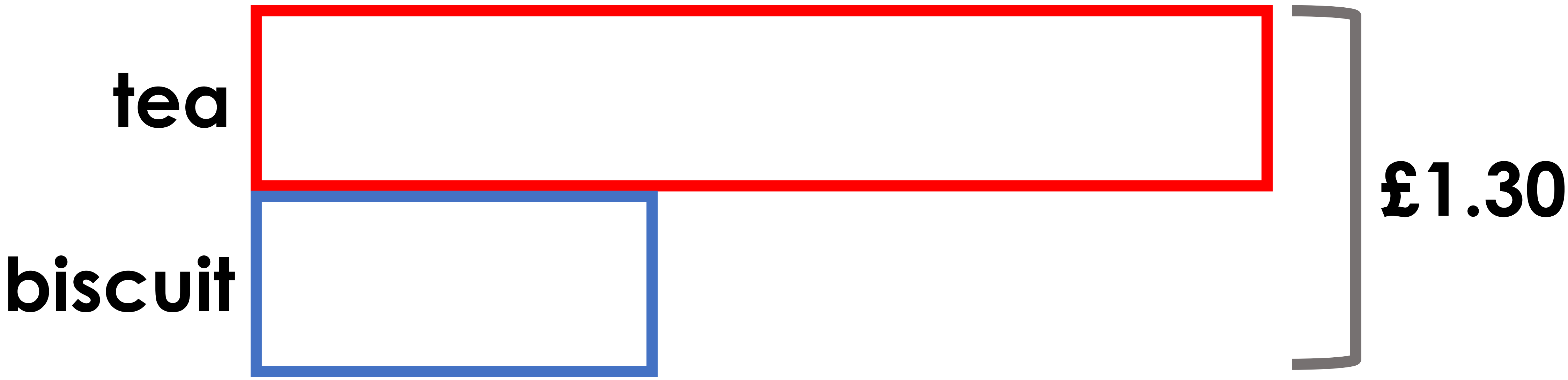
Task 14: Café calculations

Tea costs more than biscuit

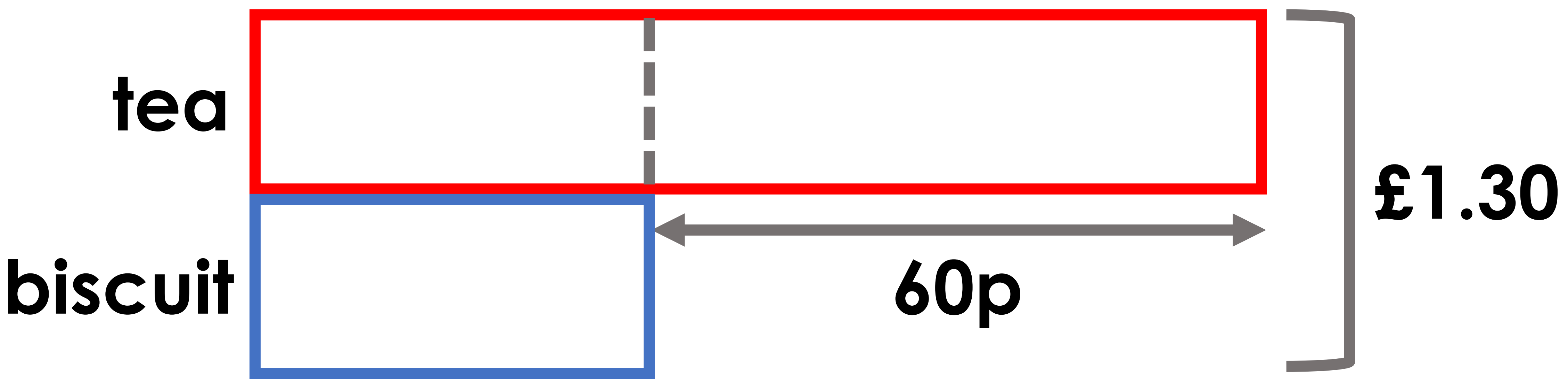


Task 14: Café calculations

Tea and biscuit = **£1.30**

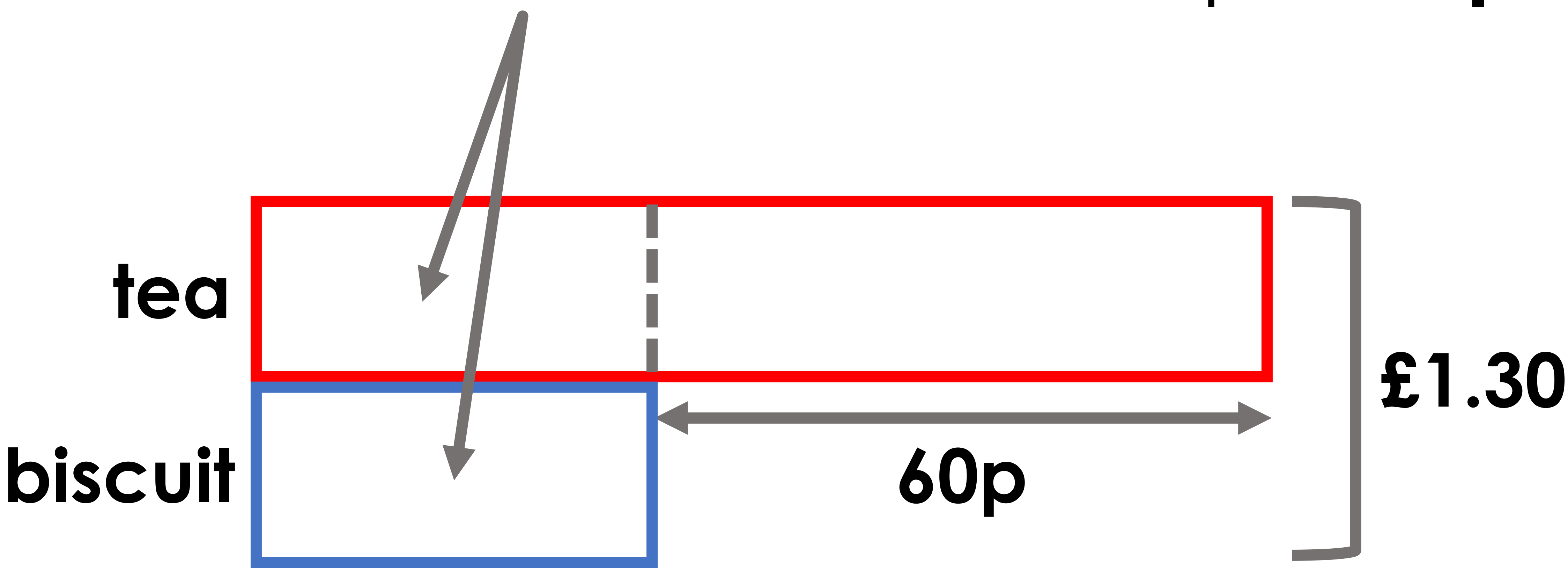


Tea **60p** more than biscuit



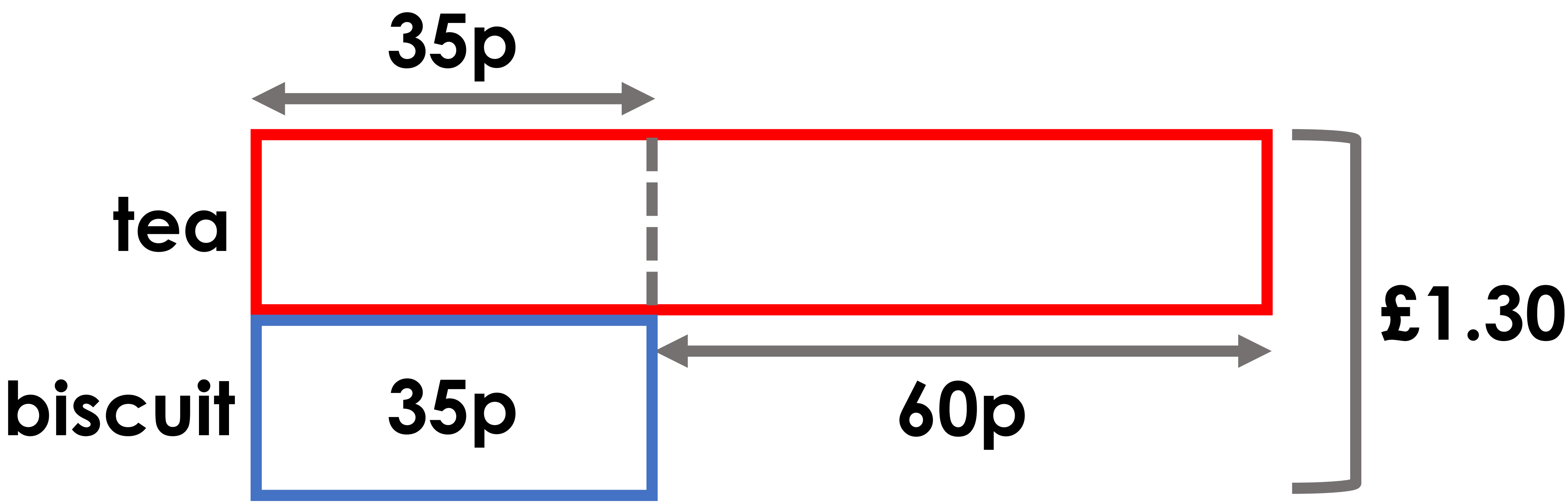
Task 14: Café calculations

Two sections : £1.30 – 60p = **70p**



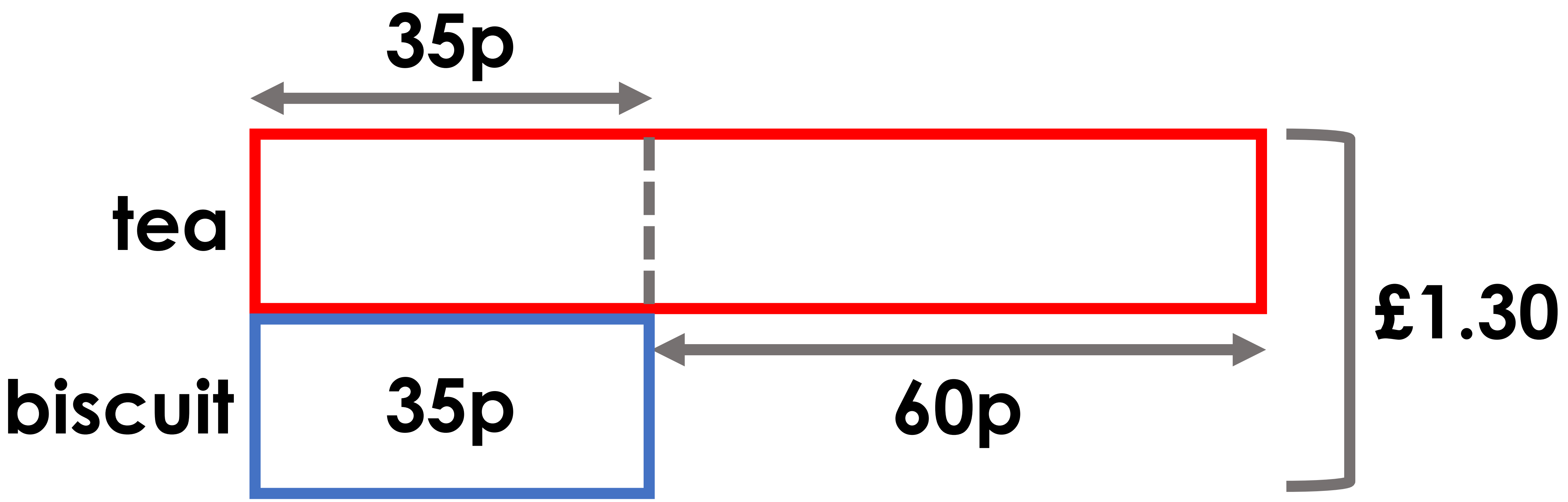
Task 14: Café calculations

Each section: 70p ÷ 2 = **35p**



Task 14: Café calculations

A biscuit costs **35p**



Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\square \\
\times\ \square 3 \\
\hline
204 \\
2720 \\
\hline
2924 \\
\hline
\end{array}
$$

Task 15: Multiplication missing digits

$$\begin{array}{r} 6\square \\ \times\ \square 3 \\ \hline 2\ 0\ 4 \\ 2\ 7\ 2\ 0 \\ \hline 2\ 9\ 2\ 4 \\ \hline \end{array}$$

$$6\square \times 3 = 204$$

Task 15: Multiplication missing digits

$$\begin{array}{r} 6\square \\ \times \ \square 3 \\ \hline 204 \\ 2720 \\ \hline 2924 \\ \hline \end{array}$$

$6\square \times 3 = 204$

$60 \times 3 = 180$

Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\square \\
\times\ \square 3 \\
\hline
2\,0\,4 \\
2\,7\,2\,0 \\
\hline
2\,9\,2\,4 \\
\hline
\end{array}
$$

$6\square \times 3 = 204$

$60 \times 3 = 180$

$8 \times 3 = 24$

Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\boxed{8} \\
\times\ \square\,3 \\
\hline
2\ 0\ 4 \\
2\ 7\ 2\ 0 \\
\hline
2\ 9\ 2\ 4 \\
\hline
\end{array}
$$

$$6\square \times 3 = 204$$

$$60 \times 3 = 180$$

$$8 \times 3 = 24$$

$$180 + 24 = 204$$

Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\,\boxed{8} \\
\times\ \boxed{}\,3 \\
\hline
2\,0\,4 \\
2\,7\,2\,0 \\
\hline
2\,9\,2\,4 \\
\hline
\end{array}
$$

$$68 \times \boxed{}0 = 2720$$

Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\,\boxed{8} \\
\times\ \boxed{}\,3 \\
\hline
2\ 0\ 4 \\
2\ 7\ 2\ 0 \\
\hline
2\ 9\ 2\ 4 \\
\hline
\end{array}
$$

$$68 \times \boxed{}0 = 2720$$

Round 68 to 70 to do an estimate.

Task 15: Multiplication missing digits

$$\begin{array}{r} 6\boxed{8} \\ \times\ \boxed{}3 \\ \hline 204 \\ 2720 \\ \hline 2924 \\ \hline \end{array}$$

$$68 \times \boxed{}0 = 2720$$

Round 68 to 70 to do an estimate.

How can I make the 2 tens?

Task 15: Multiplication missing digits

$$\begin{array}{r} 6\,\boxed{8} \\ \times\ \boxed{4}\,3 \\ \hline 2\,0\,4 \\ 2\,7\,2\,0 \\ \hline 2\,9\,2\,4 \\ \hline \end{array}$$

$$68 \times \boxed{}0 = 2720$$

$70 \times \underline{4}0 = 2800$

$8 \times \underline{4} = 3\underline{2}$

Task 15: Multiplication missing digits

$$
\begin{array}{r}
6\boxed{8} \\
\times\ \boxed{4}3 \\
\hline
204 \\
2720 \\
\hline
2924 \\
\hline
\end{array}
$$

Task 16: Remainder of one-half

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

When ÷ **8**, a remainder of $\boxed{}$ is equivalent to $\frac{1}{2}$

Task 16: Remainder of one-half

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

When $\div$ **8**, a remainder of $\boxed{4}$ is equivalent to $\frac{1}{2}$

Example: $20 \div 8 = 2$ remainder $4 = 2\frac{1}{2}$

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\square\square \div \boxed{8} = \square\,\frac{\boxed{1}}{\boxed{2}}$$

~~0~~
~~1~~
~~2~~
3
4
5
6
7
~~8~~
9

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

$\cancel{0}$
$\cancel{1}$
$\cancel{2}$
$\cancel{3}$
4
5
6
7
$\cancel{8}$
9

Try 3:

$$28 \div 8 = 3\frac{1}{2}$$

NOT a solution as the digits 2 and 8 are used twice.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

~~0~~
~~1~~
~~2~~
~~3~~
4
5
6
7
~~8~~
9

Try 4:

$$\mathbf{36 \div 8 = 4\tfrac{1}{2}}$$

This is a possible solution.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

~~0~~
~~1~~
~~2~~
~~3~~
4
~~5~~
6
7
~~8~~
9

Try 5:

$$44 \div 8 = 5\frac{1}{2}$$

NOT a solution as the digit 4 is used twice.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

$\cancel{0}$
$\cancel{1}$
$\cancel{2}$
$\cancel{3}$
4
$\cancel{5}$
$\cancel{6}$
7
$\cancel{8}$
9

Try 6:

$$52 \div 8 = 6\frac{1}{2}$$

NOT a solution as the digit 2 is used twice.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\square\square \div \boxed{8} = \square\,\frac{\boxed{1}}{\boxed{2}}$$

~~0~~ ~~1~~ ~~2~~ ~~3~~ 4 ~~5~~ ~~6~~ 7 ~~8~~ 9

Try 7:

$$60 \div 8 = 7\frac{1}{2}$$

This is a possible solution.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\boxed{}\,\boxed{} \div \boxed{8} = \boxed{}\,\frac{\boxed{1}}{\boxed{2}}$$

$\cancel{0}$ $\cancel{1}$ $\cancel{2}$ $\cancel{3}$ 4 $\cancel{5}$ $\cancel{6}$ 7 $\cancel{8}$ 9

Try 9:

$$76 \div 8 = 9\frac{1}{2}$$

This is a possible solution.

Task 16: Remainder of one-half

Example method: work out which digits can go in this place.

$$\square\square \div \boxed{8} = \square\frac{\boxed{1}}{\boxed{2}}$$

$\cancel{0}$

$\cancel{1}$

$\cancel{2}$

$\cancel{3}$

4

$\cancel{5}$

$\cancel{6}$

7

$\cancel{8}$

9

Possible solutions:

$$60 \div 8 = 7\frac{1}{2}$$

$$36 \div 8 = 4\frac{1}{2}$$

$$76 \div 8 = 9\frac{1}{2}$$

Task 17: Find the factors

532

1 2 3 4 5 6 7 8 9

Without calculating we know…

Task 17: Find the factors

532

1 2 3 4 ~~5~~ 6 7 8 9

Without calculating we know…

Task 17: Find the factors

532

1 2 3 4 ~~5~~ 6 7 8 9

600 is a multiple of 3

60 is a multiple of 3

540 is therefore a multiple of 3

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ 6 7 8 9

600 is a multiple of 3

60 is a multiple of 3

540 is therefore a multiple of 3

So 3 is not a factor of 532.

540 – 532 = 8. 8 is not a multiple of 3.

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ 6 7 8 9

3 is not a factor of 532, therefore

█ and █ are not factors of 532.

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

3 is not a factor of 532, therefore

6 and 9 are not factors of 532.

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

4 is a factor of 100 ($4 \times 25 = 100$)

This means 4 is a factor of 500

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

4 is a factor of 100 $(4 \times 25 = 100)$

This means 4 is a factor of 500

4 is a factor of 32 $(4 \times 8 = 32)$

So 4 is a factor of 532 $(500 + 32 = 532)$

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

7 is a factor of 490 ($7 \times 70 = 490$)

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

7 is a factor of 490 ($7 \times 70 = 490$)

$532 - 490 = 42$

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

7 is a factor of 490 ($7 \times 70 = 490$)

$532 - 490 = 42$

7 is a factor of 42 ($7 \times 6 = 42$)

So 7 is a factor of 532 ($490 + 42 = 532$)

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

8 is a factor of 480 ($8 \times 60 = 480$)

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 8 ~~9~~

8 is a factor of 480 ($8 \times 60 = 480$)

$532 - 480 = 52$

Task 17: Find the factors

532

1 2 ~~3~~ 4 ~~5~~ ~~6~~ 7 ~~8~~ ~~9~~

8 is a factor of 480 ($8 \times 60 = 480$)

$532 - 480 = 52$

8 is a not a factor of 52

So 8 is not a factor of 532

Task 18: Number detective

Digits with sum of 13:
9 and 4
8 and 5
7 and 6

Task 18: Number detective

Digits with sum of 13:	Number made with these digits:
9 and 4	94 and 49
8 and 5	85 and 58
7 and 6	76 and 67

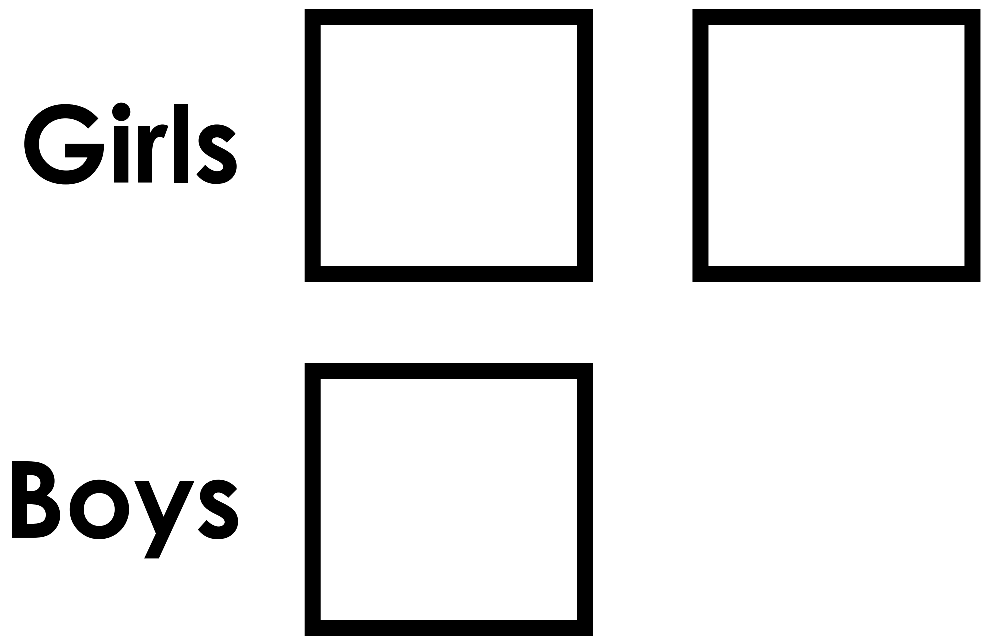
Task 18: Number detective

Digits with sum of 13:	Number made with these digits:
9 and 4	94 and 49
8 and 5	85 and 58
7 and 6	76 and 67

Multiple of 4

Task 19: Athletics club ratios

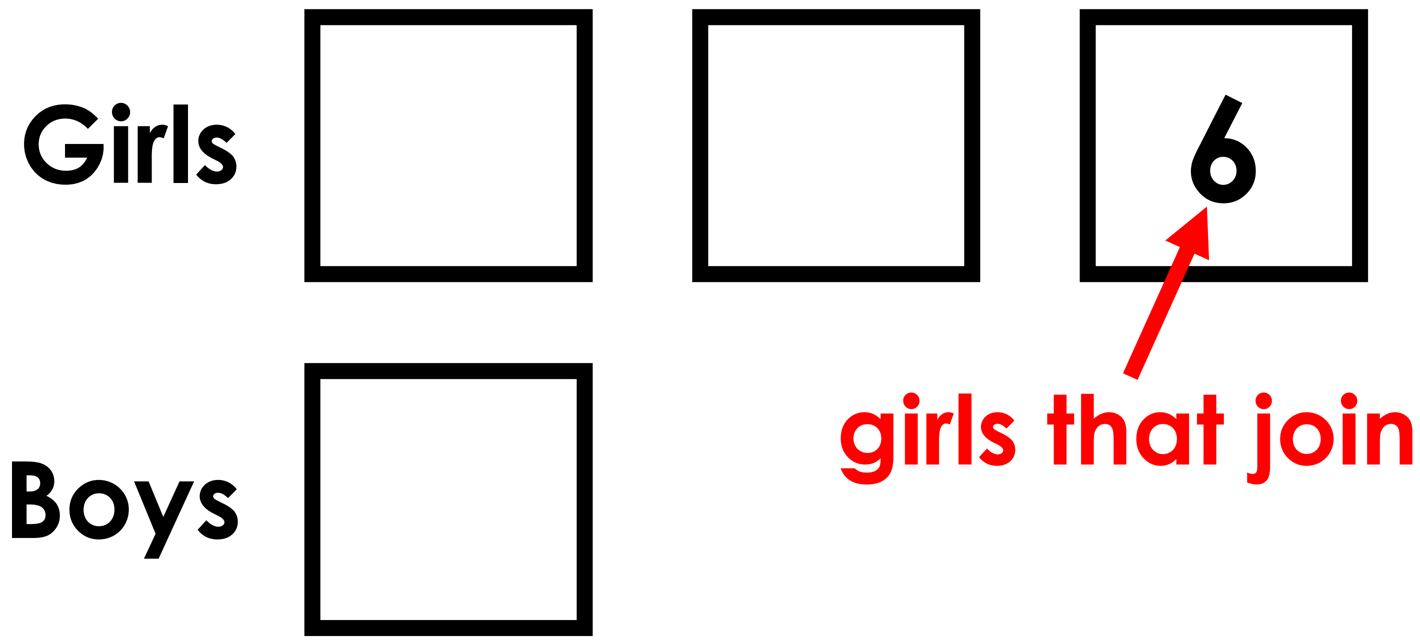
Athletics Club, Week 1:



Twice as many girls as boys.

Task 19: Athletics club ratios

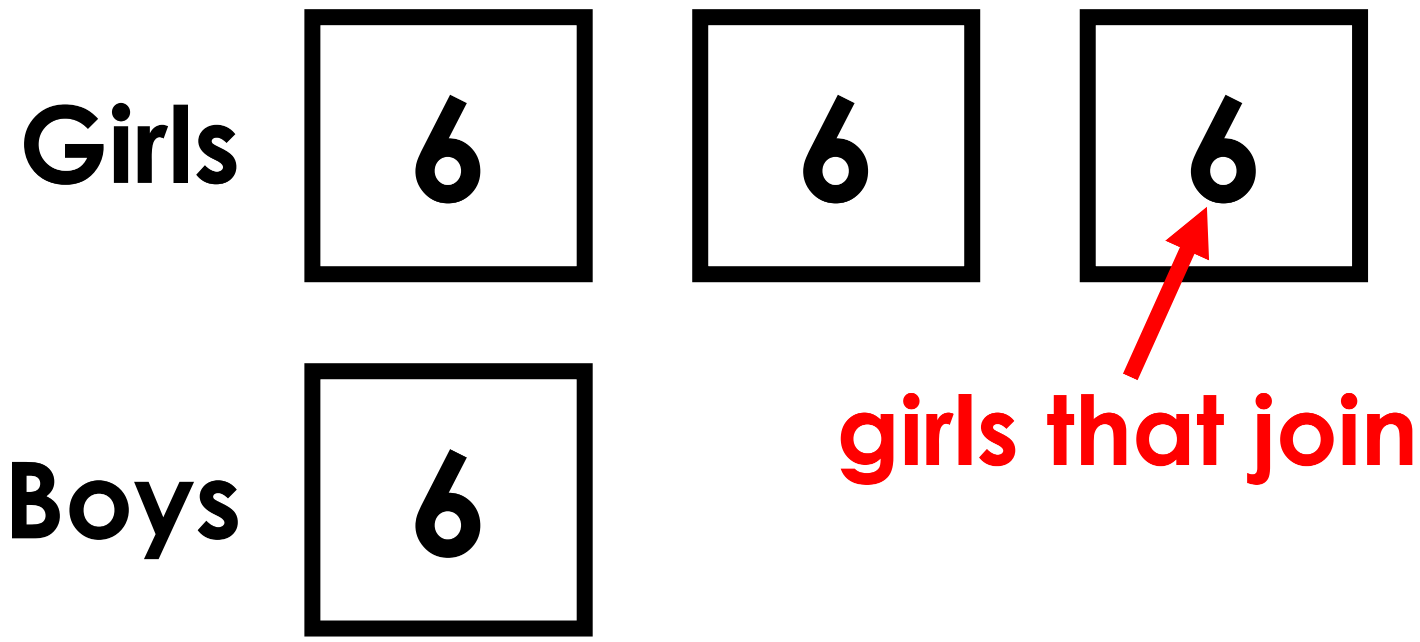
Athletics Club, Week 2:



For every boy there are three girls.

Task 19: Athletics club ratios

Athletics Club, Week 2:



For every boy there are three girls.

There are 24 children at athletics club.

Task 20: Shot accuracy statistics

Julia's average shots per match:

12 per match

shots scored

shots missed

12 shots scored per match

shots missed per match

shots taken per match

Task 20: Shot accuracy statistics

Julia's average shots per match:

12 per match

shots scored	4	4	4
shots missed			

12	shots scored per match
	shots missed per match
	shots taken per match

Task 20: Shot accuracy statistics

Julia's average shots per match:

12 per match

shots scored	4	4	4
shots missed	4		

12	shots scored per match
4	shots missed per match
	shots taken per match

Task 20: Shot accuracy statistics

Julia's average shots per match:

12 per match

shots scored	4	4	4
shots missed	4		

12	shots scored per match
4	shots missed per match
16	shots taken per match

Task 20: Shot accuracy statistics

Julia's average shots per match:

12 per match

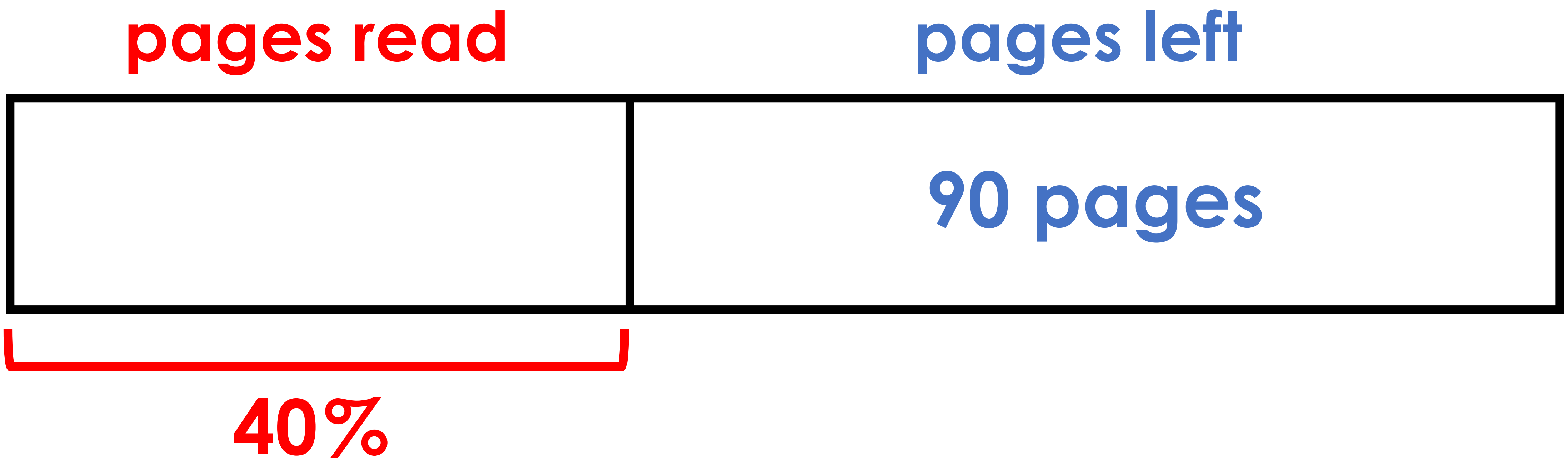
shots scored	4	4	4
shots missed	4		

12	**shots scored per match**
4	**shots missed per match**
16	**shots taken per match**

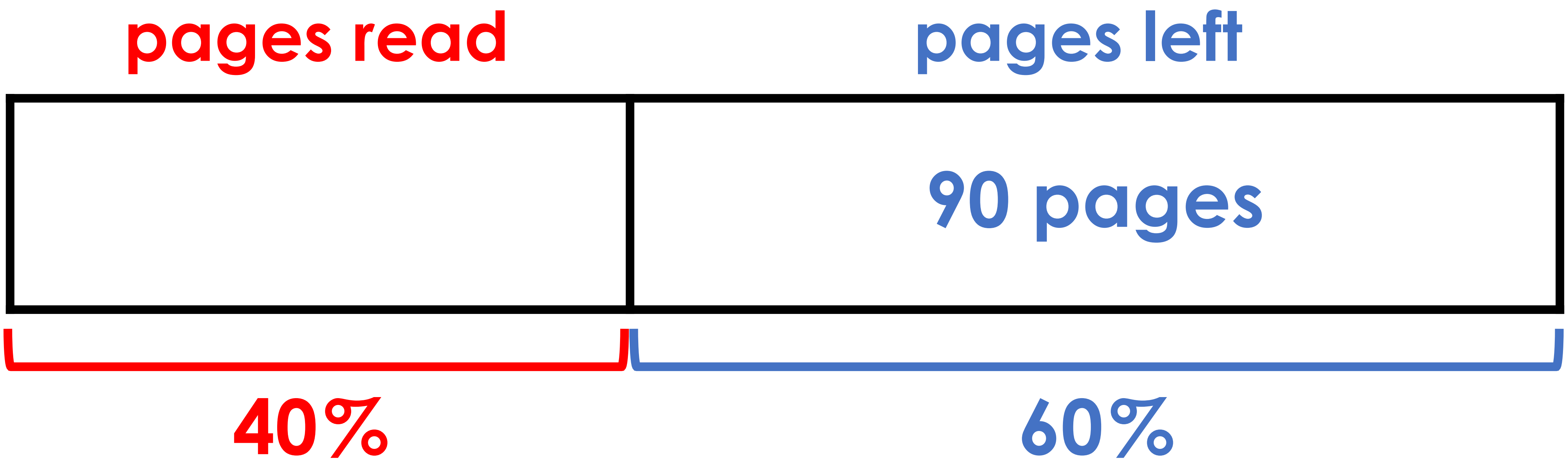
16 shots per match × **12** matches

= 192 shots in the season

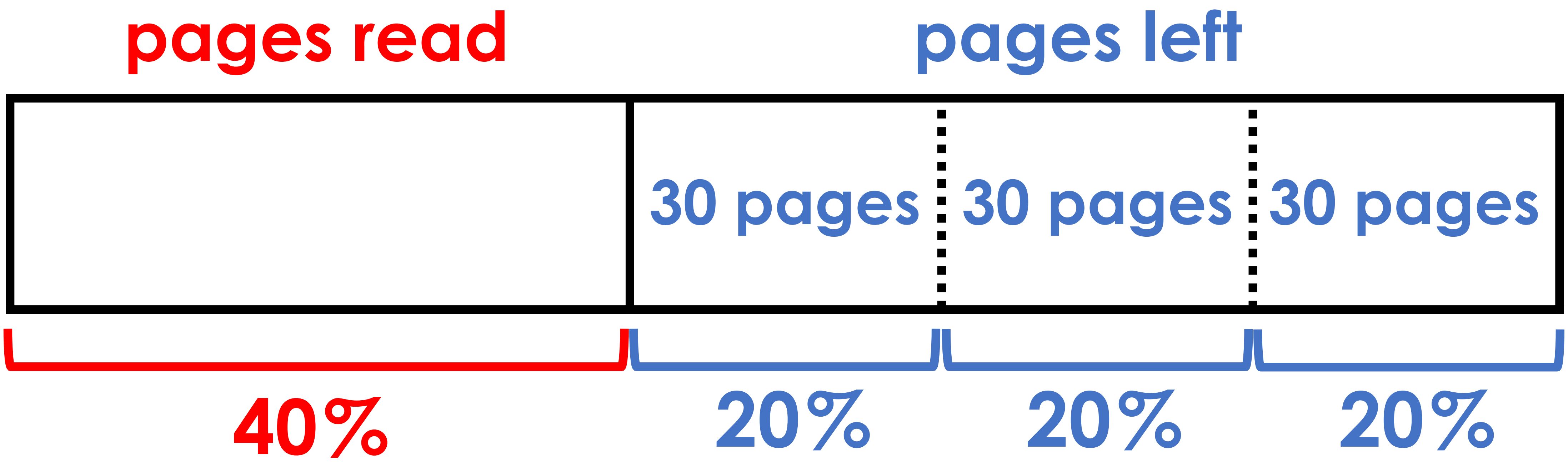
Task 21: Pages read, pages left



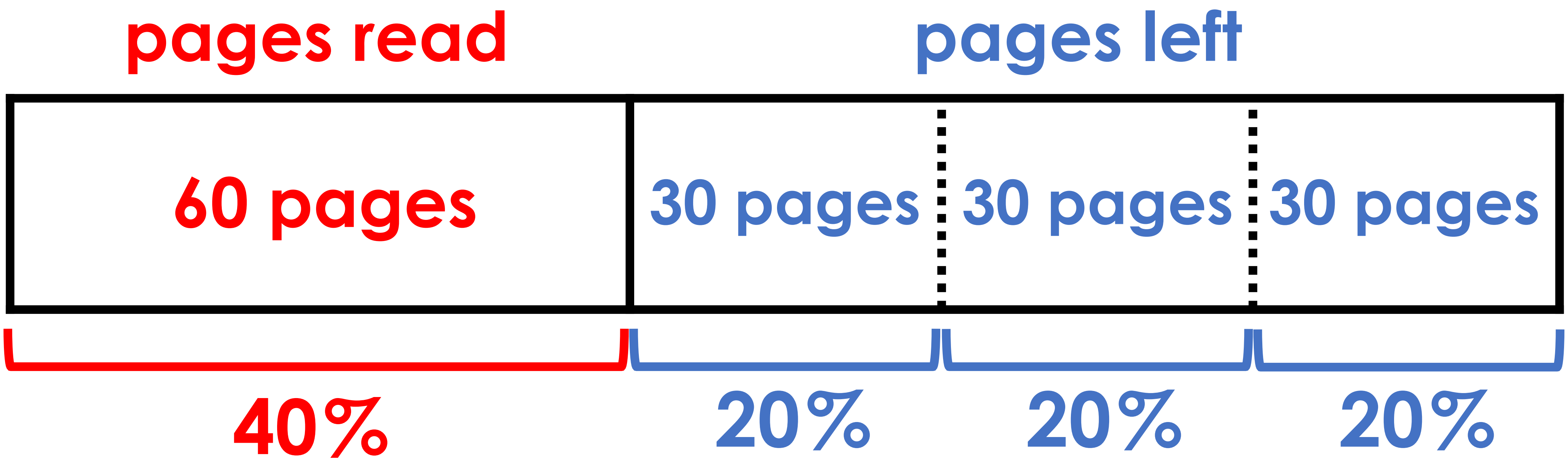
Task 21: Pages read, pages left



Task 21: Pages read, pages left



Task 21: Pages read, pages left



60 pages have been read

Task 22: Clothes shop sales

Task 22: Clothes shop sales

£8 off in the sale.

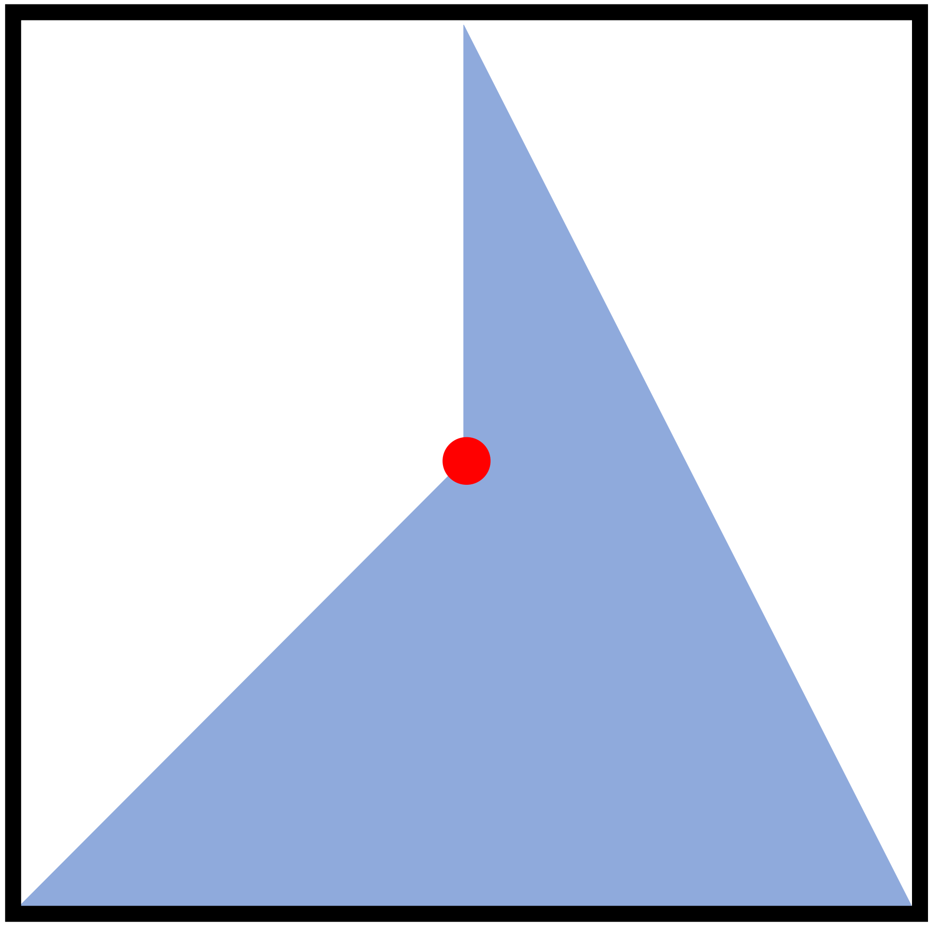
Next step: £8 is what fraction of £32?

Task 22: Clothes shop sales

£8 is one-quarter of £32. One-quarter is 25%.

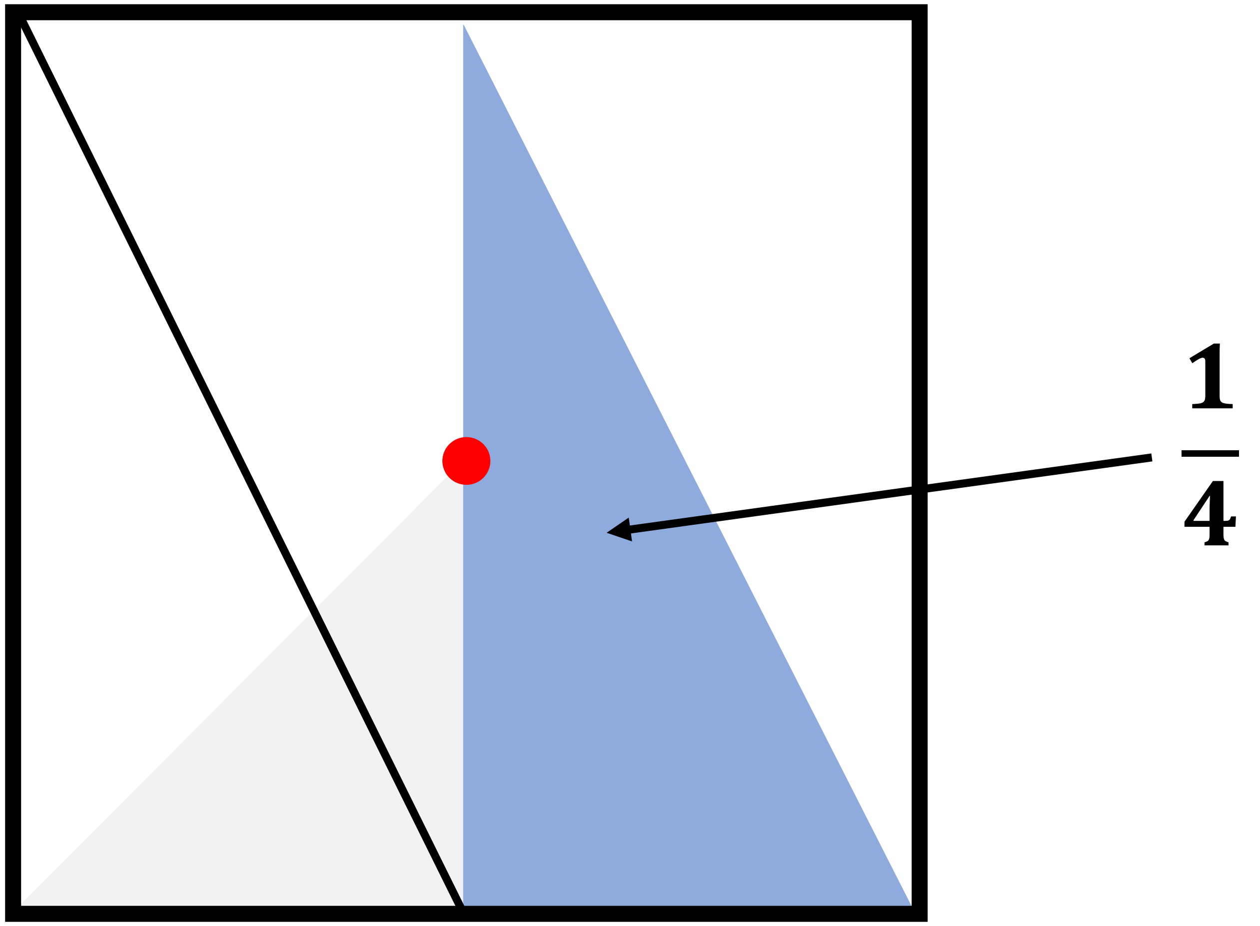
There is 25% off in the sale.

Task 23: Fraction of square

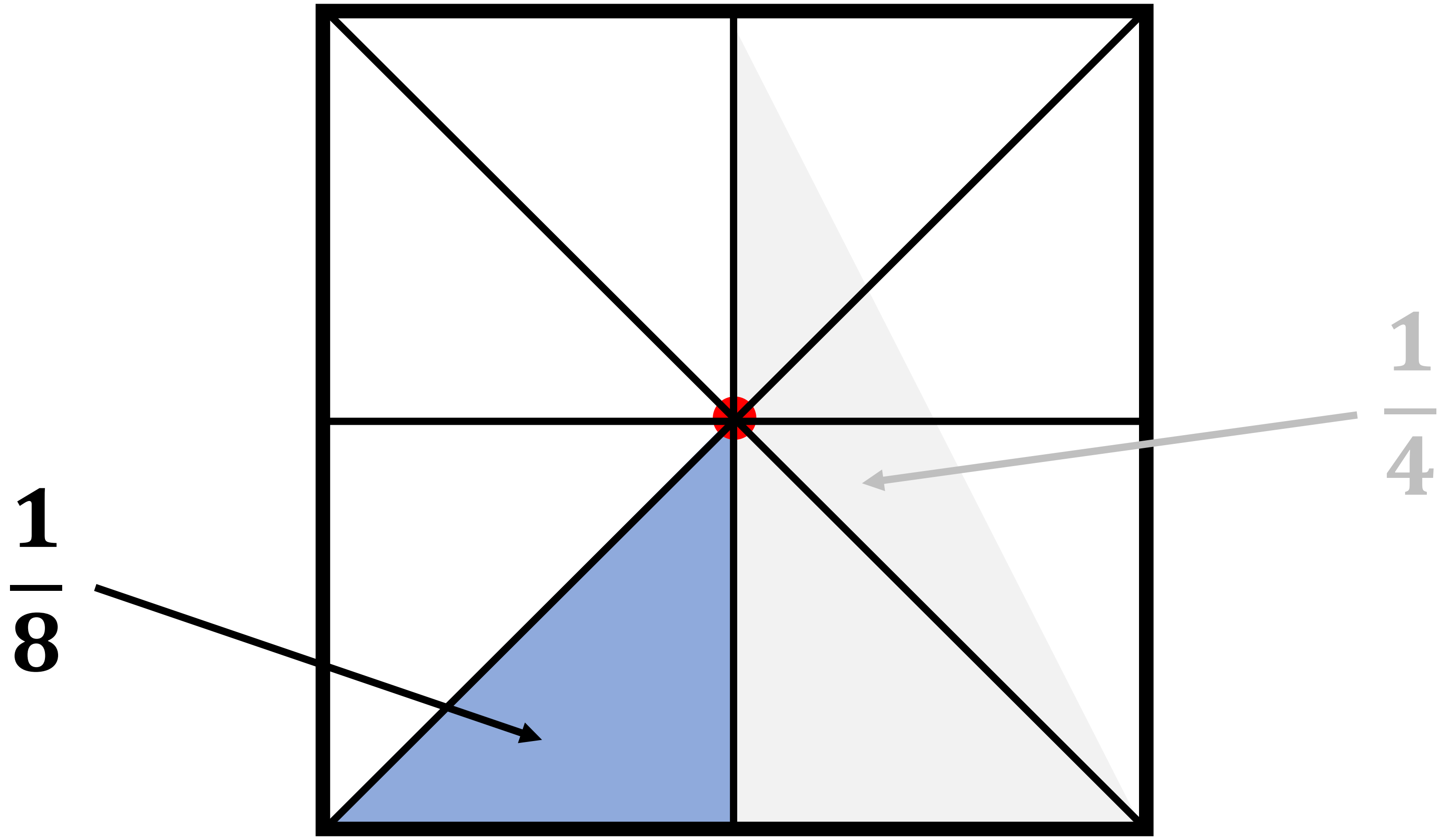


Split blue shape into sections

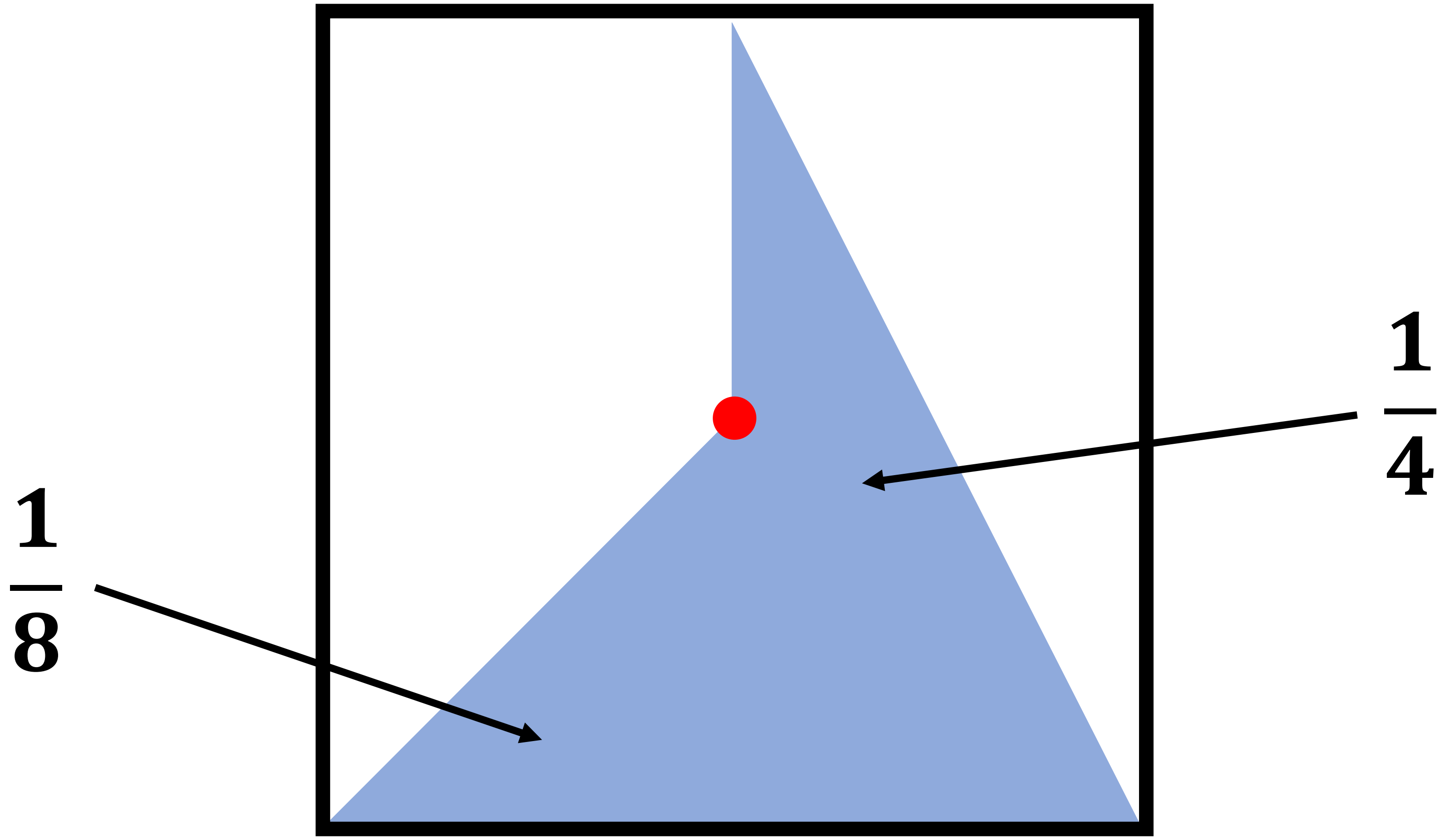
Task 23: Fraction of square



Task 23: Fraction of square



Task 23: Fraction of square



$$\frac{1}{8} + \frac{1}{4} = \frac{3}{8}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\square}{6} + \frac{1}{\square} = \frac{\square}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\square}{6} + \frac{1}{\square} = \frac{\boxed{1}}{3}$$

Find all the ways to make $\frac{1}{3}$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{1}}{6} + \frac{1}{\boxed{6}} = \frac{\boxed{1}}{3}$$

Find all the ways to make $\frac{1}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{1}}{6} + \frac{1}{\boxed{6}} = \frac{\boxed{1}}{3}$$

Find all the ways to make $\frac{1}{3}$

This is the only way to make $\frac{1}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\square}{6} + \frac{1}{\square} = \frac{\boxed{2}}{3}$$

Find all the ways to make $\frac{2}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{1}}{6} + \frac{1}{\boxed{2}} = \frac{\boxed{2}}{3}$$

Find all the ways to make $\frac{2}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3} \qquad \frac{1}{6} + \frac{1}{2} = \frac{2}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{2}}{6} + \frac{1}{\boxed{3}} = \frac{\boxed{2}}{3}$$

Find all the ways to make $\frac{2}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3} \qquad \frac{1}{6} + \frac{1}{2} = \frac{2}{3} \qquad \frac{2}{6} + \frac{1}{3} = \frac{2}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{3}}{6} + \frac{1}{\boxed{6}} = \frac{\boxed{2}}{3}$$

Find all the ways to make $\frac{2}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3} \qquad \frac{1}{6} + \frac{1}{2} = \frac{2}{3} \qquad \frac{2}{6} + \frac{1}{3} = \frac{2}{3} \qquad \frac{3}{6} + \frac{1}{6} = \frac{2}{3}$$

Task 24: Adding fractions

Example system to find **all possible answers:**

$$\frac{\boxed{3}}{6} + \frac{1}{\boxed{6}} = \frac{\boxed{2}}{3}$$

Find all the ways to make $\frac{2}{3}$

These are all the ways to make $\frac{2}{3}$

$$\frac{1}{6} + \frac{1}{6} = \frac{1}{3} \qquad \frac{1}{6} + \frac{1}{2} = \frac{2}{3} \qquad \frac{2}{6} + \frac{1}{3} = \frac{2}{3} \qquad \frac{3}{6} + \frac{1}{6} = \frac{2}{3}$$

Task 25: Make one and a quarter

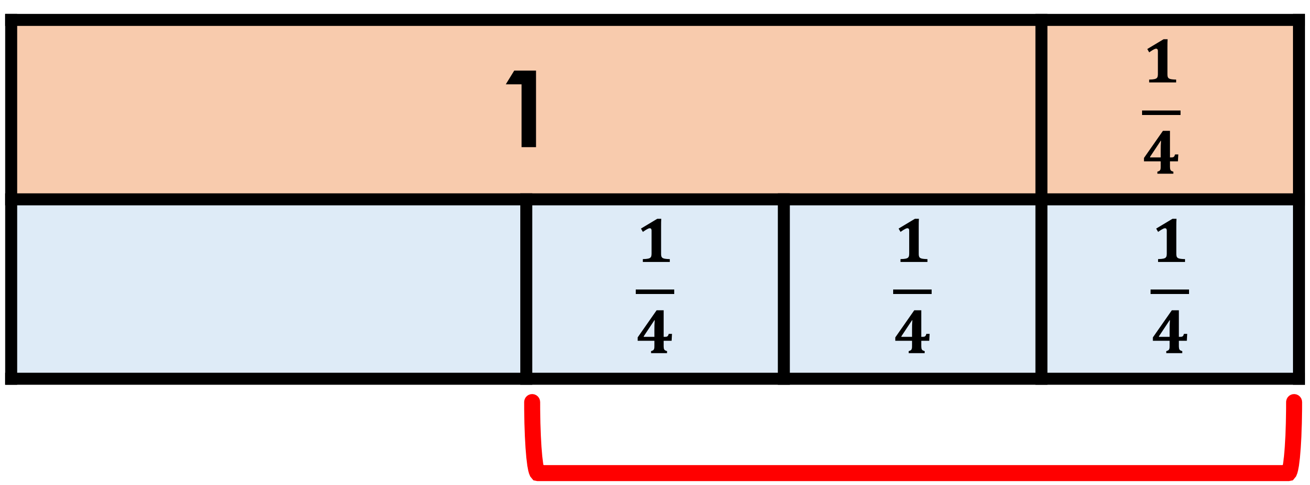
Example answer 1:

$$\frac{3}{\square} + \frac{\square}{\square} = 1\frac{1}{4}$$

Task 25: Make one and a quarter

Example answer 1:

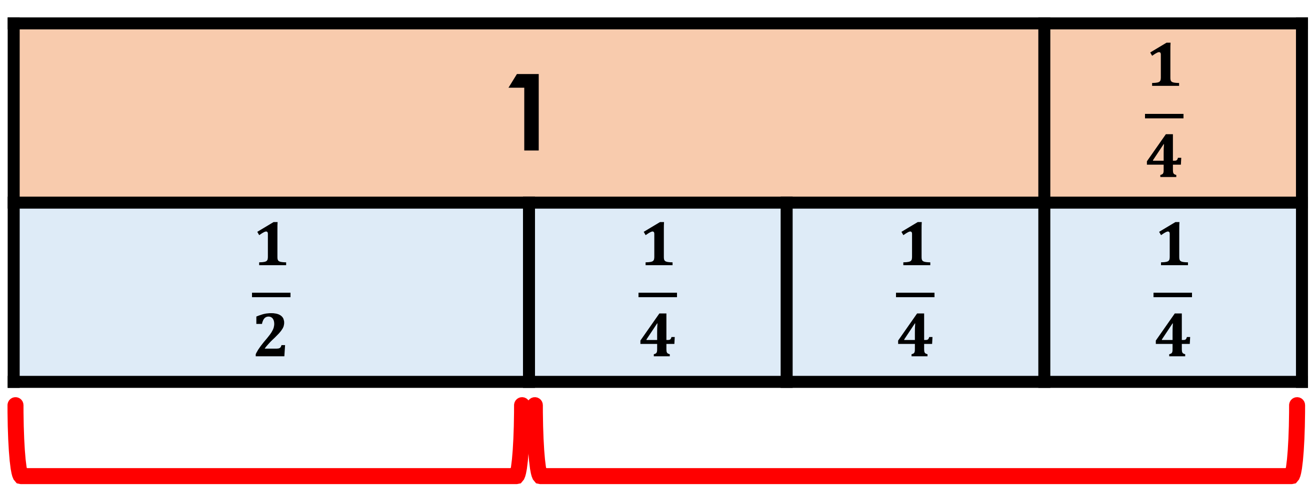
$$\frac{3}{\boxed{4}} + \frac{\square}{\square} = 1\frac{1}{4}$$



Task 25: Make one and a quarter

Example answer 1:

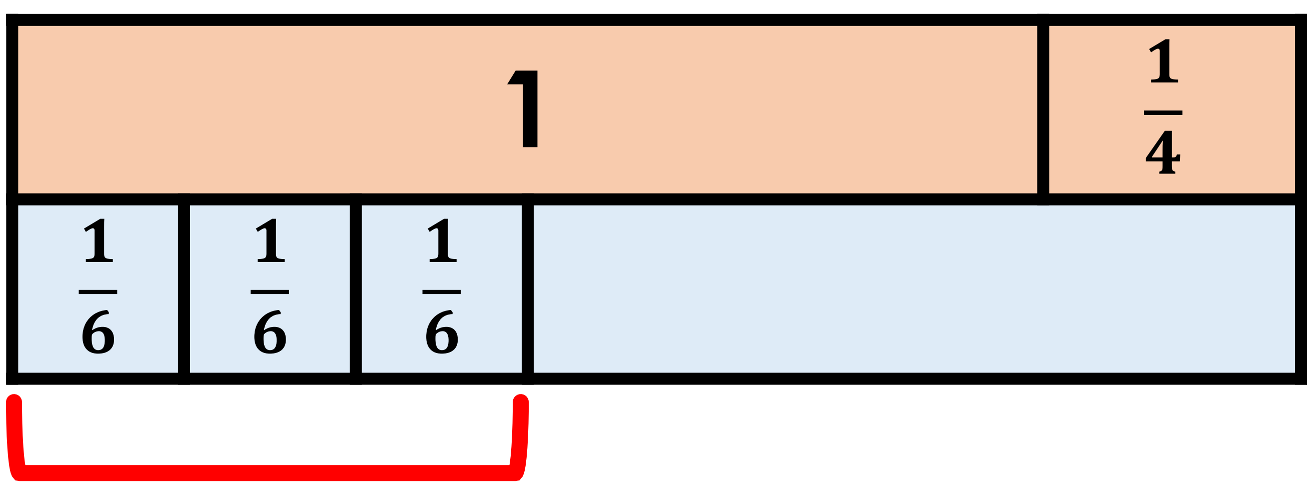
$$\frac{3}{\boxed{4}} + \frac{\boxed{1}}{\boxed{2}} = 1\frac{1}{4}$$



Task 25: Make one and a quarter

Example answer 2:

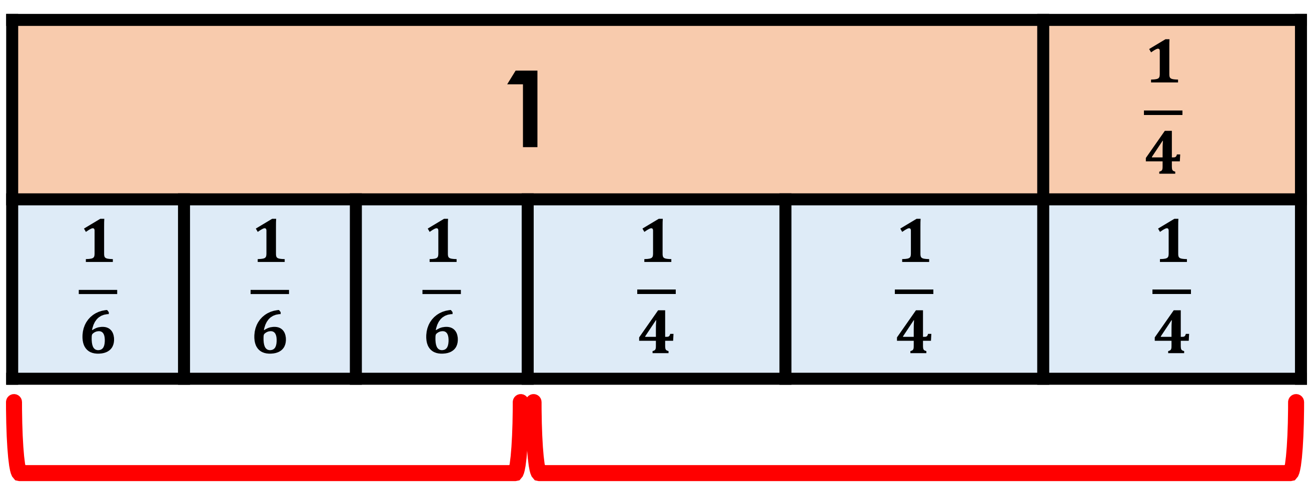
$$\frac{3}{\boxed{6}} + \frac{\square}{\square} = 1\frac{1}{4}$$



Task 25: Make one and a quarter

Example answer 2:

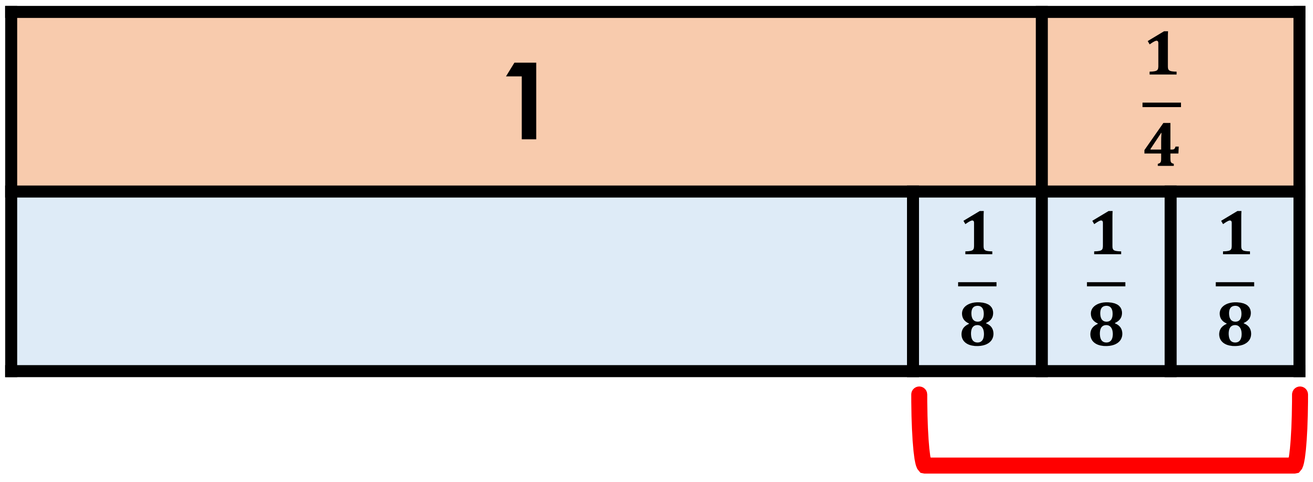
$$\frac{3}{\boxed{6}} + \frac{\boxed{3}}{\boxed{4}} = 1\frac{1}{4}$$



Task 25: Make one and a quarter

Example answer 3:

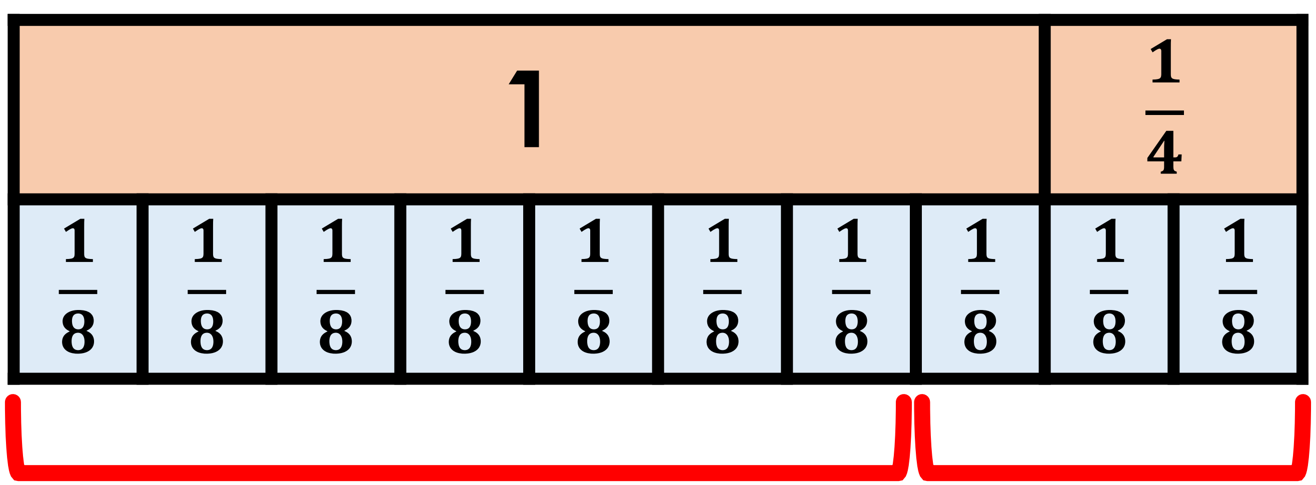
$$\frac{3}{\boxed{8}} + \frac{\square}{\square} = 1\frac{1}{4}$$



Task 25: Make one and a quarter

Example answer 3:

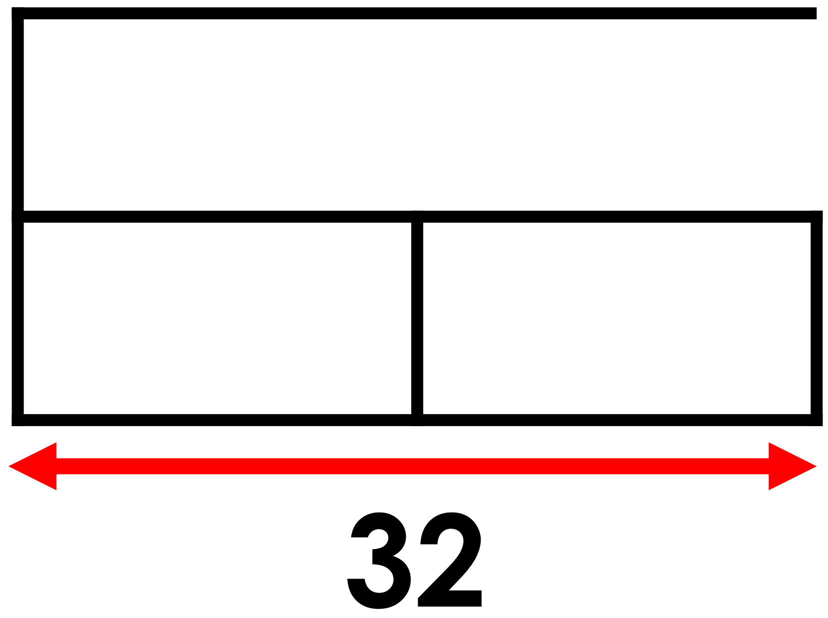
$$\frac{3}{\boxed{8}} + \frac{\boxed{7}}{\boxed{8}} = 1\frac{1}{4}$$



Task 26: Fractions of an amount

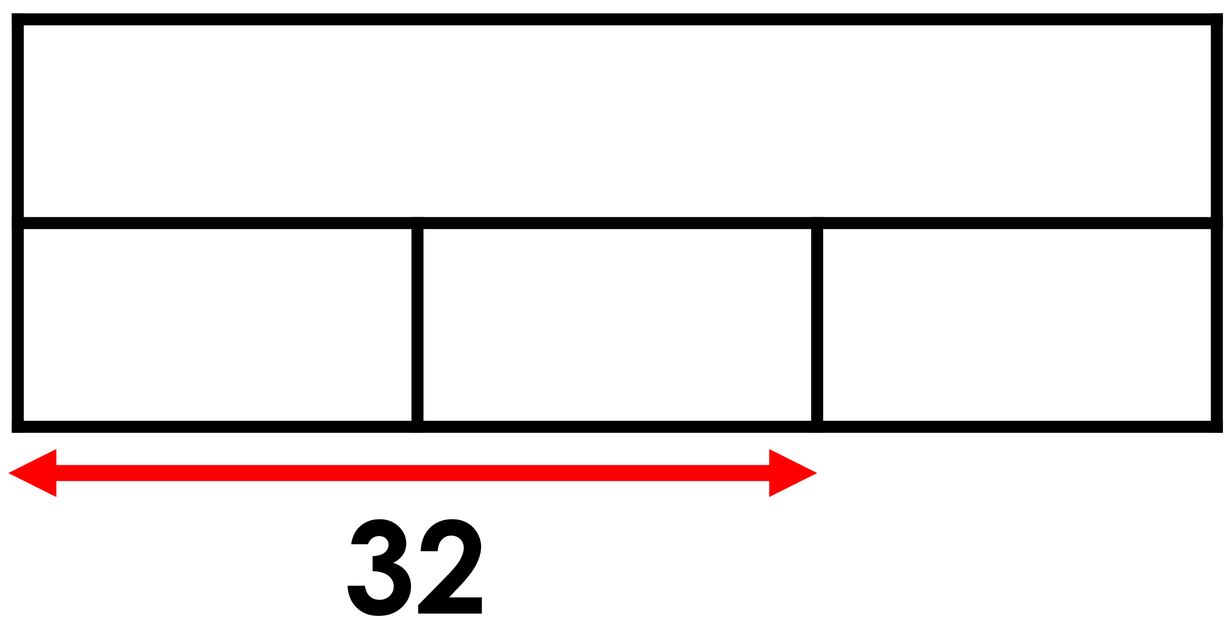
Example answer 1:

$$\frac{2}{\square} \text{ of } \square = 32$$



Task 26: Fractions of an amount

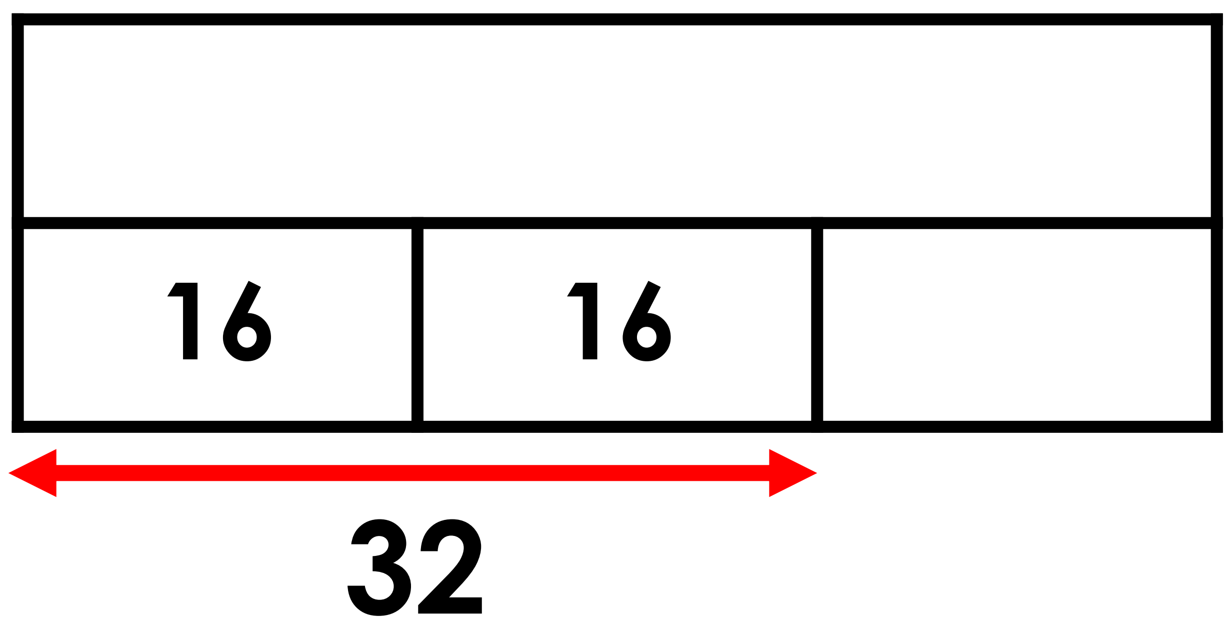
Example answer 1: $\dfrac{2}{\boxed{3}}$ of $\boxed{}$ $= 32$



Task 26: Fractions of an amount

Example answer 1:

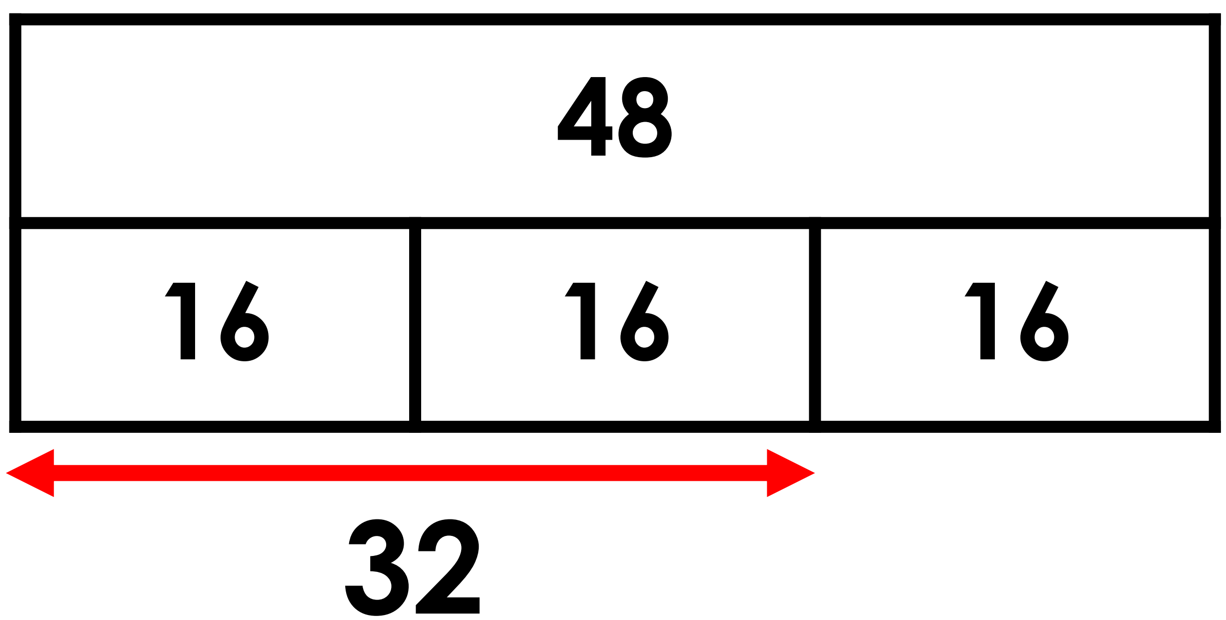
$$\frac{2}{\boxed{3}} \text{ of } \boxed{} = 32$$



Task 26: Fractions of an amount

Example answer 1:

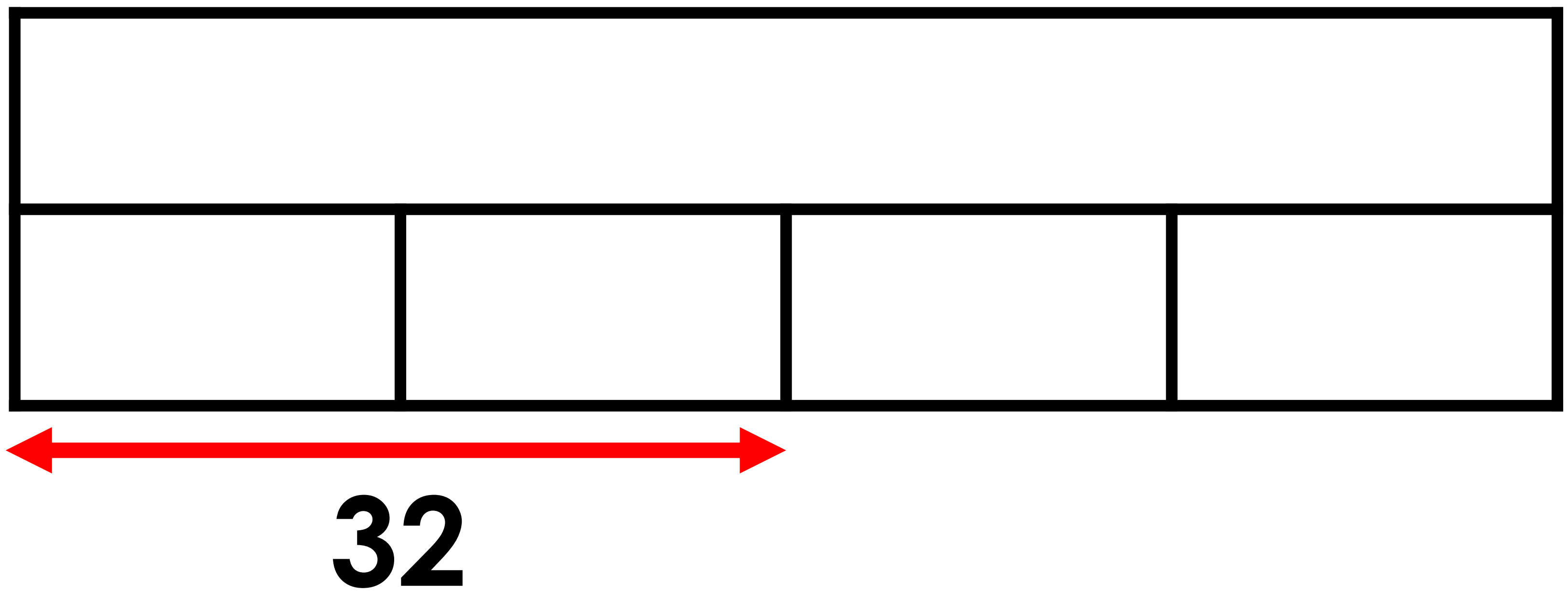
$$\frac{2}{\boxed{3}} \text{ of } \boxed{48} = 32$$



Task 26: Fractions of an amount

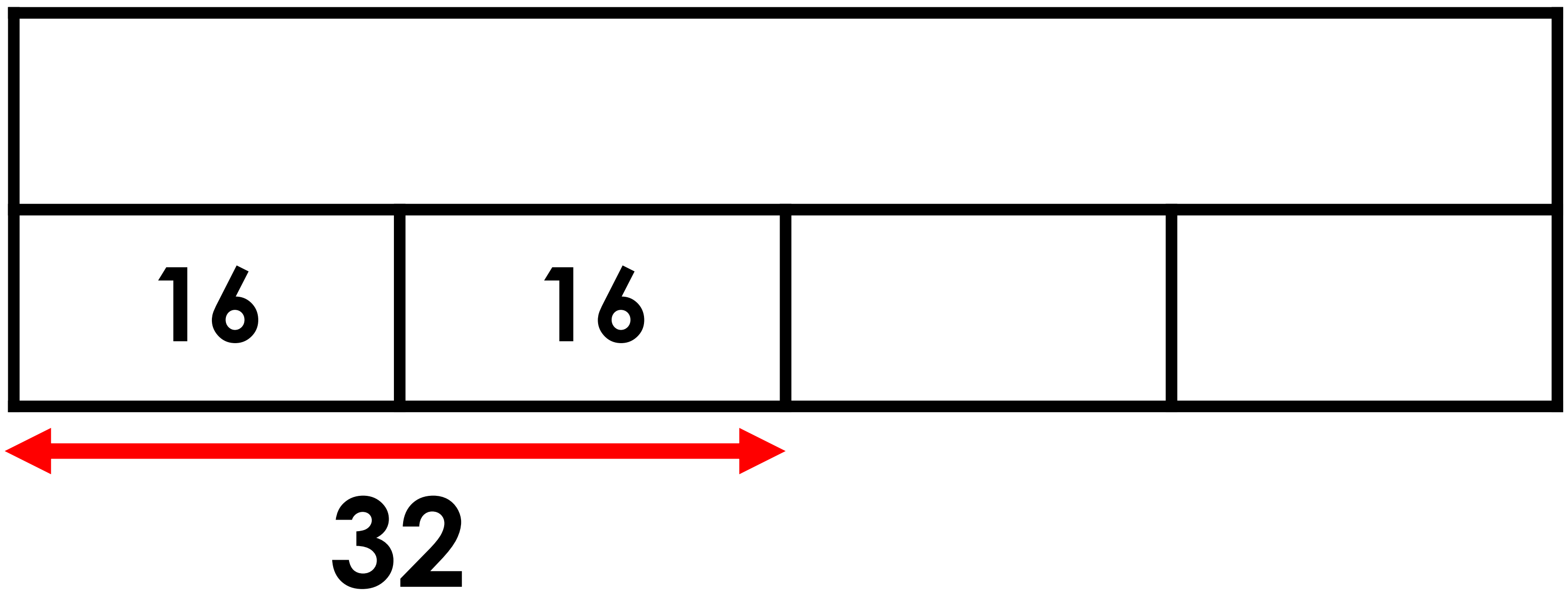
Example answer 2:

$$\frac{2}{\boxed{4}} \text{ of } \boxed{} = 32$$



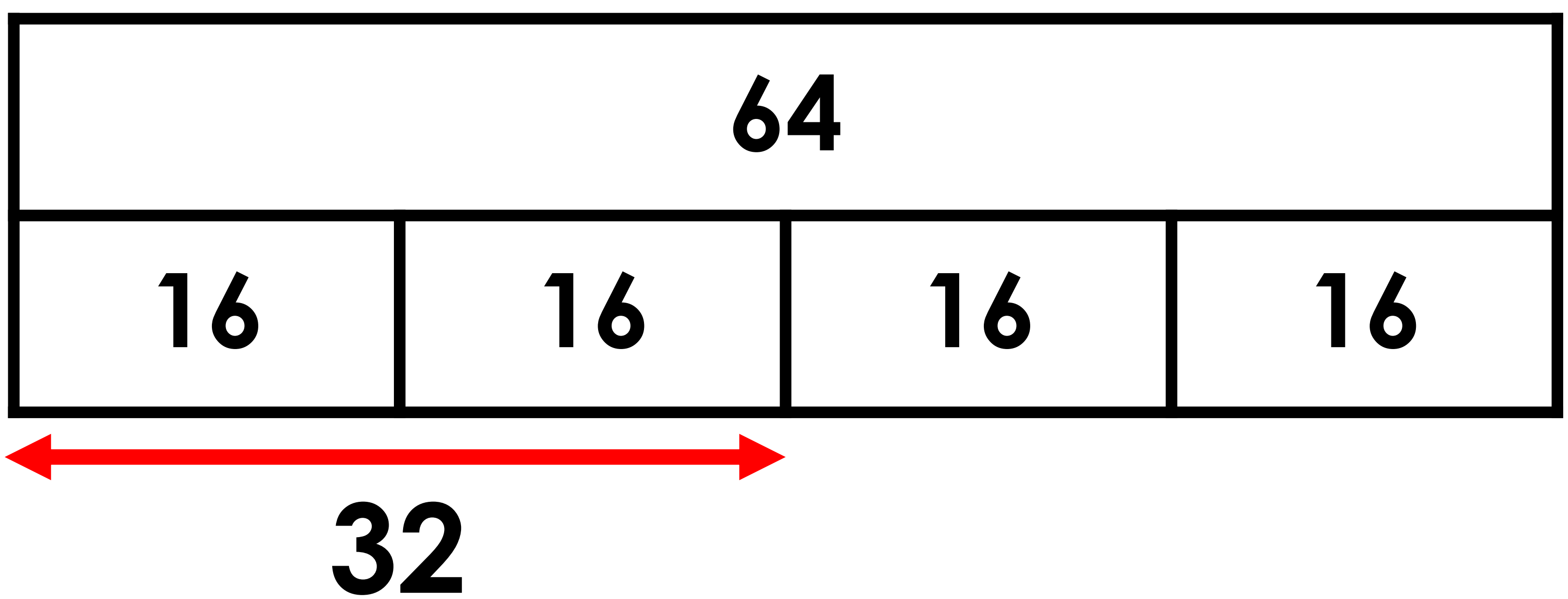
Task 26: Fractions of an amount

Example answer 2: $\frac{2}{\boxed{4}}$ of $\boxed{\quad} = 32$



Task 26: Fractions of an amount

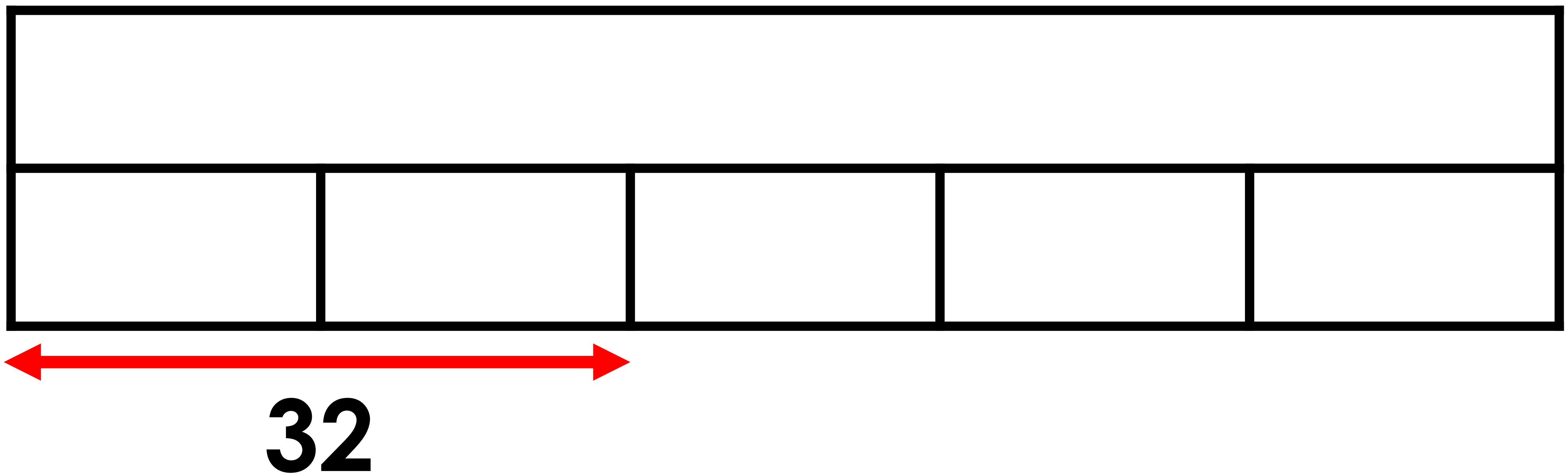
Example answer 2: $\frac{2}{\boxed{4}}$ of $\boxed{64}$ = 32



Task 26: Fractions of an amount

Example answer 3:

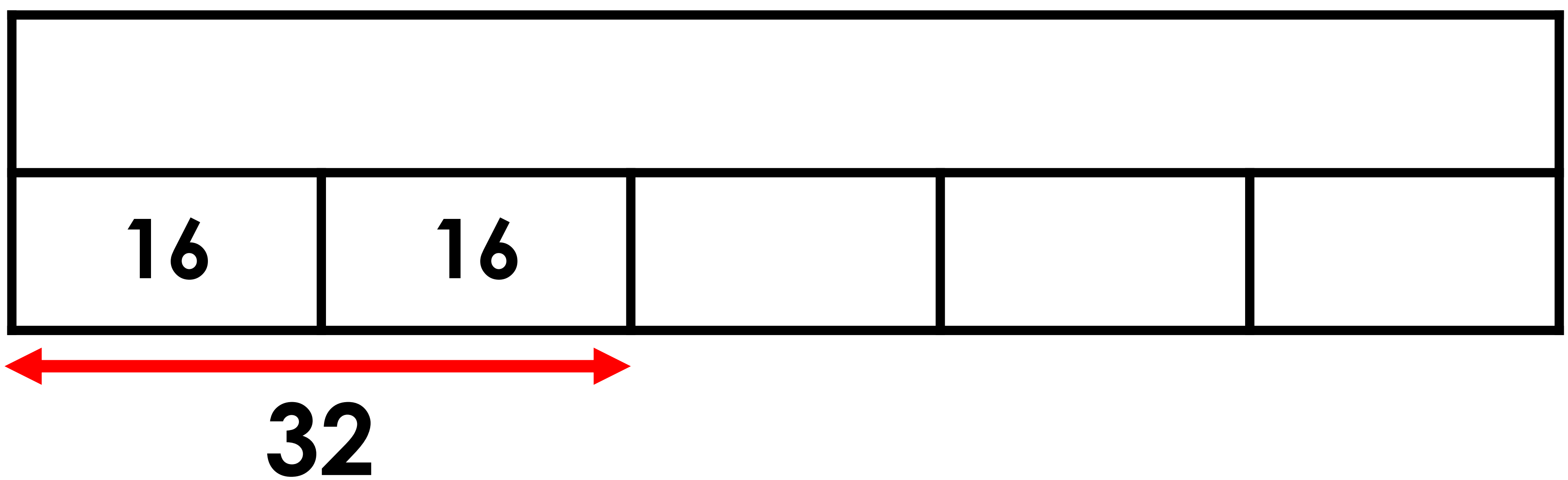
$$\frac{2}{\boxed{5}} \text{ of } \boxed{} = 32$$



Task 26: Fractions of an amount

Example answer 3:

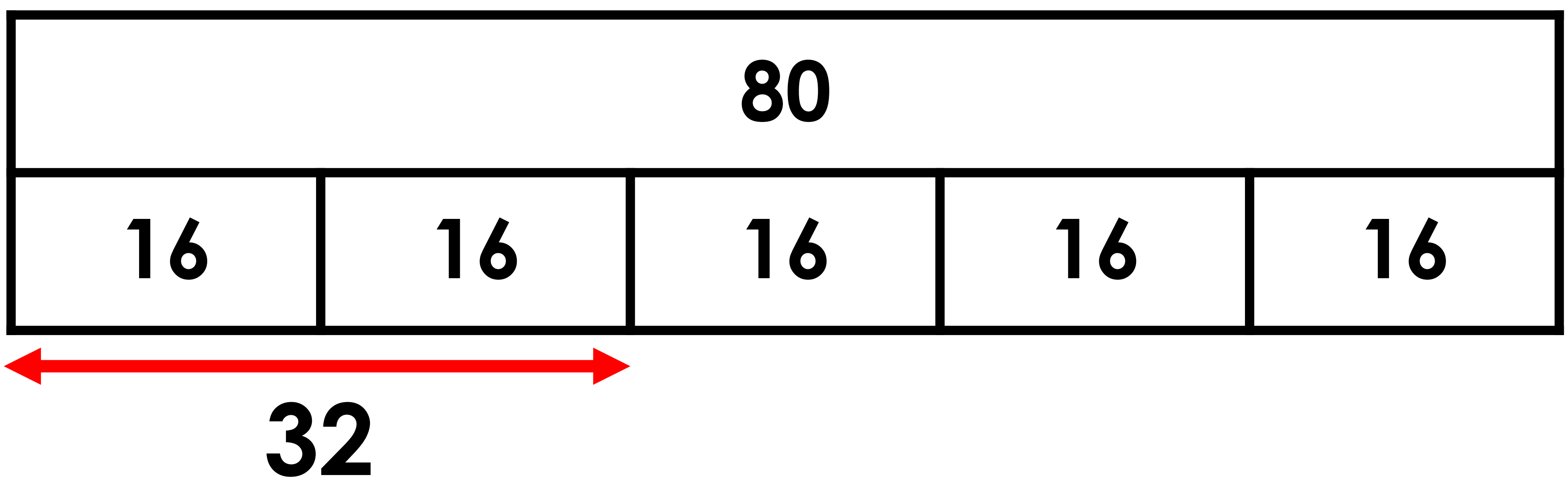
$$\frac{2}{\boxed{5}} \text{ of } \boxed{} = 32$$



Task 26: Fractions of an amount

Example answer 3:

$$\frac{2}{\boxed{5}} \text{ of } \boxed{80} = 32$$



Task 27: Improper fractions

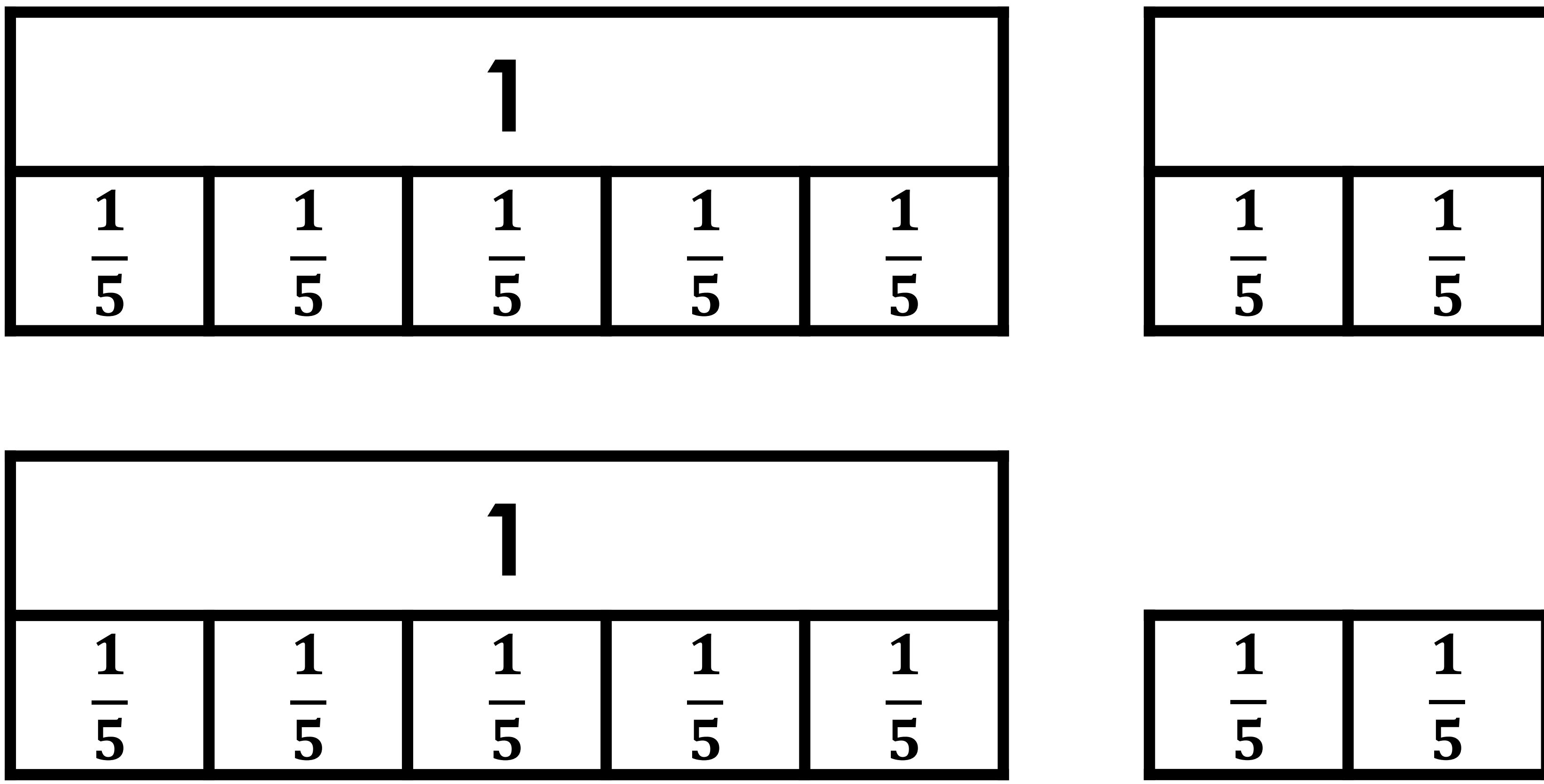
Can it be fifths?

$$\frac{17}{\boxed{5}} = 2\frac{\boxed{}}{\boxed{}}$$

Task 27: Improper fractions

Can it be fifths?

$$\frac{17}{\boxed{5}} = 2\frac{\square}{\square}$$



$$\frac{17}{5} = 3\frac{2}{5}$$

NOT a solution

Task 27: Improper fractions

Can it be sixths?

$$\frac{17}{\boxed{6}} = 2\frac{\boxed{}}{\boxed{}}$$

Task 27: Improper fractions

Can it be sixths?

$$\frac{17}{\boxed{6}} = 2\frac{\boxed{5}}{\boxed{6}}$$

1					
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

1					
$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$	$\frac{1}{6}$

$$\frac{17}{6} = 2\frac{5}{6}$$

Solution 1

Task 27: Improper fractions

Can it be sevenths?

$$\frac{17}{\boxed{7}} = 2\frac{\boxed{}}{\boxed{}}$$

Task 27: Improper fractions

Can it be sevenths?

$$\frac{17}{\boxed{7}} = 2\frac{\boxed{3}}{\boxed{7}}$$

1						
$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$

1						
$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$

$\frac{1}{7}$	$\frac{1}{7}$	$\frac{1}{7}$

$$\frac{17}{7} = 2\frac{3}{7}$$

Solution 2

Task 27: Improper fractions

Can it be eighths?

$$\frac{17}{\boxed{8}} = 2\frac{\square}{\square}$$

Task 27: Improper fractions

Can it be eighths?

$$\frac{17}{\boxed{8}} = 2\frac{\boxed{1}}{\boxed{8}}$$

1							
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

1							
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$

$\boxed{\frac{1}{8}}$

$$\frac{17}{8} = 2\frac{1}{8}$$

Solution 3

Task 27: Improper fractions

Can it be ninths?

$$\frac{17}{\boxed{9}} = 2\frac{\boxed{}}{\boxed{}}$$

Task 27: Improper fractions

Can it be ninths?

$$\frac{17}{\boxed{9}} = 2\frac{\square}{\square}$$

1								
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$

$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$

$$\frac{17}{9} = 1\frac{8}{9}$$

NOT a solution

Task 28: Make two and a quarter

Example answer 1:

$$\frac{\square}{\square} \times \square = 2\frac{1}{4}$$

1	1	$\frac{1}{4}$

Task 28: Make two and a quarter

Example answer 1:

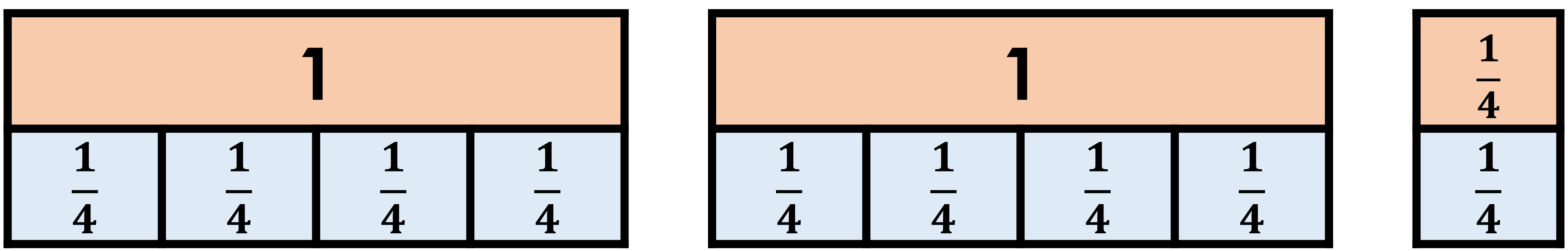
$$\frac{\boxed{1}}{\boxed{4}} \times \boxed{} = 2\frac{1}{4}$$

1	1	$\frac{1}{4}$

Task 28: Make two and a quarter

Example answer 1:

$$\frac{\boxed{1}}{\boxed{4}} \times \boxed{9} = 2\frac{1}{4}$$



Task 28: Make two and a quarter

Example answer 2:

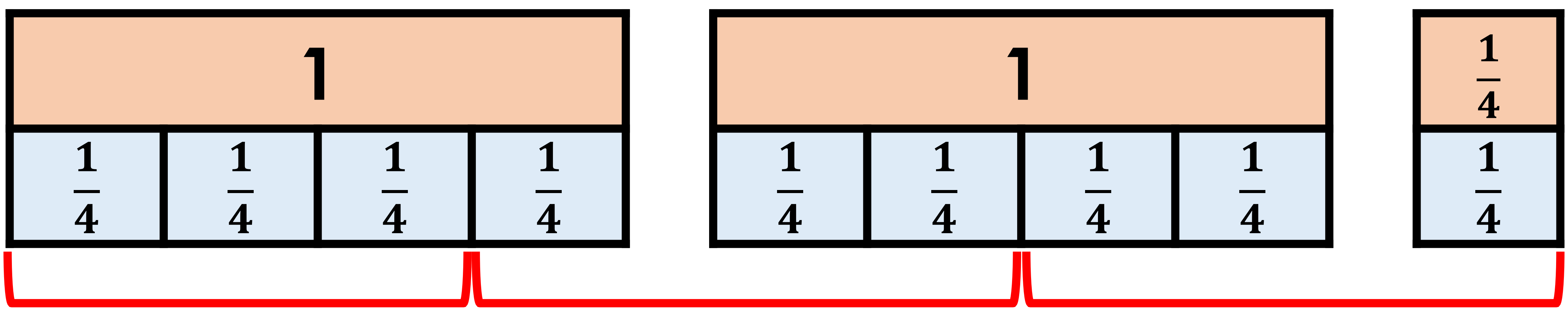
$$\frac{\boxed{3}}{\boxed{4}} \times \square = 2\frac{1}{4}$$

1	1	$\frac{1}{4}$

Task 28: Make two and a quarter

Example answer 2:

$$\frac{\boxed{3}}{\boxed{4}} \times \boxed{3} = 2\frac{1}{4}$$



Task 28: Make two and a quarter

Example answer 3:

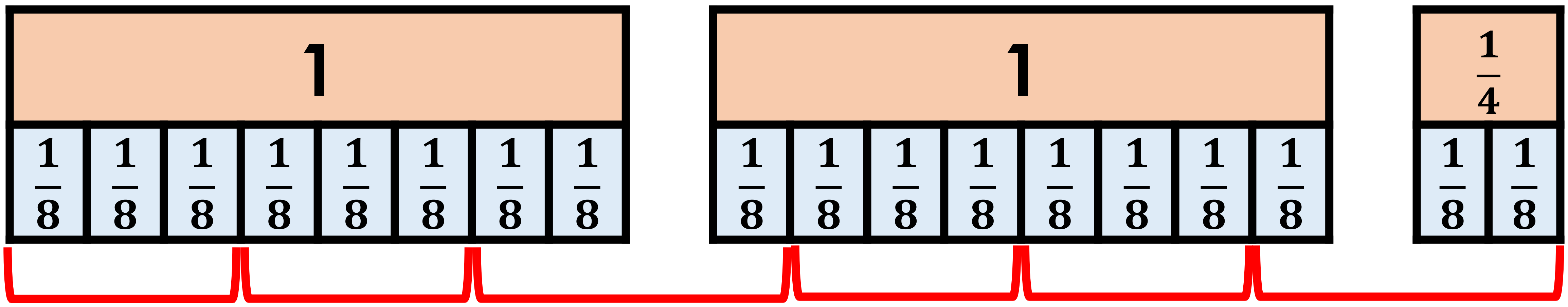
$$\frac{\boxed{3}}{\boxed{8}} \times \boxed{} = 2\frac{1}{4}$$

1	1	$\frac{1}{4}$

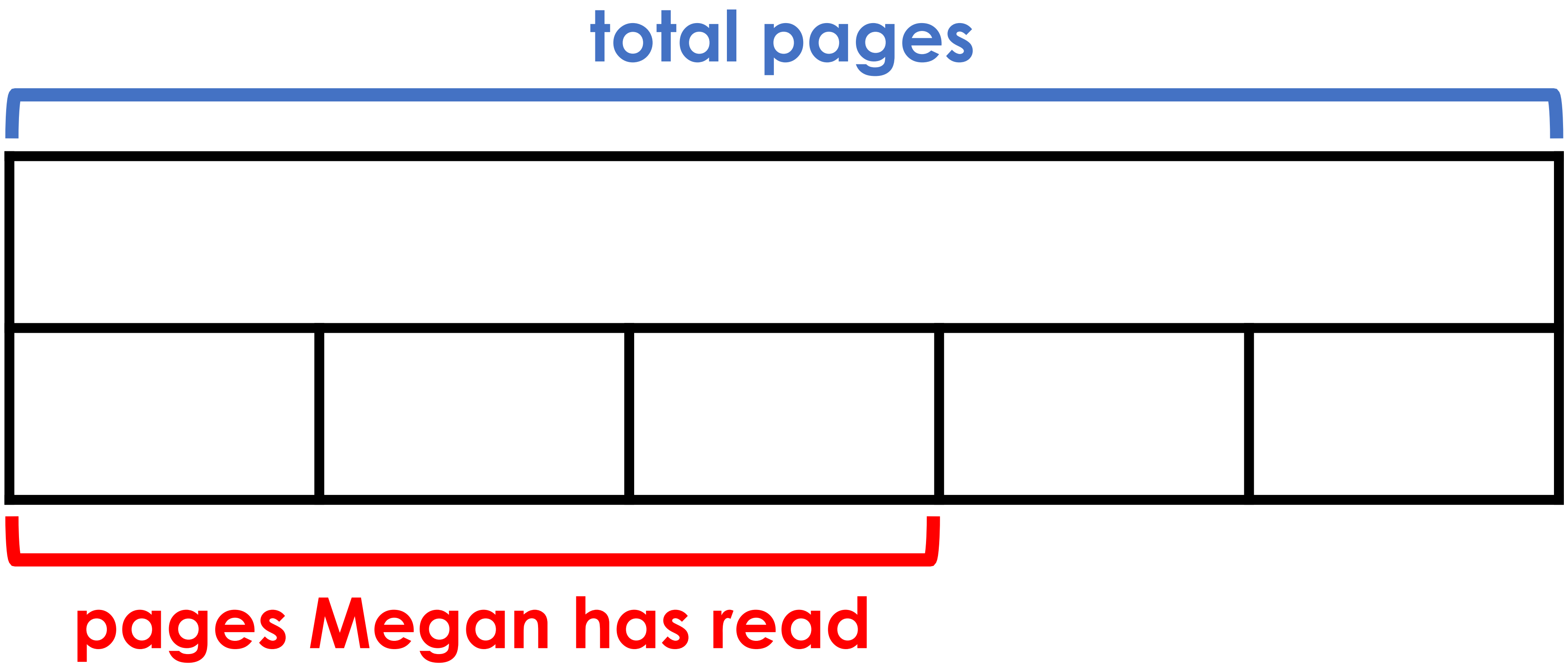
Task 28: Make two and a quarter

Example answer 3:

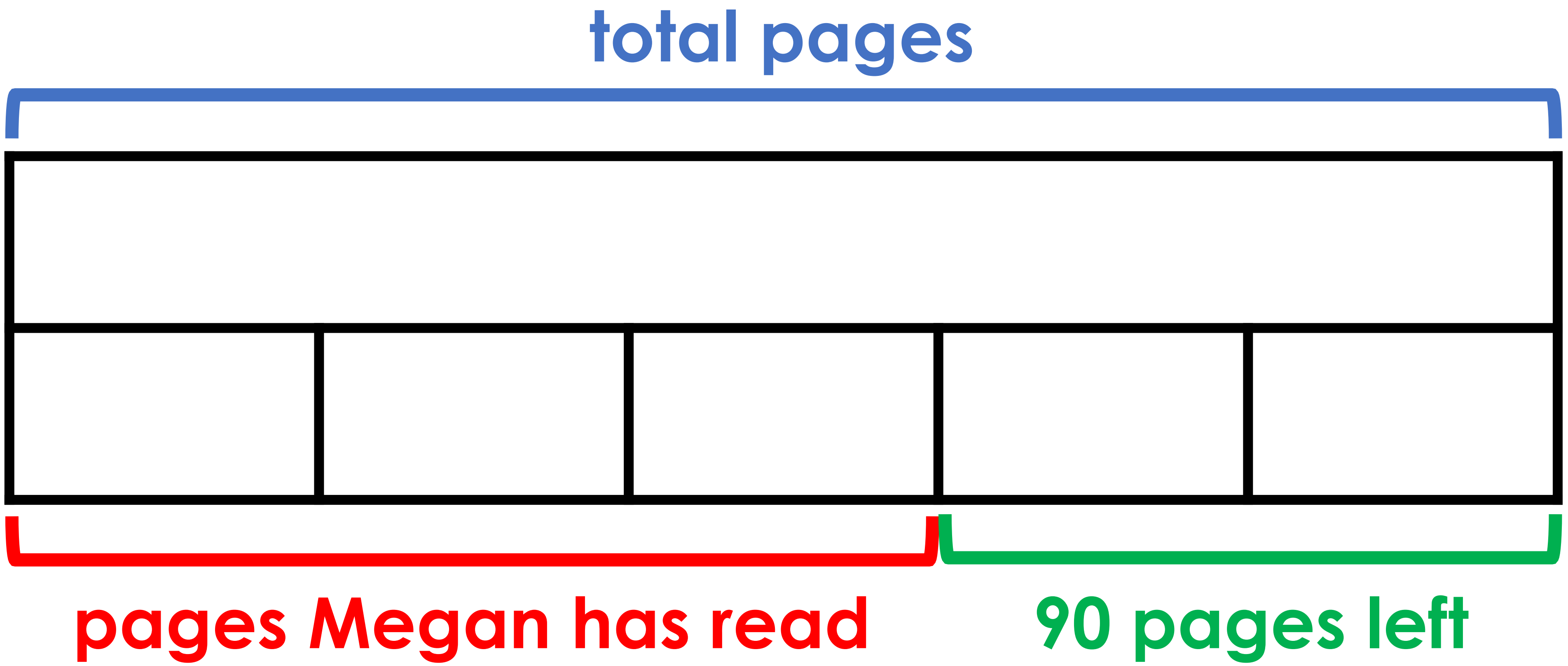
$$\frac{\boxed{3}}{\boxed{8}} \times \boxed{6} = 2\frac{1}{4}$$



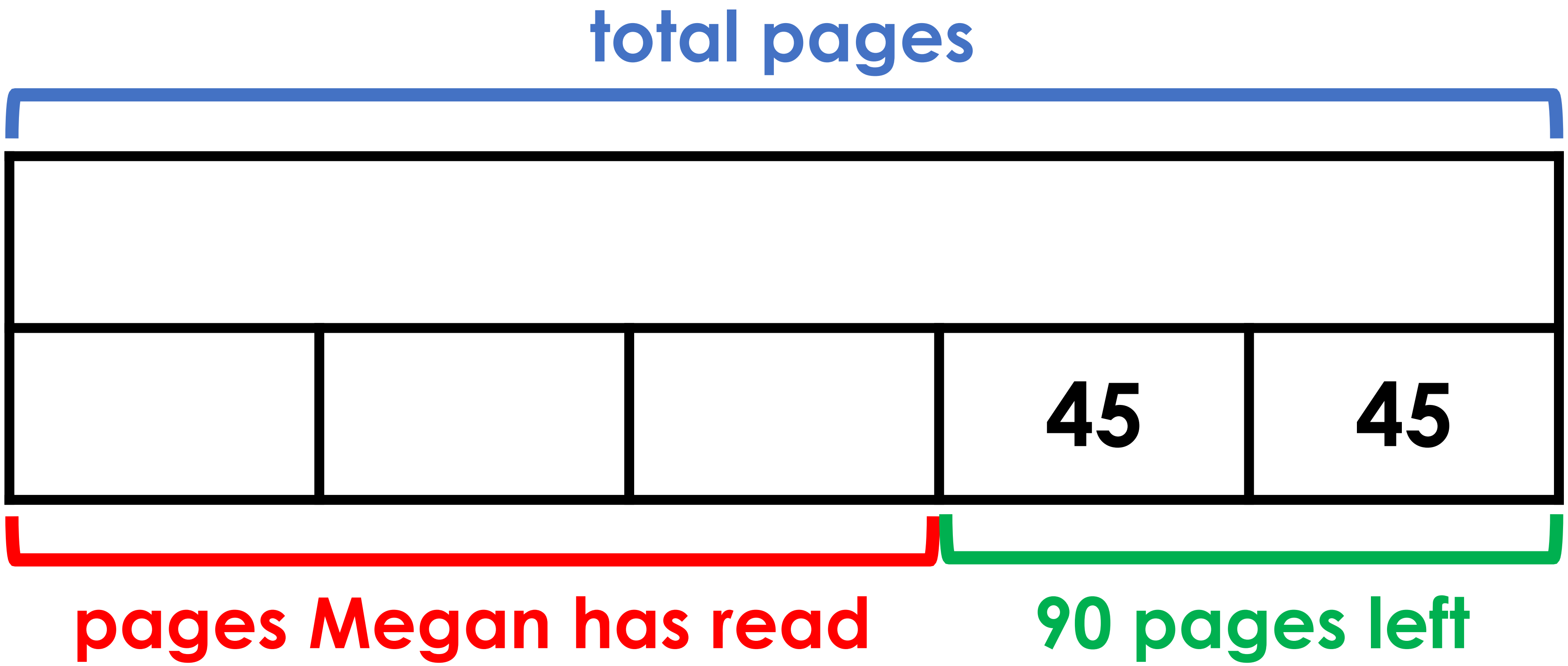
Task 29: Part-finished book



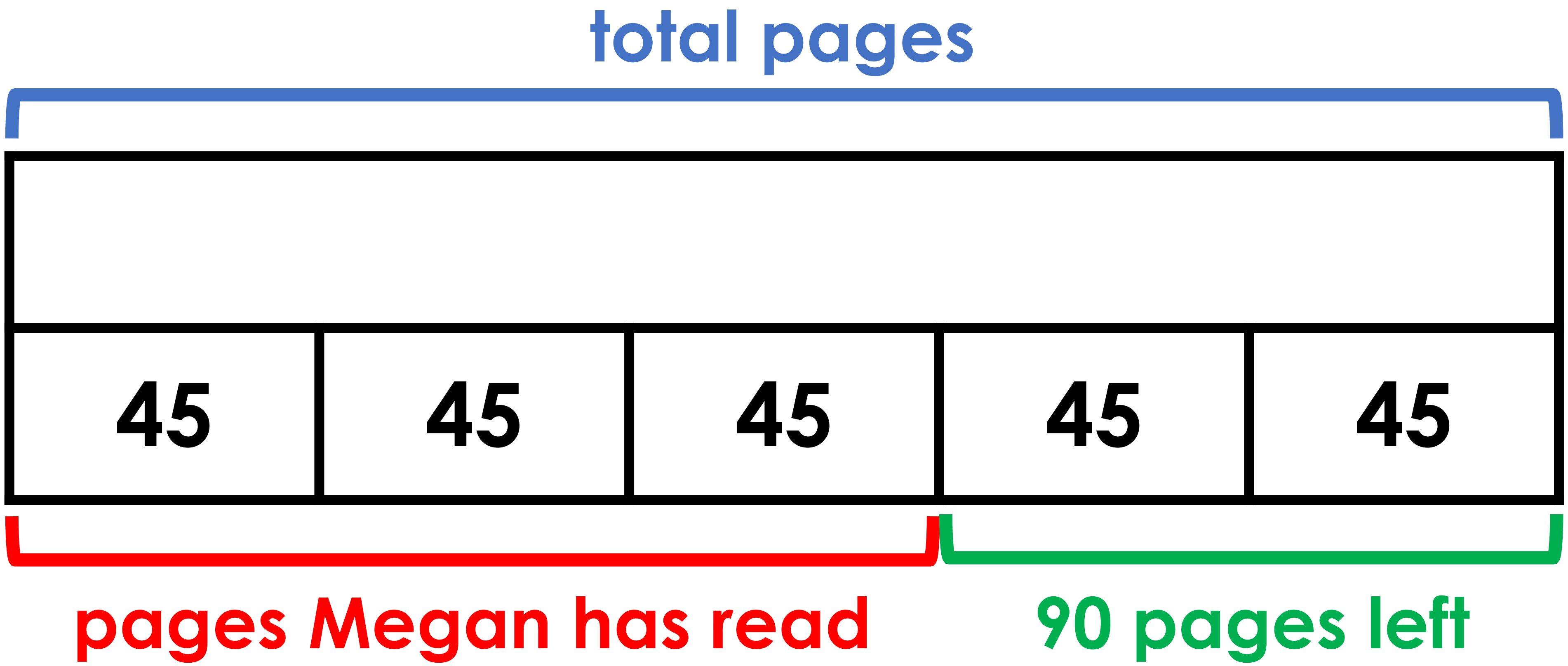
Task 29: Part-finished book



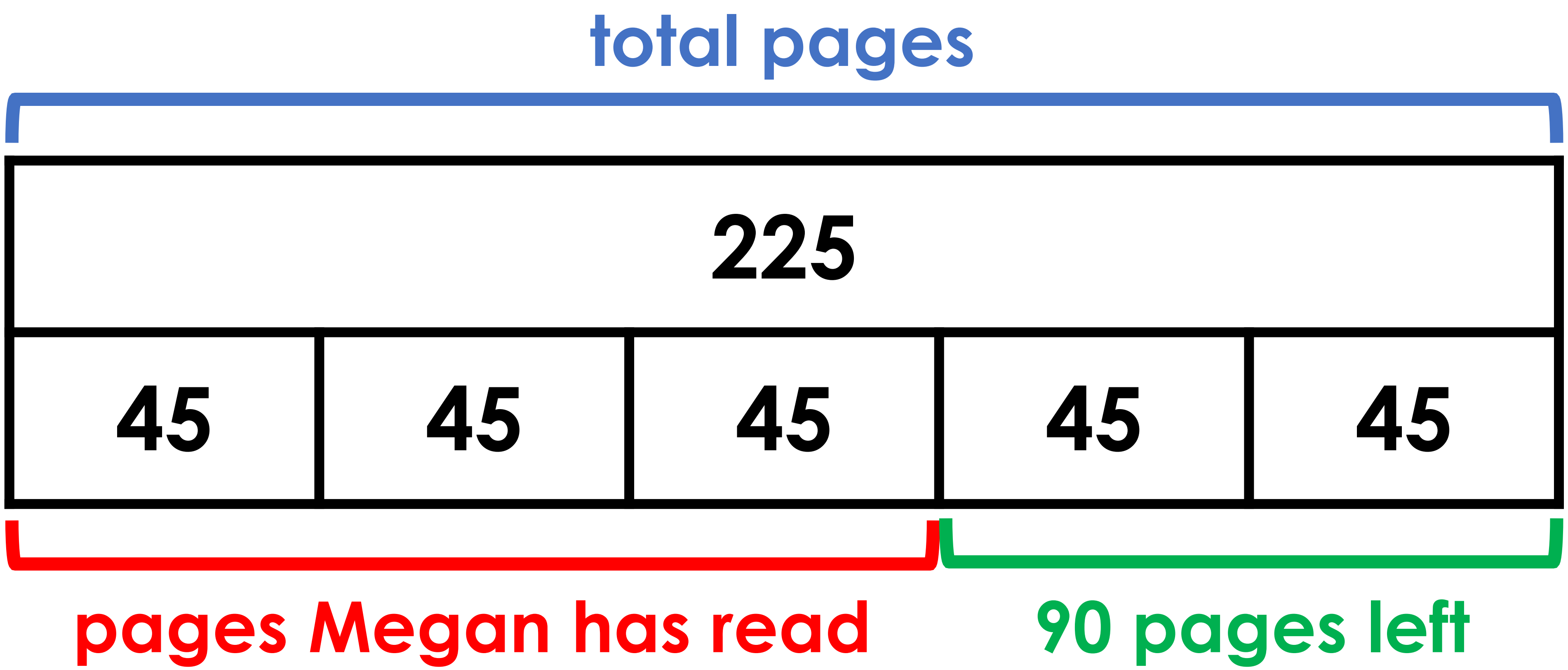
Task 29: Part-finished book



Task 29: Part-finished book

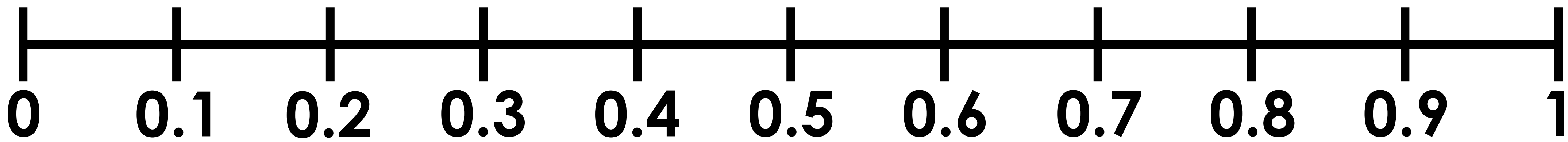


Task 29: Part-finished book

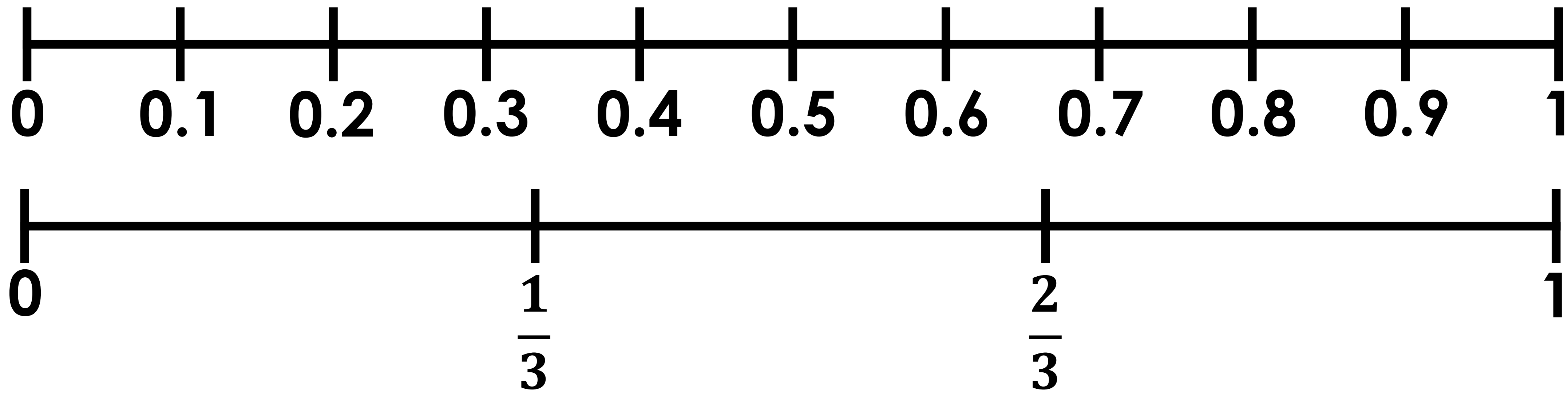


Megan's book is **225 pages** long.

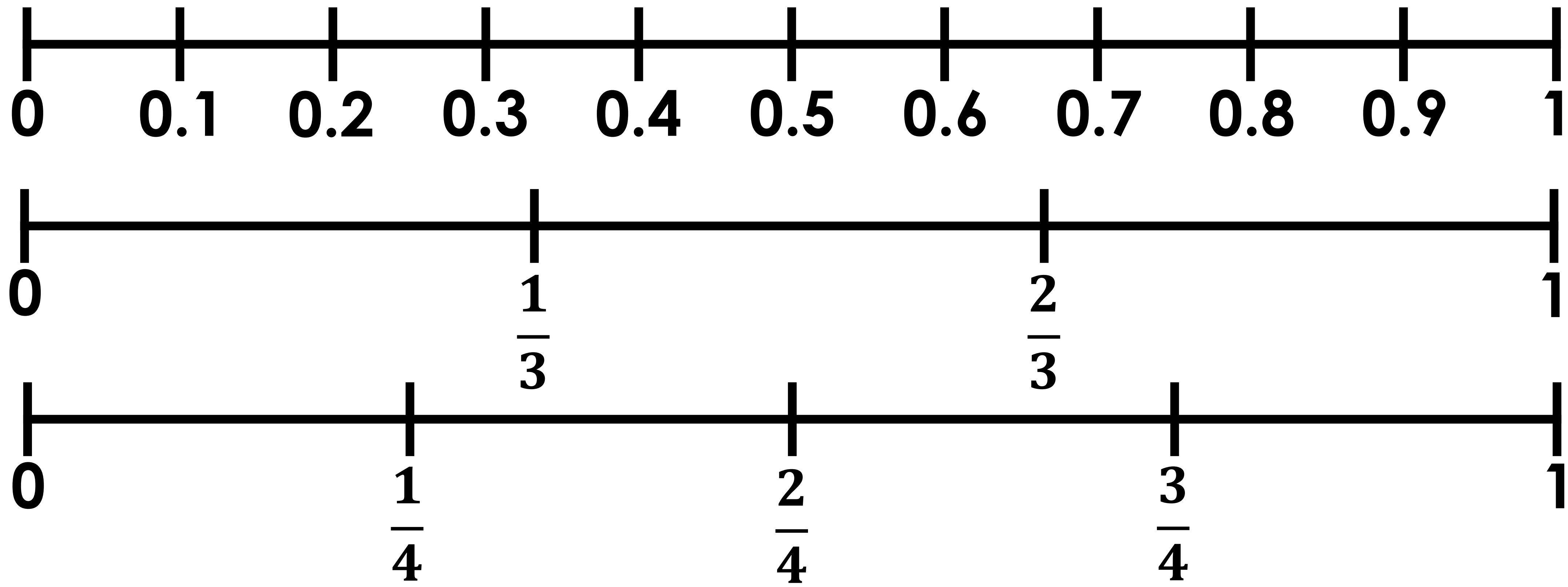
Task 30: Fractions and decimals



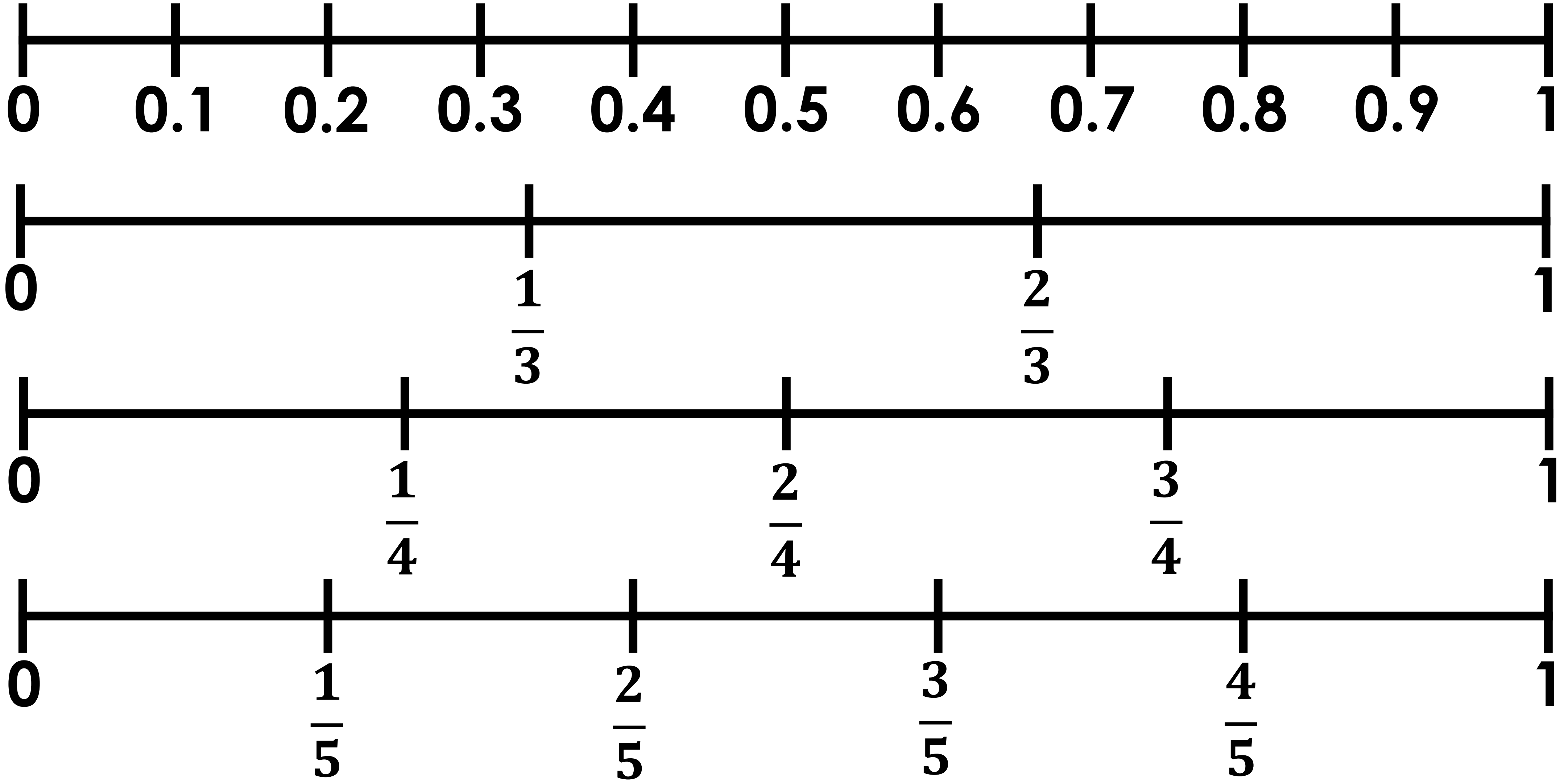
Task 30: Fractions and decimals



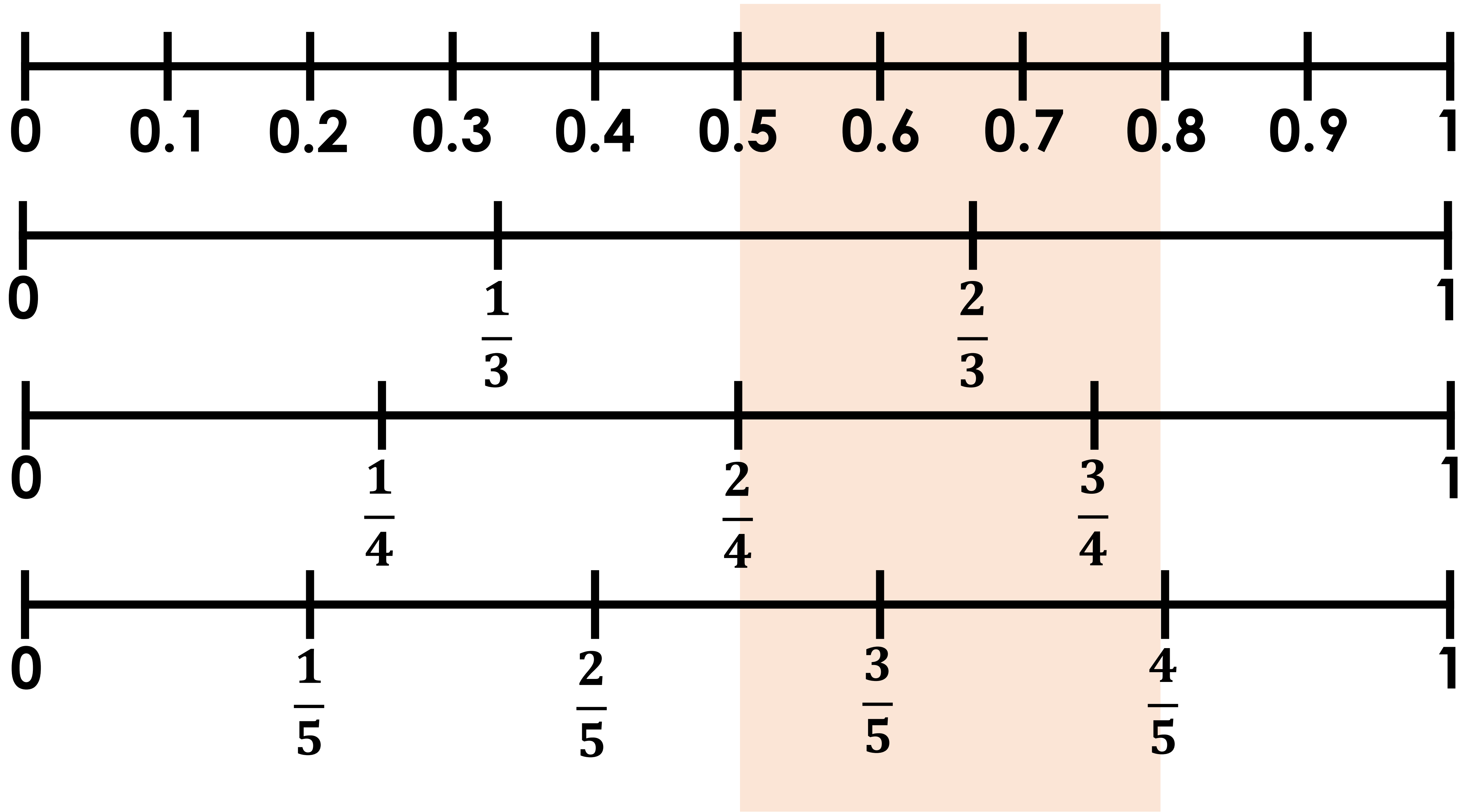
Task 30: Fractions and decimals



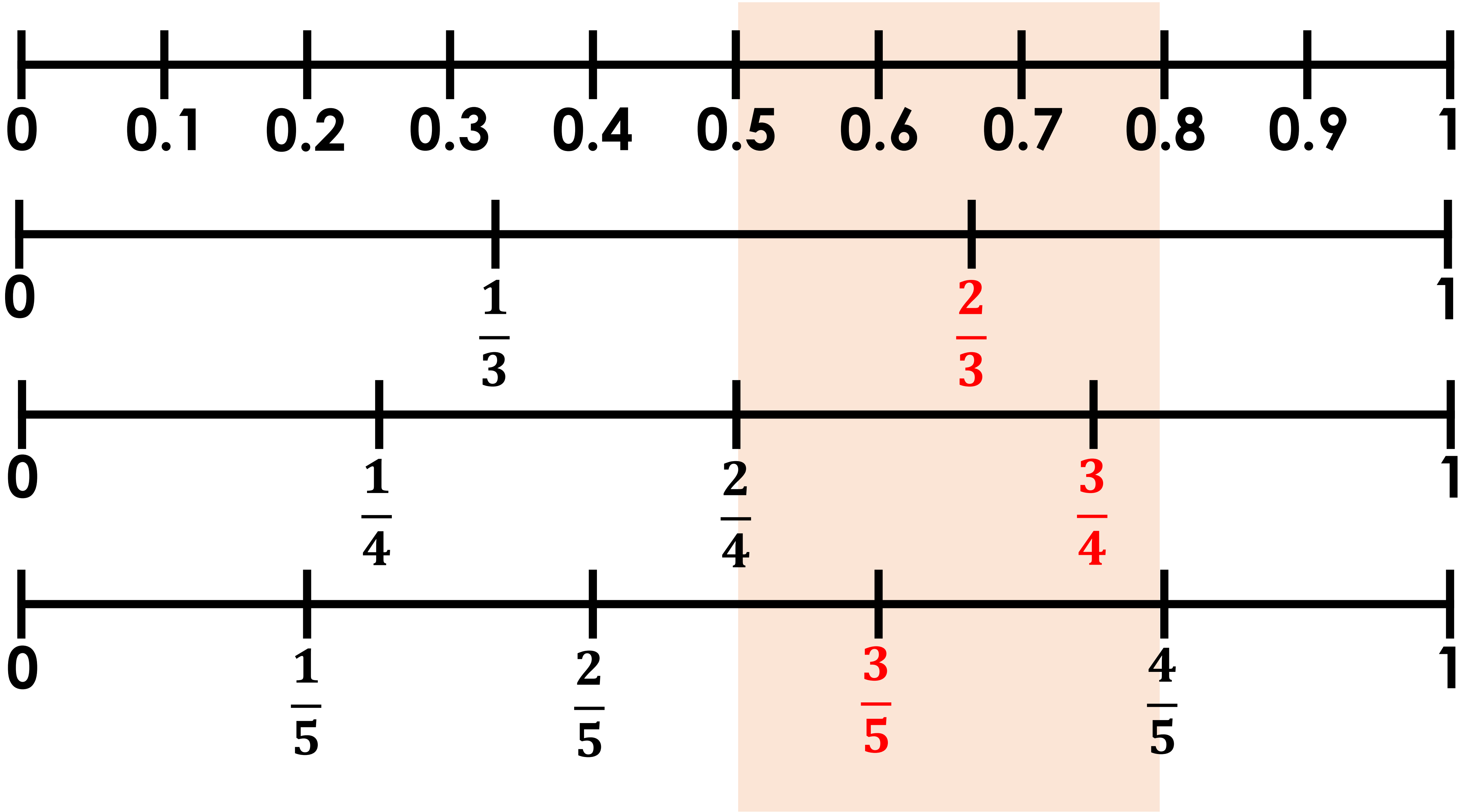
Task 30: Fractions and decimals



Task 30: Fractions and decimals

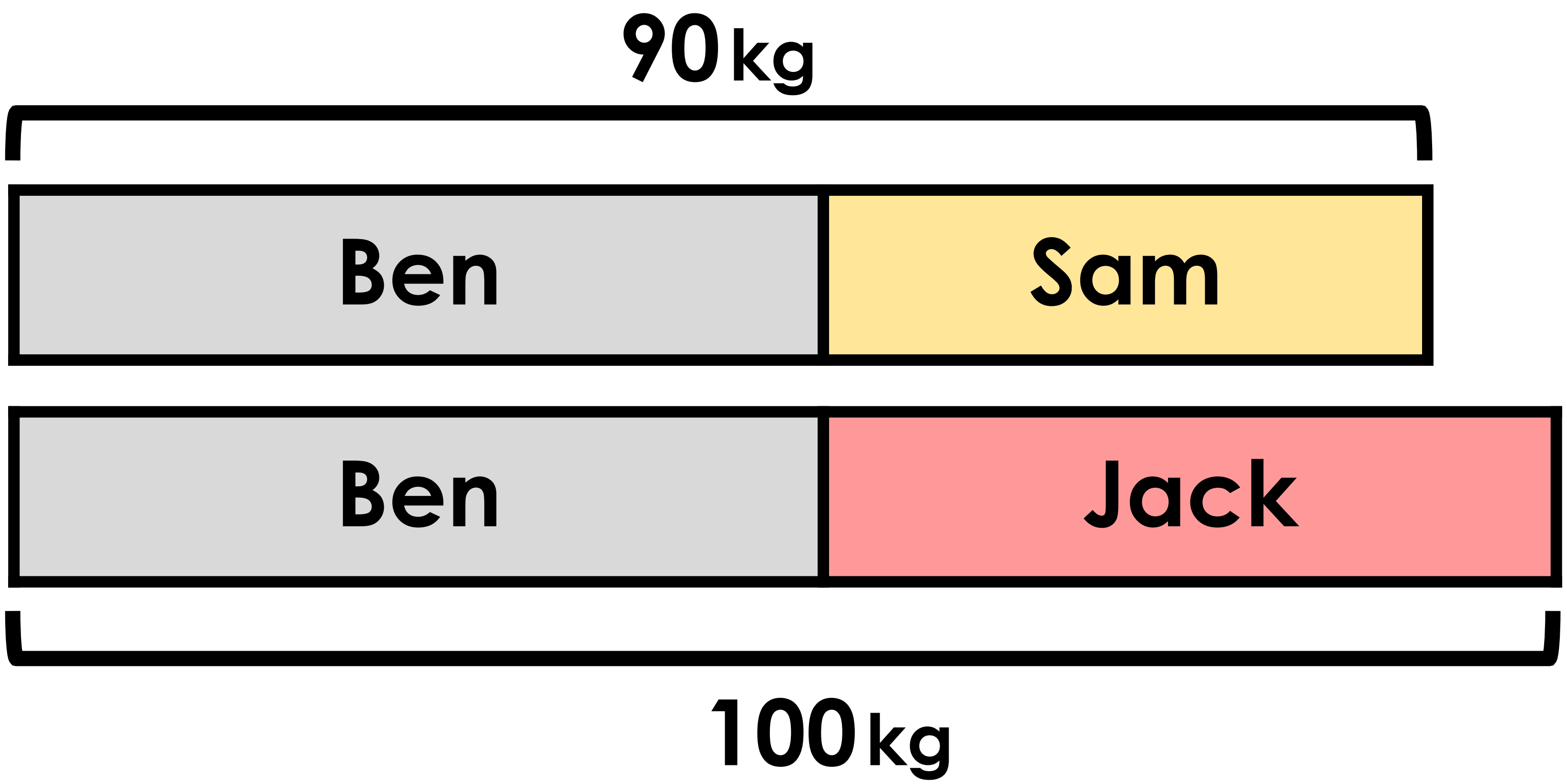


Task 30: Fractions and decimals



More than 0.5 and less than 0.8: $\frac{2}{3}$ $\frac{3}{4}$ $\frac{3}{5}$

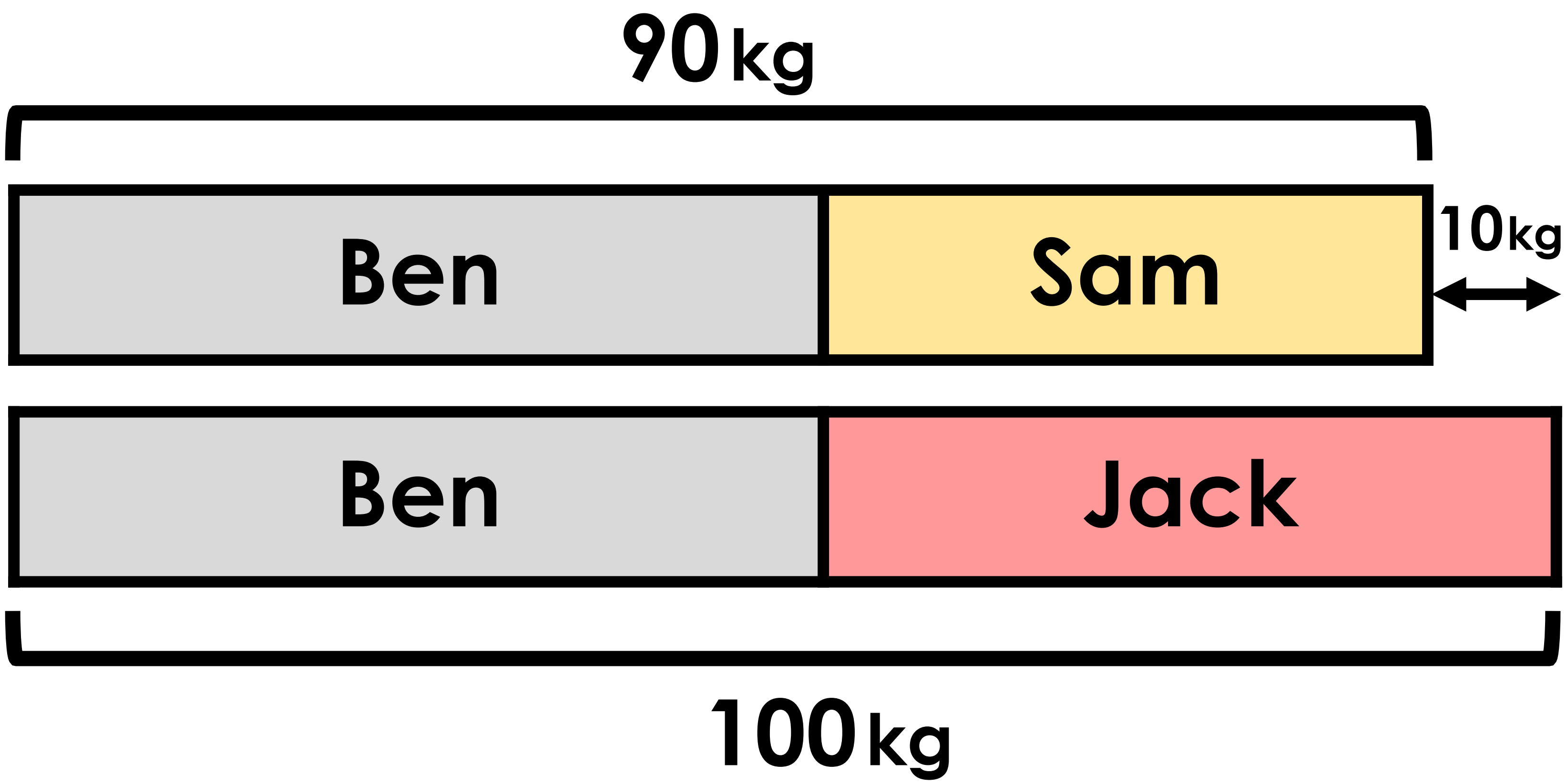
Task 31: Combined weights



Ben + Sam = 90kg

Ben + Jack = 100kg

Task 31: Combined weights

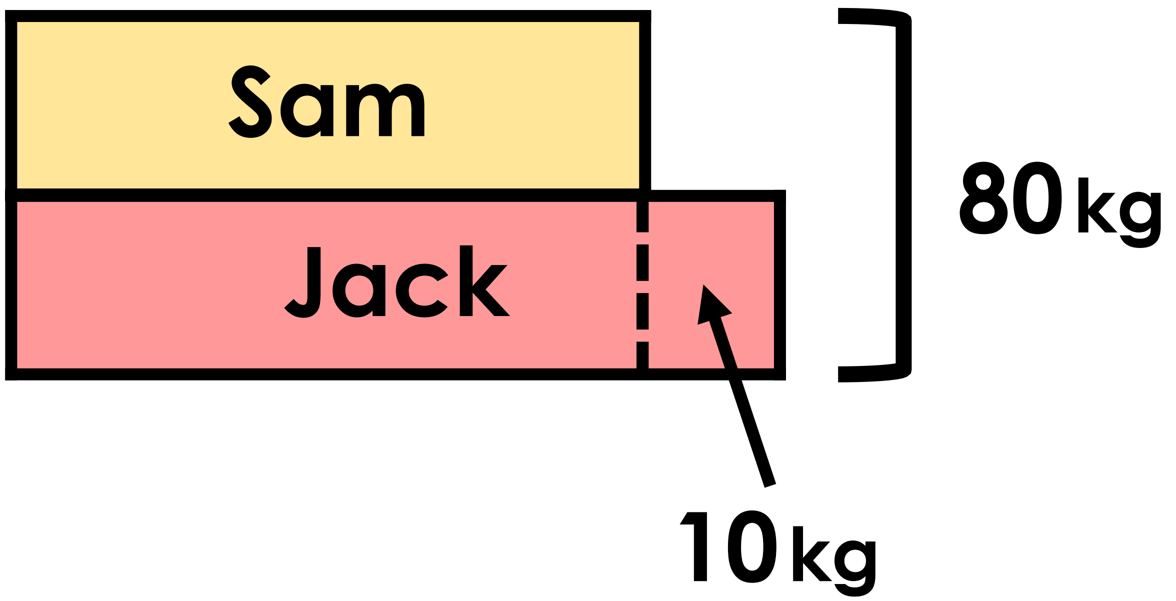


Ben + Sam = 90kg

Ben + Jack = 100kg

Jack weighs 10kg more than Sam.

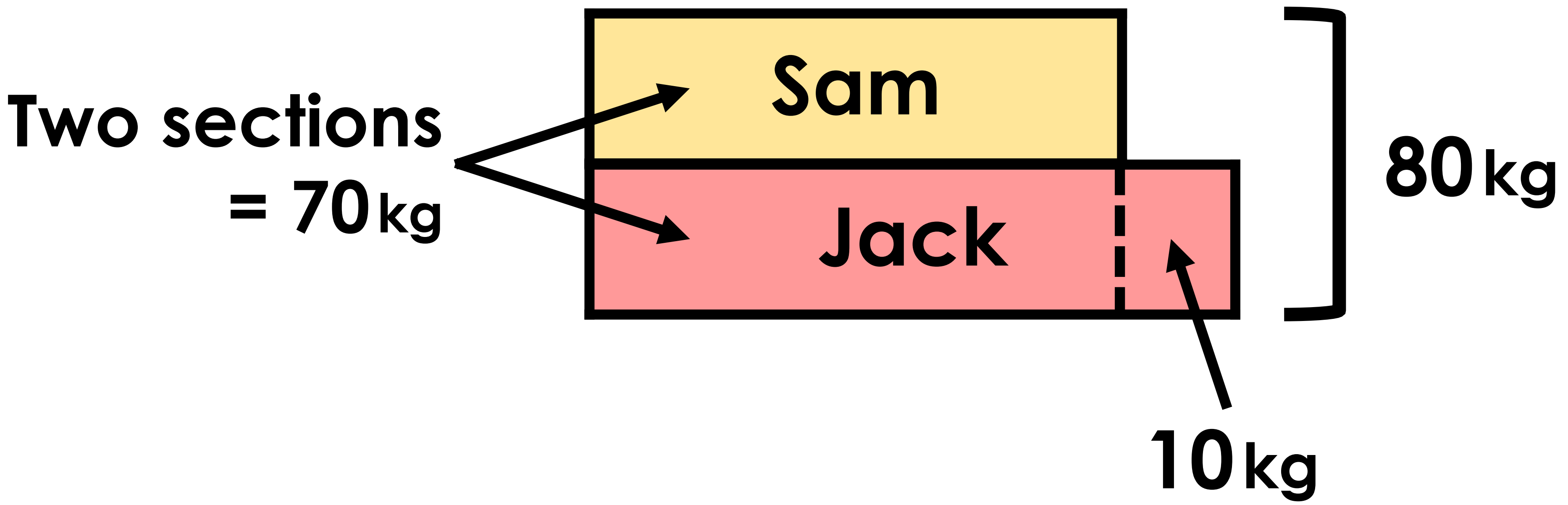
Task 31: Combined weights



Jack weighs 10kg more than Sam.

Sam and Jack weigh 80kg in total.

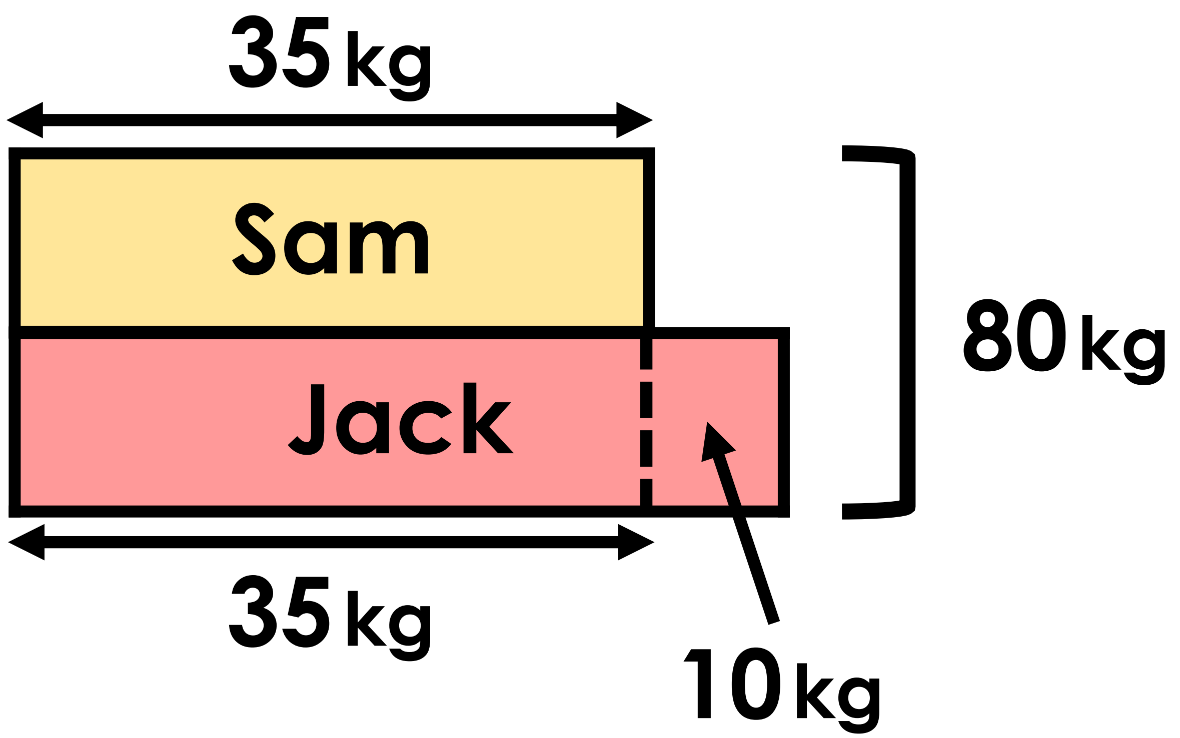
Task 31: Combined weights



Jack weighs 10kg more than Sam.

Sam and Jack weigh 80kg in total.

Task 31: Combined weights

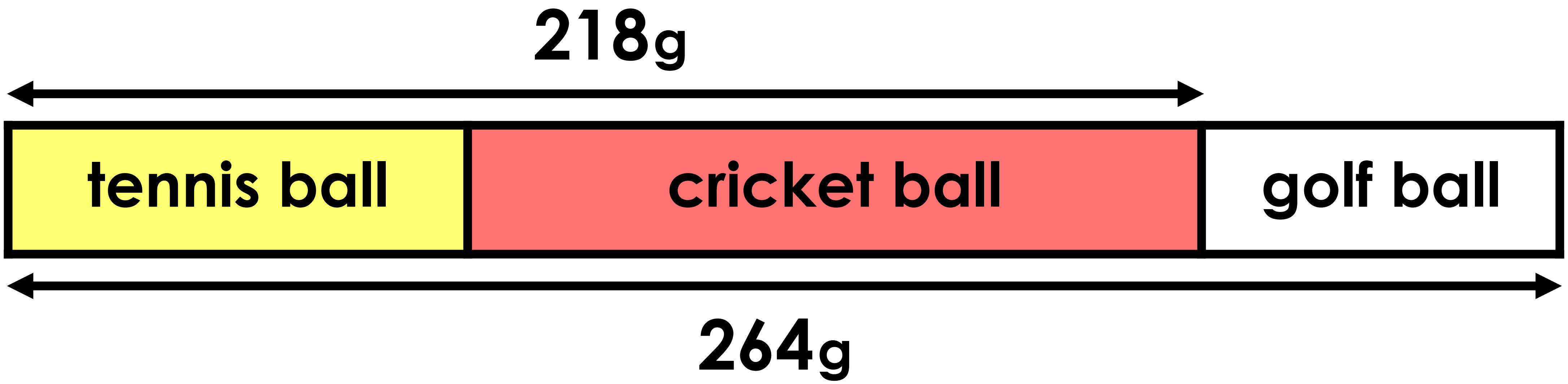


Sam weighs 35kg

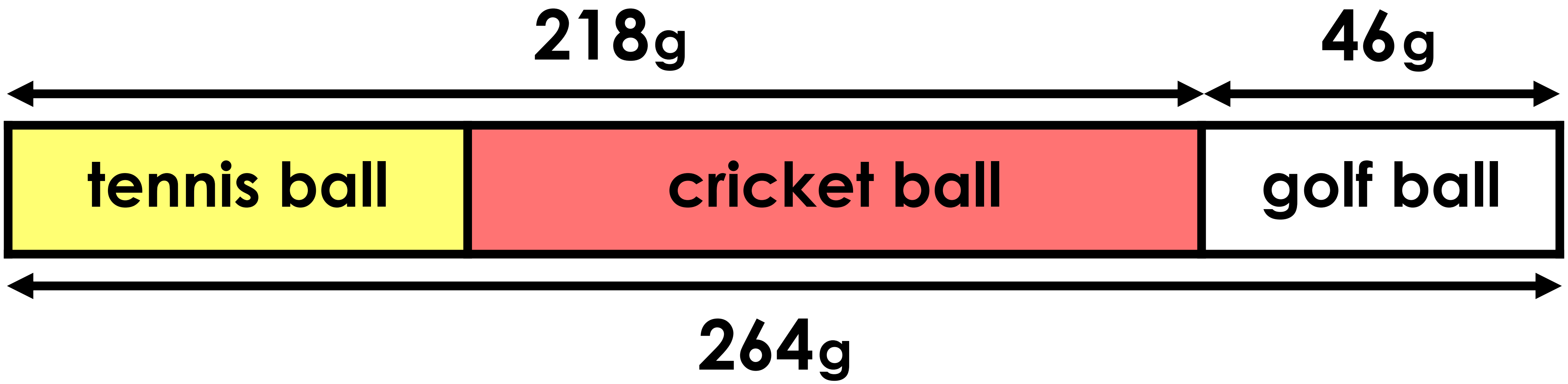
Jack weighs 10kg more than Sam.

Sam and Jack weigh 80kg in total.

Task 32: Sports ball weights

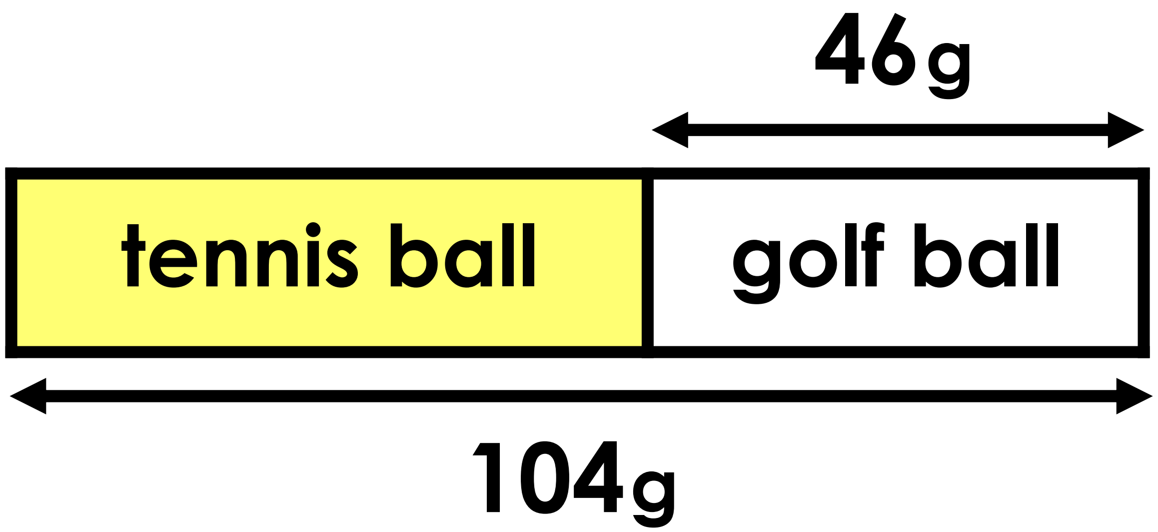


Task 32: Sports ball weights

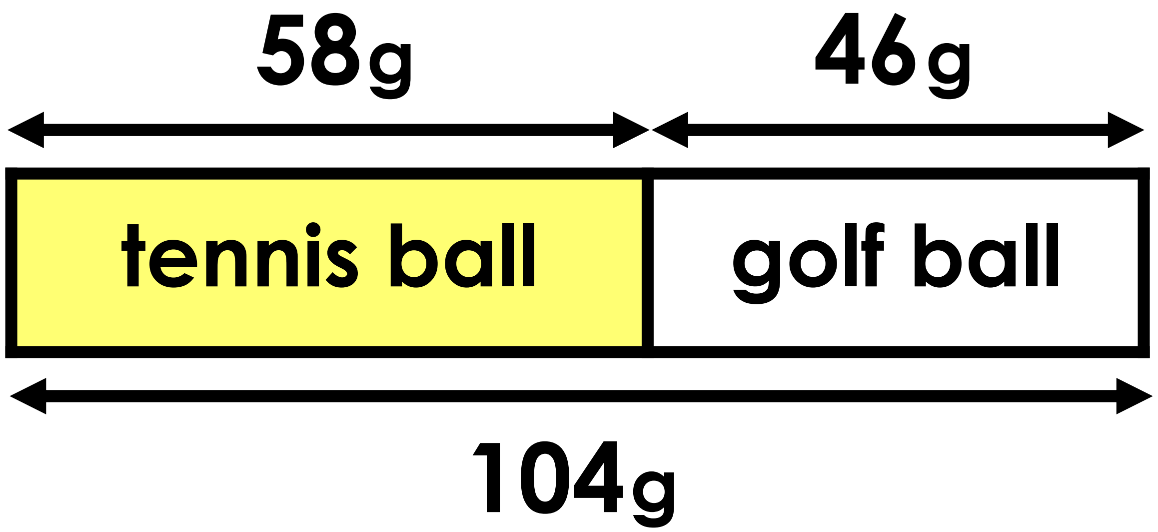


A golf ball weighs 46g

Task 32: Sports ball weights

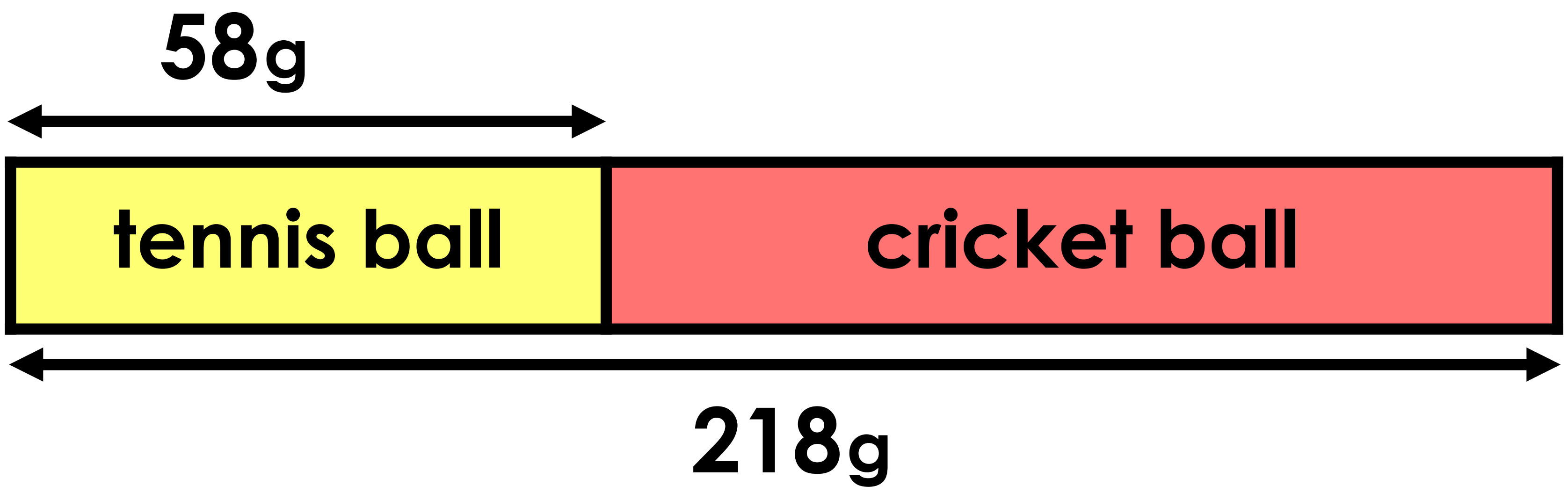


Task 32: Sports ball weights

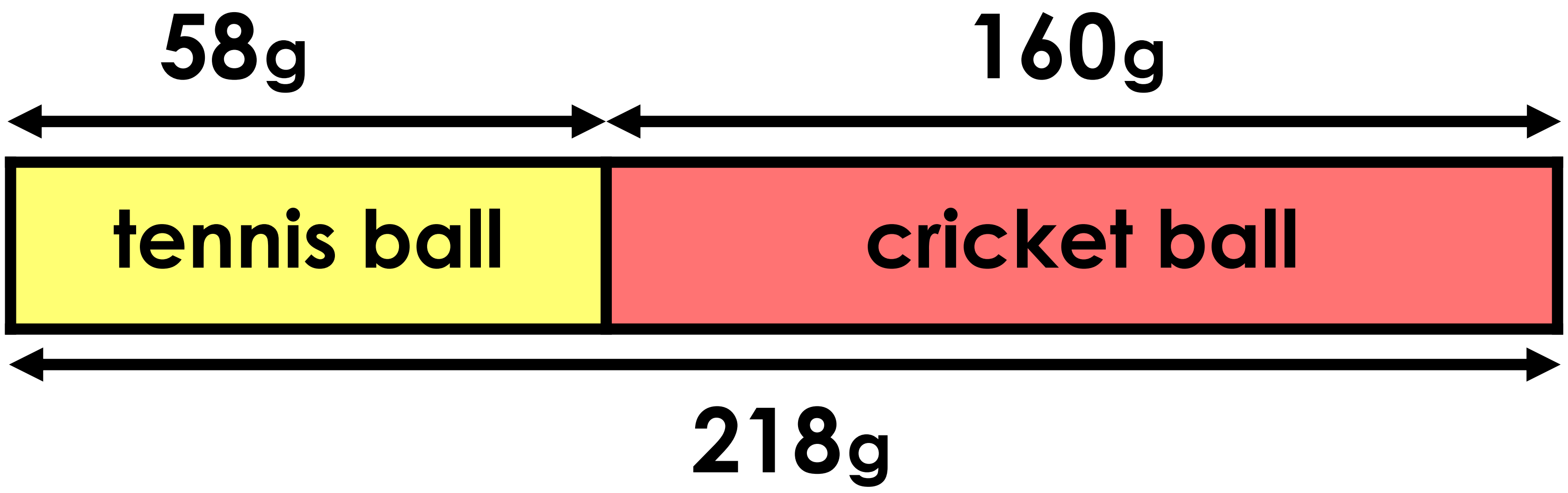


A tennis ball weighs 58g

Task 32: Sports ball weights



Task 32: Sports ball weights



A cricket ball weighs 160g

Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.

starting cost

$\boxed{£7}$

Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.

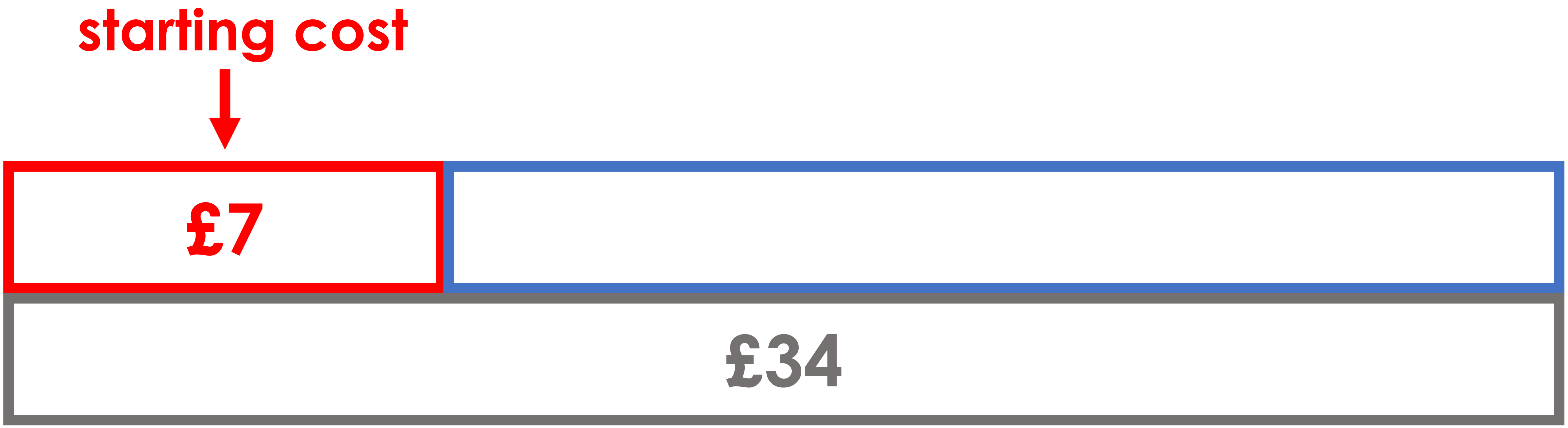
Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.

Total cost = <u>£25</u>

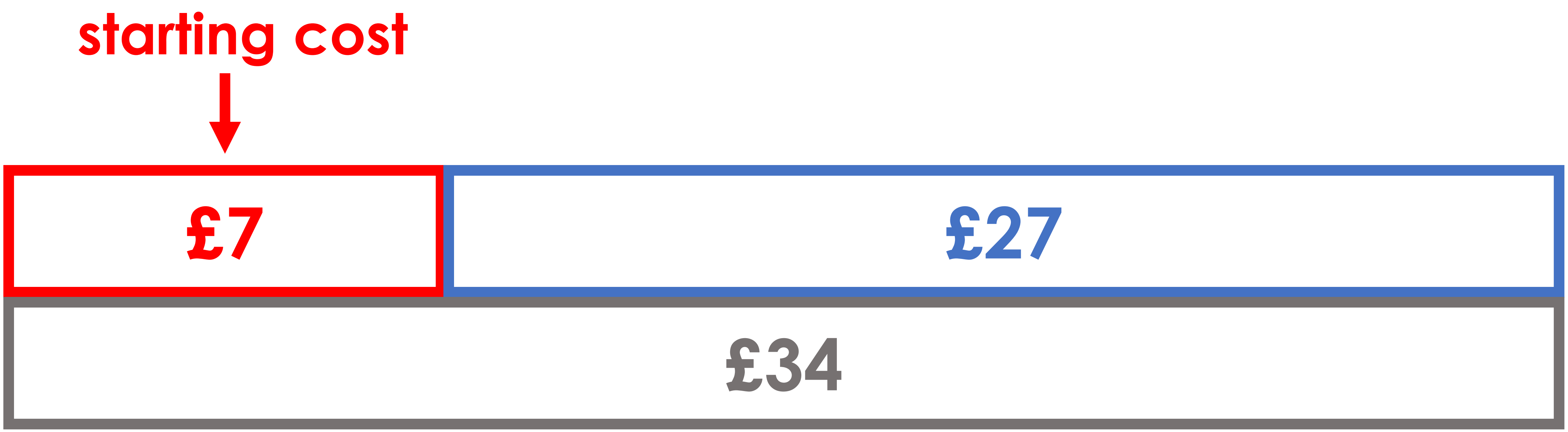
Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.



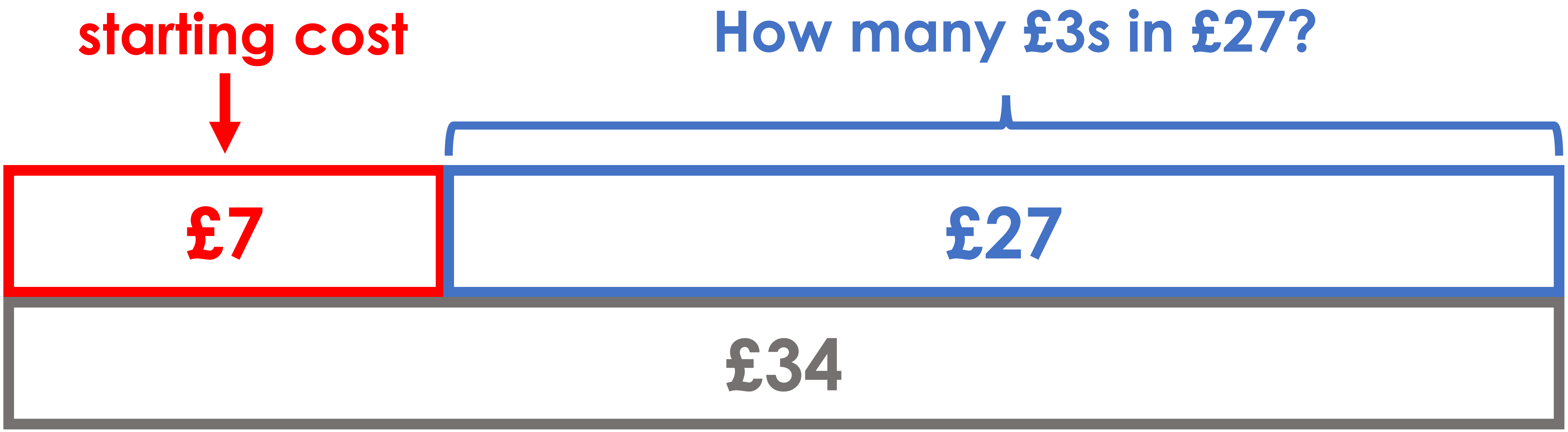
Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.



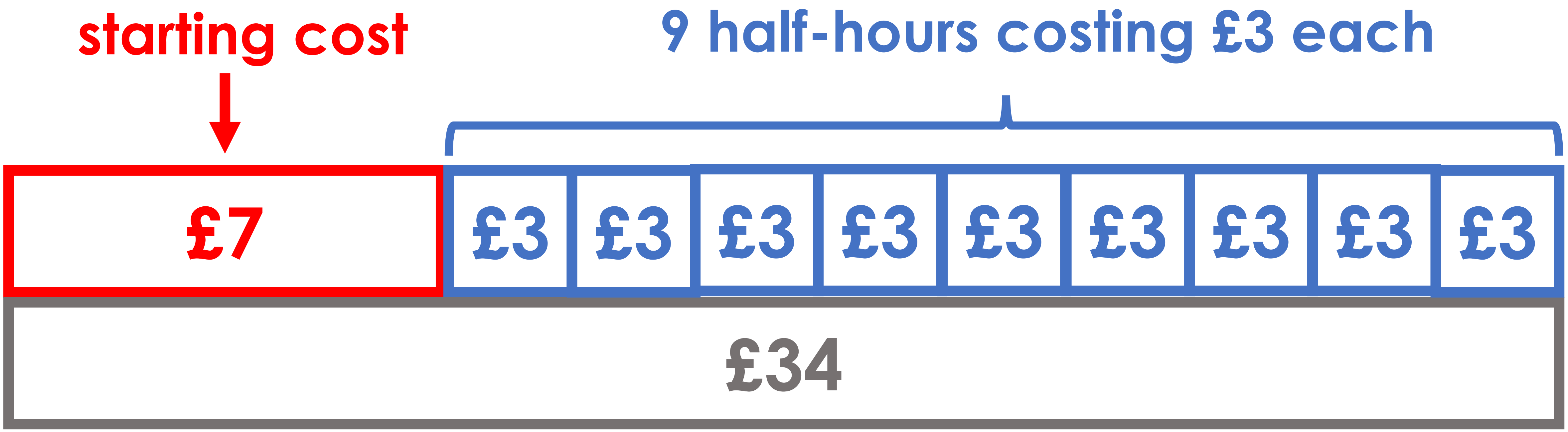
Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.



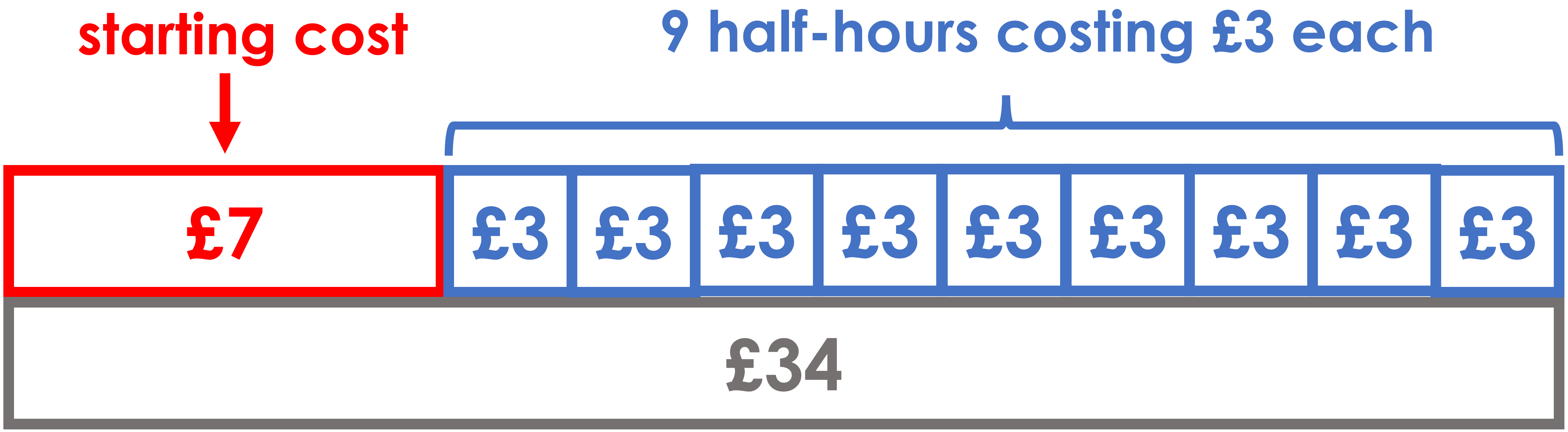
Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.



Task 33 Question: Hiring a surfboard

£7 to hire a surfboard plus £3 per half-hour.

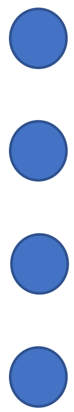


Jack goes surfing for $4\frac{1}{2}$ hours

Task 34: Dot pattern sequence

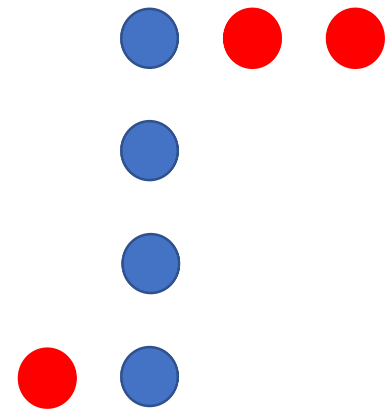
Method 1:

Picture 1:



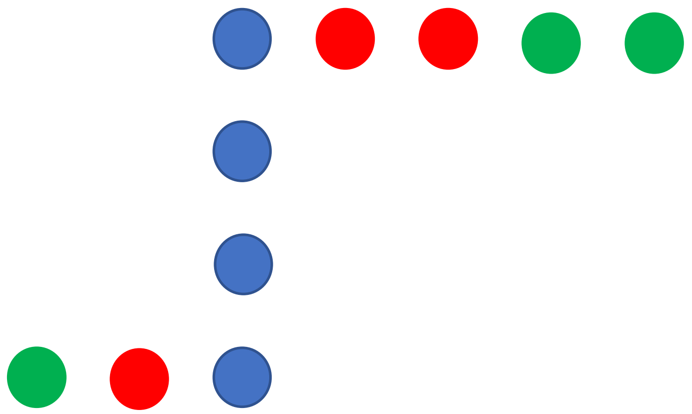
4 dots

Picture 2:



7 dots

Picture 3:

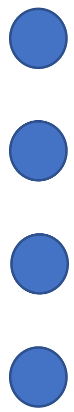


10 dots

Task 34: Dot pattern sequence

Method 1: 4 dots plus 3 more dots each picture

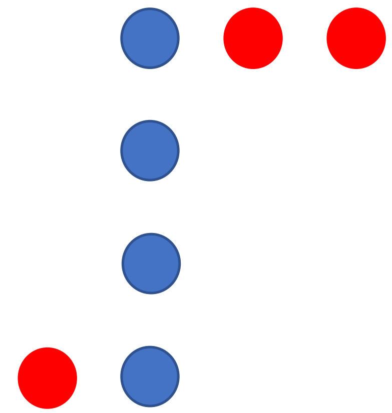
Picture 1:



4 dots

4 dots

Picture 2:

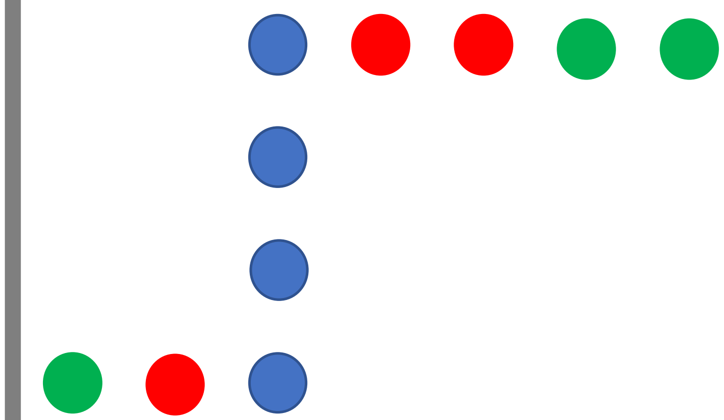


7 dots

4 + 3 dots

4 + 1 × 3 dots

Picture 3:



10 dots

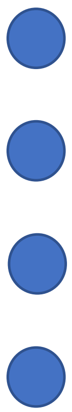
4 + 3 + 3 dots

4 + 2 × 3 dots

Task 34: Dot pattern sequence

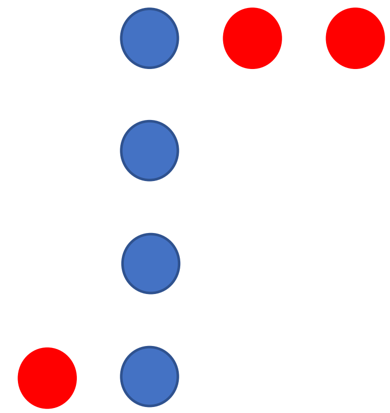
Method 1: 4 dots plus 3 more dots each picture

Picture 1:



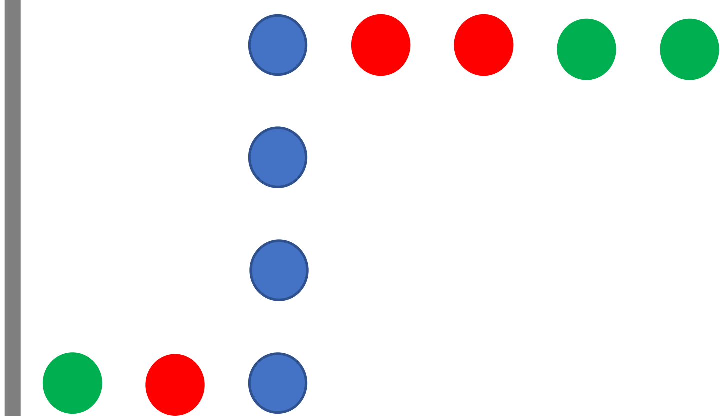
4 dots

Picture 2:



7 dots

Picture 3:



10 dots

4 dots

4 + 3 dots
4 + 1 × 3 dots

4 + 3 + 3 dots
4 + 2 × 3 dots

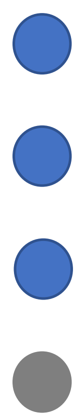
Picture 8: $4 + 7 \times 3$
$= 25$ dots

Picture 16: $4 + 15 \times 3$
$= 49$ dots

Task 34: Dot pattern sequence

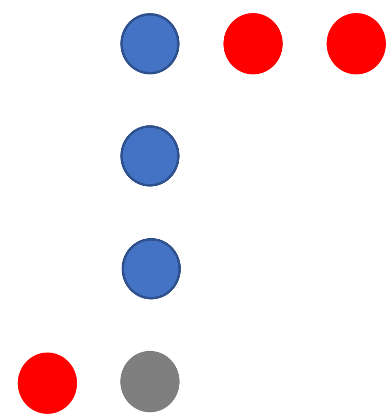
Method 2:

Picture 1:



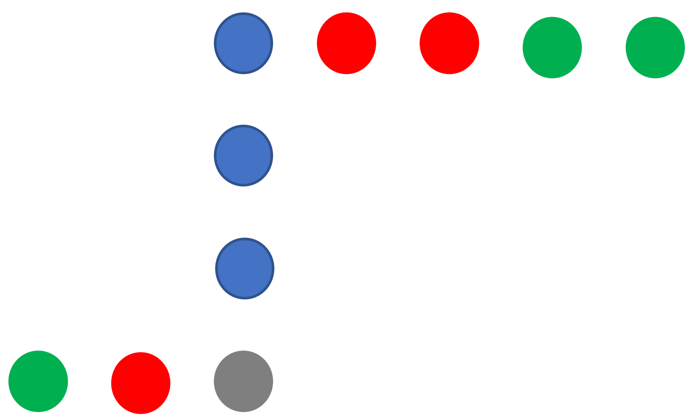
4 dots

Picture 2:



7 dots

Picture 3:

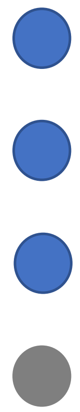


10 dots

Task 34: Dot pattern sequence

Method 2: 3 more dots each picture plus 1

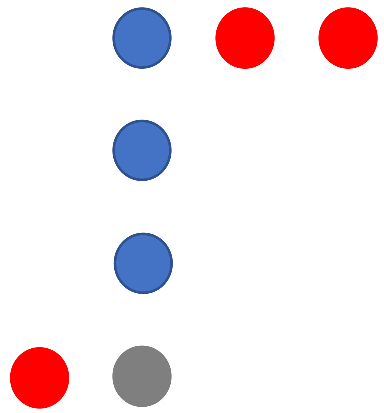
Picture 1:



4 dots

1 + 3 dots

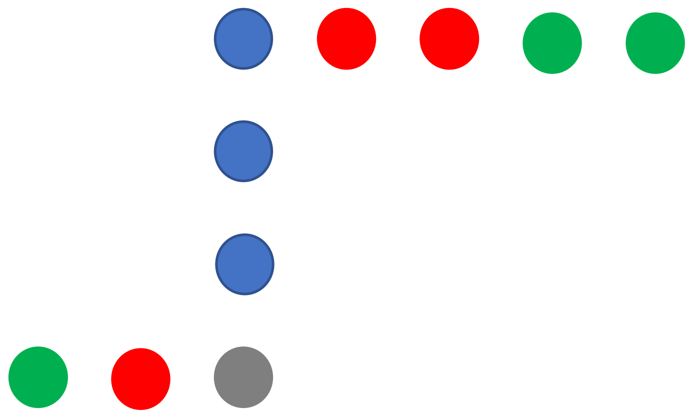
Picture 2:



7 dots

1 + 2 × 3 dots

Picture 3:

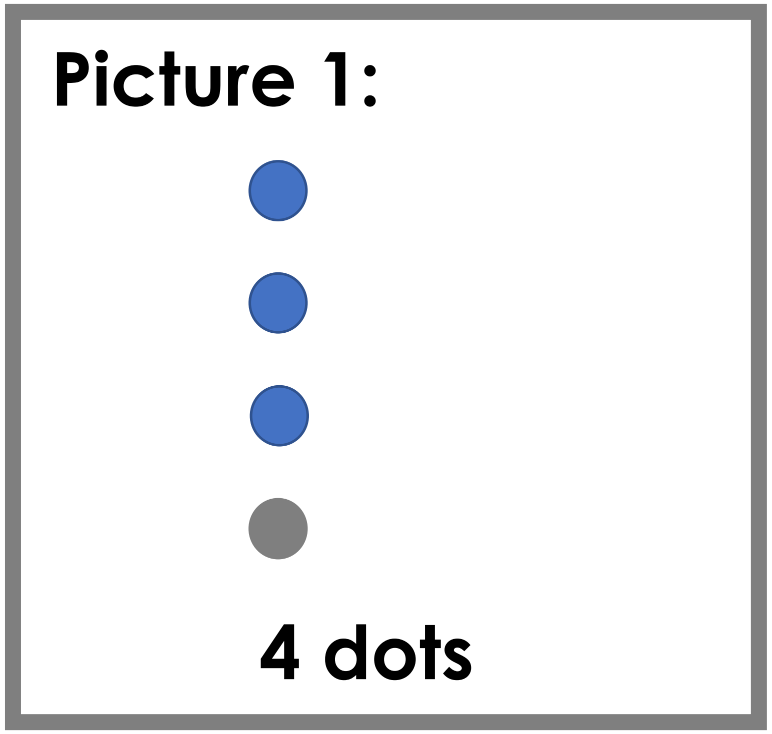


10 dots

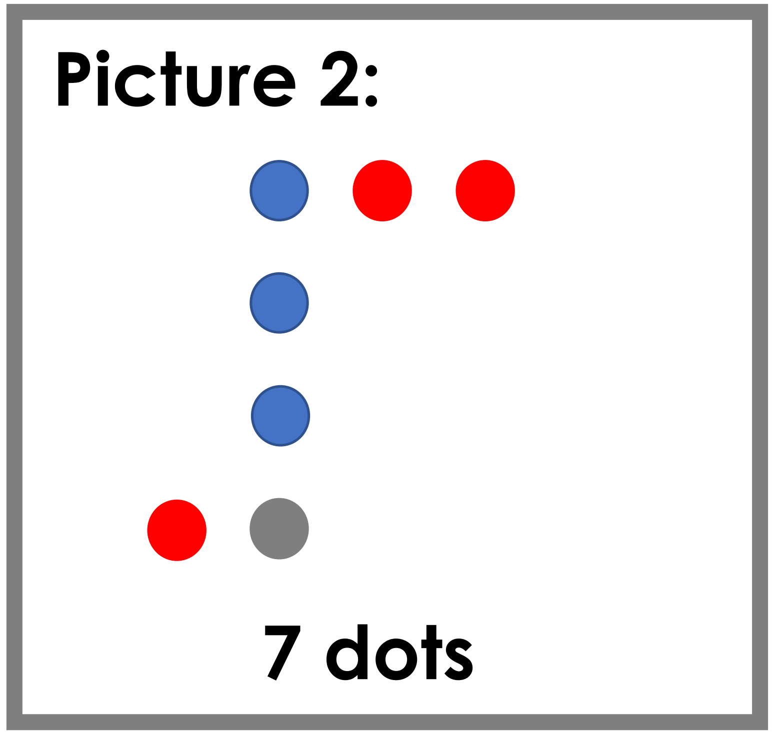
1 + 3 × 3 dots

Task 34: Dot pattern sequence

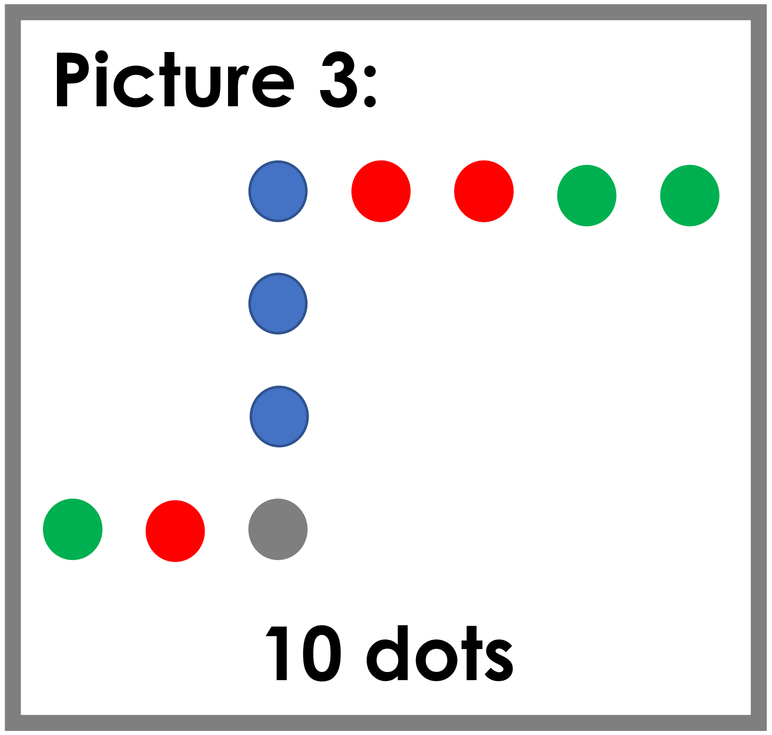
Method 2: 3 more dots each picture plus 1



1 + 3 dots



1 + 2 × 3 dots



1 + 3 × 3 dots

Picture 8: $8 \times 3 + 1$
$= 25$ dots

Picture 16: $16 \times 3 + 1$
$= 49$ dots

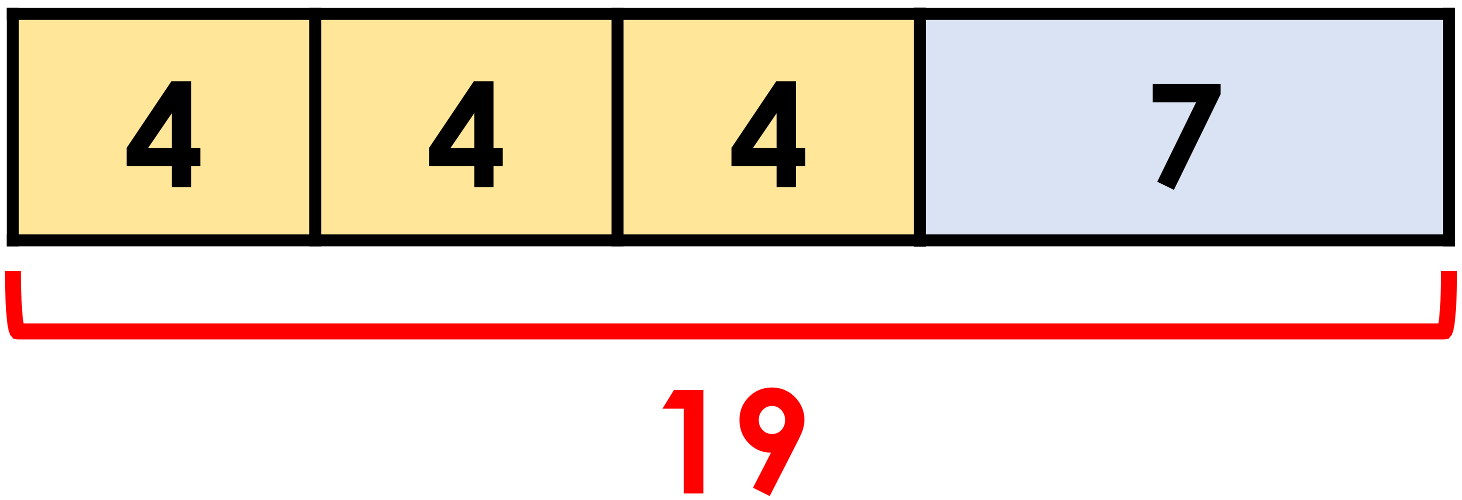
Task 35: My secret number

Could the secret number be 4?

4	4	4	7

Task 35: My secret number

Could the secret number be 4?



Less than 20.

The secret number is **more than 4.**

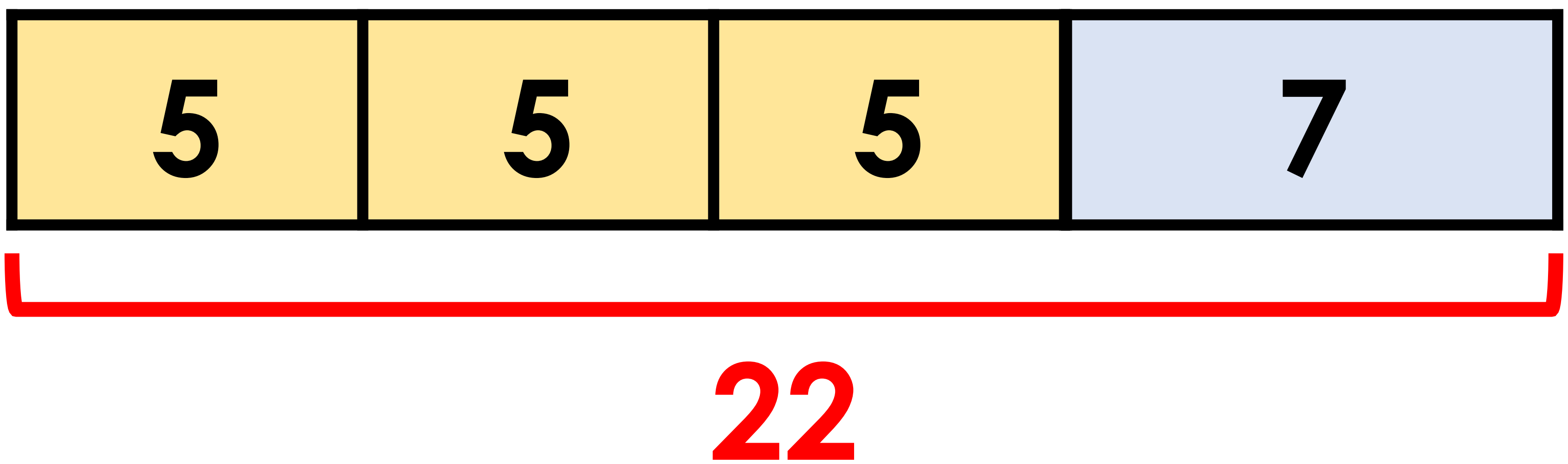
Task 35: My secret number

Could the secret number be 5?

5	5	5	7

Task 35: My secret number

Could the secret number be 5?



The secret number could be 5.

Next try 6.

Task 35: My secret number

Could the secret number be 6?

6	6	6	7

Task 35: My secret number

Could the secret number be 6?

$$\underbrace{\boxed{6}\boxed{6}\boxed{6}\boxed{7}}_{25}$$

The secret number could be 6.

Next try 7.

Task 35: My secret number

Could the secret number be 7?

7	7	7	7

$\underbrace{\qquad\qquad\qquad\qquad}_{28}$

The secret number could be 7.

Next try 8.

Task 35: My secret number

Could the secret number be 8?

8	8	8	7

Task 35: My secret number

Could the secret number be 8?

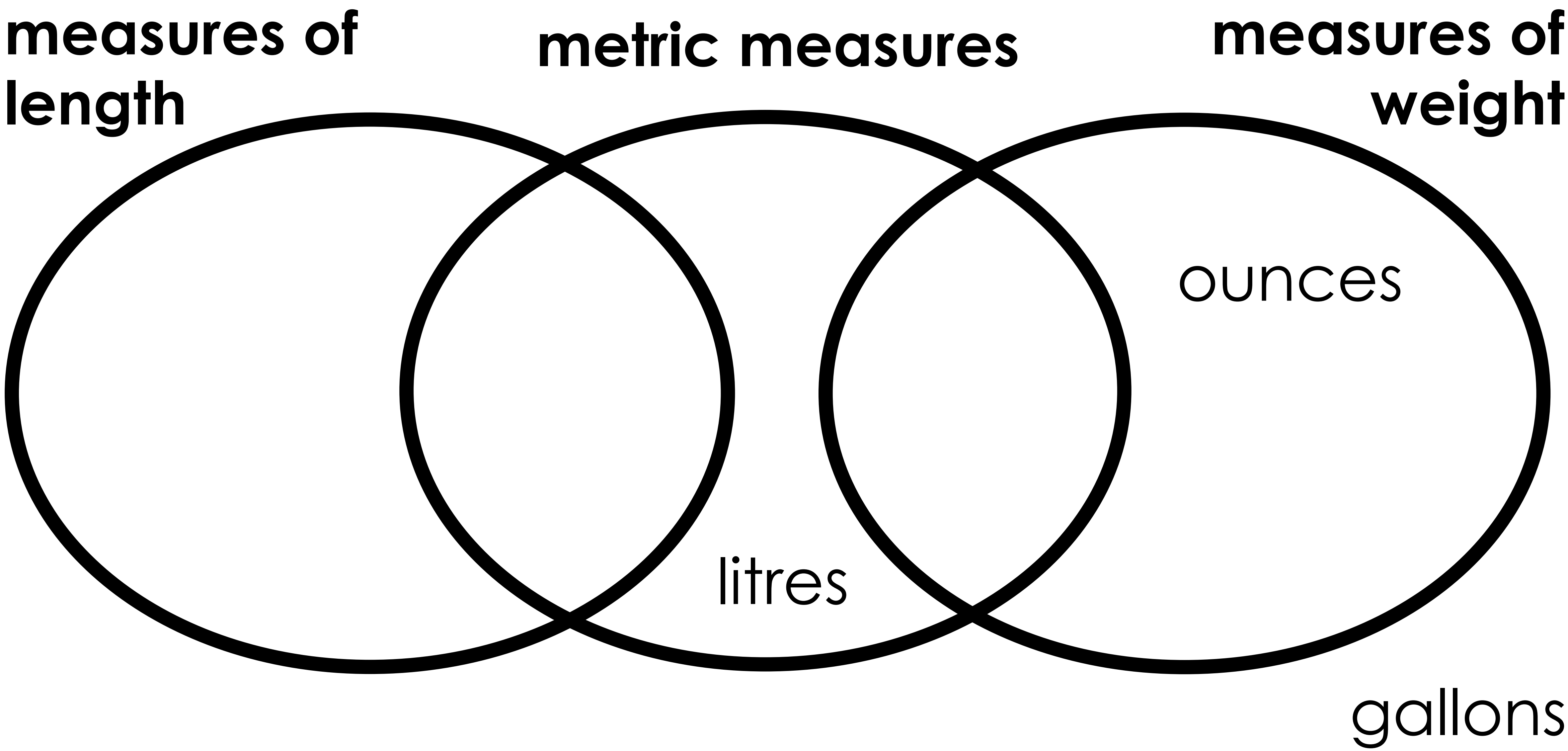
8	8	8	7

31

More than 29.

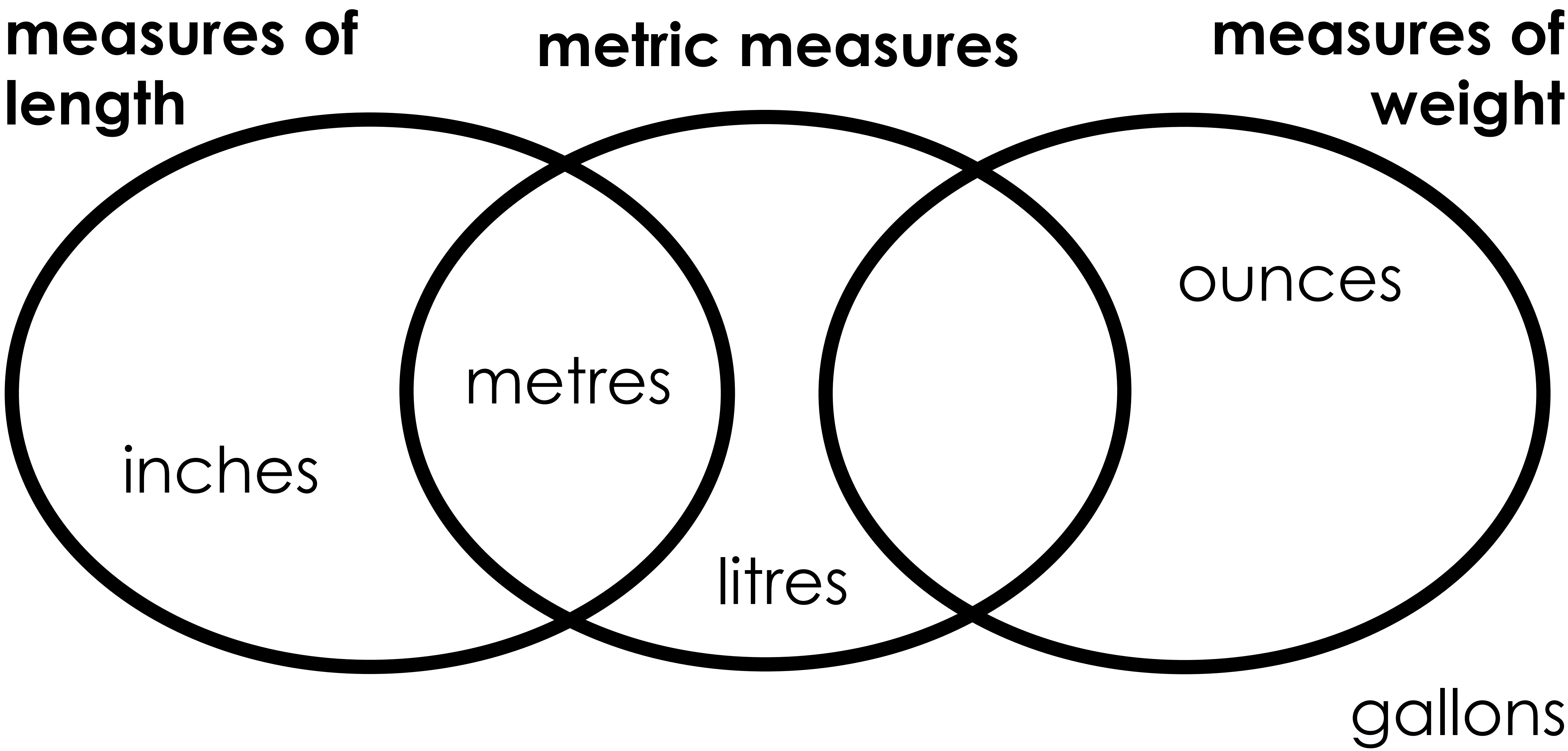
The secret number can be **5, 6 or 7.**

Task 36: Sorting measures



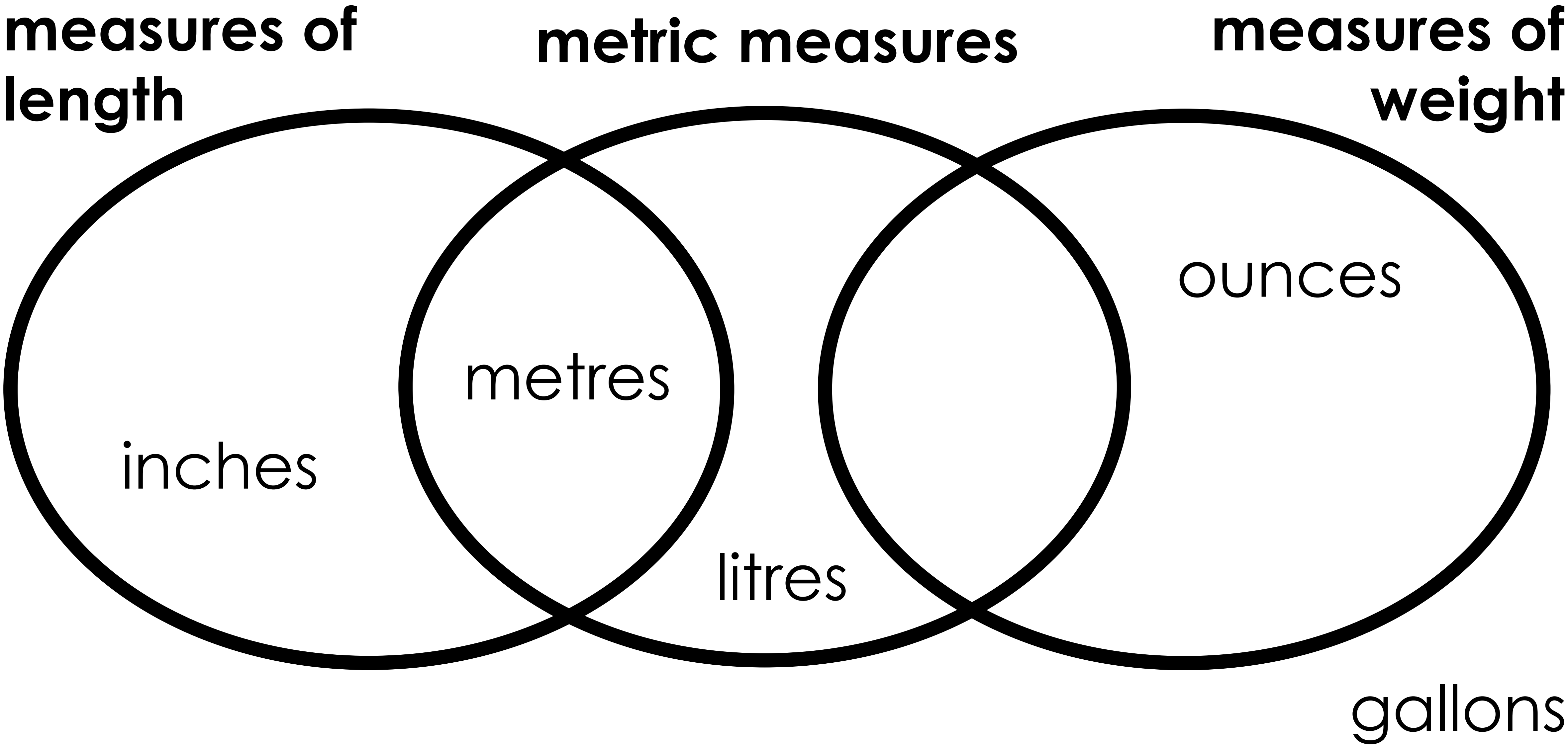
Position these measures: **inches, metres**

Task 36: Sorting measures



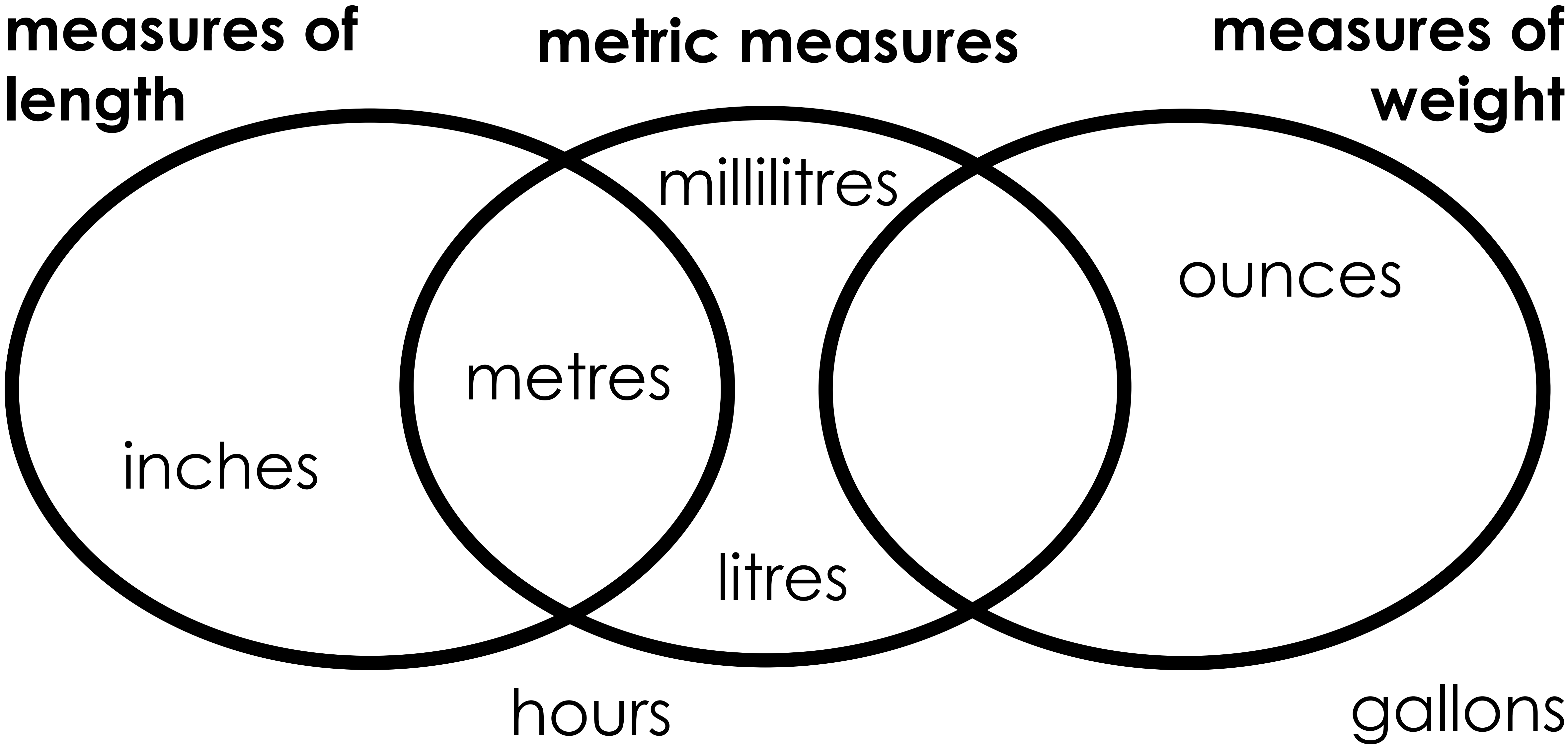
Position these measures: **inches, metres**

Task 36: Sorting measures



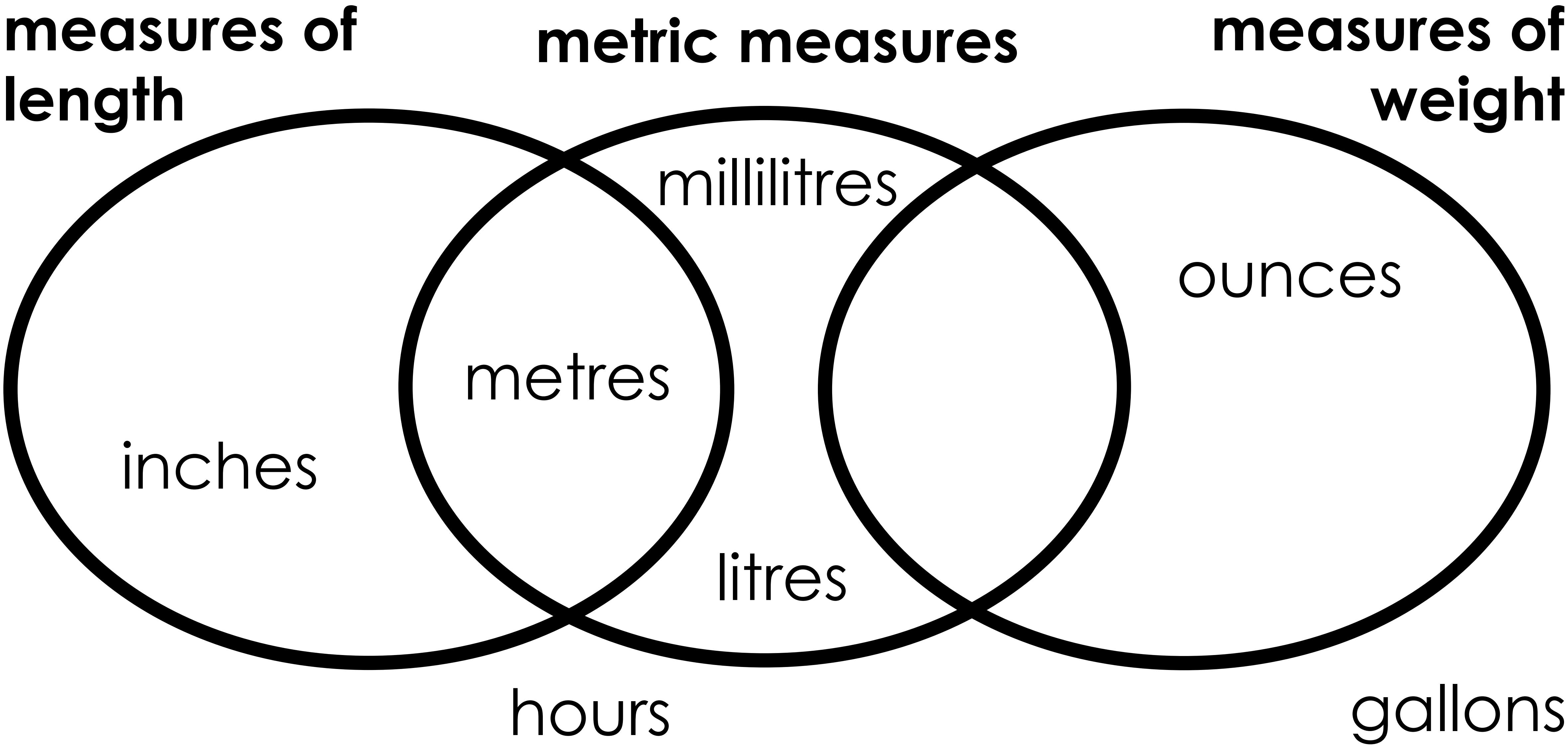
Position these measures: **hours**, **millilitres (ml)**

Task 36: Sorting measures



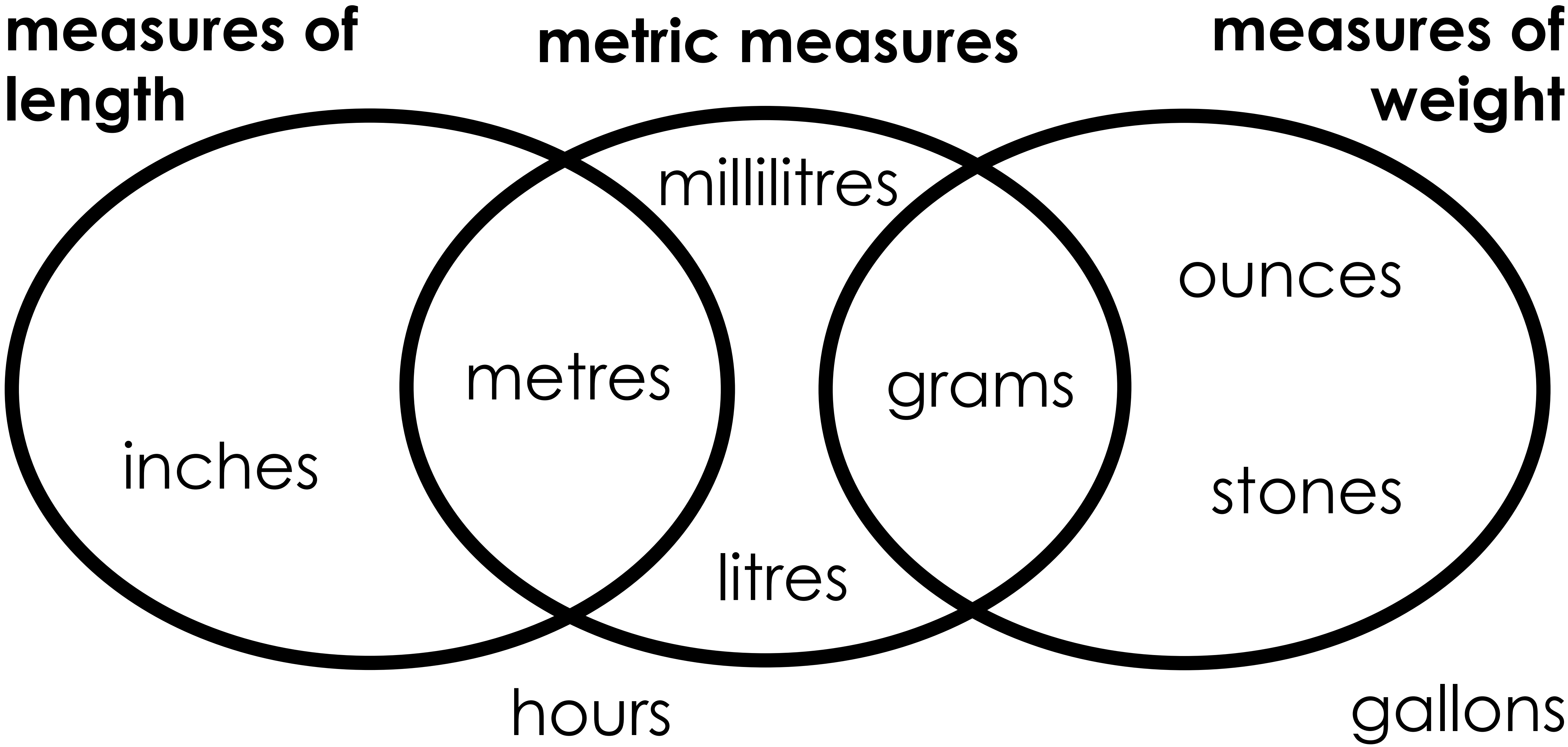
Position these measures: **hours**, **millilitres (ml)**

Task 36: Sorting measures



Position these measures: **grams, stones**

Task 36: Sorting measures



Position these measures: **grams, stones**

Task 37: Time spent driving

Example Method 1:

$\frac{3}{4}$ hour drive each way = $1\frac{1}{2}$ hours driving per day

Task 37: Time spent driving

Example Method 1:

$\frac{3}{4}$ hour drive each way = $1\frac{1}{2}$ hours driving per day

5 days × $1\frac{1}{2}$ hours = $7\frac{1}{2}$ hours per week

7 hours 30 minutes driving to work each week

Task 37: Time spent driving

Example Method 2:

$\frac{3}{4}$ hour drive each way, 10 journeys

$\frac{3}{4} \times 10$

Example Method 2:

$\frac{3}{4}$ hour drive each way, 10 journeys

$\frac{3}{4} \times 10 = \frac{30}{4}$

$\frac{30}{4} = 7\frac{2}{4}$ hours per week

7 hours 30 minutes driving to work each week

Task 37: Time spent driving

Example Method 3:

$\frac{3}{4}$ hour drive each way (45 minutes), 10 journeys

45 minutes × 10

Task 37: Time spent driving

Example Method 3:

$\frac{3}{4}$ hour drive each way (45 minutes), 10 journeys

45 minutes × 10 = 450 minutes

450 minutes = 7 hours 30 minutes

7 hours 30 minutes driving to work each week

Task 38: Lengths of time

minutes → hours → days → weeks

5400 minutes

$\frac{1}{2}$ week

72 hours

4 days

shortest **longest**

Task 38: Lengths of time

minutes → hours → days → weeks

5400 minutes $\quad \frac{1}{2}$ week $\quad$ 72 hours $\quad$ 4 days

5400 mins ÷ 60

= 90 hours

shortest **longest**

Task 38: Lengths of time

minutes → hours → days → weeks

5400 minutes

$\frac{1}{2}$ week

72 hours

4 days

5400 mins ÷ 60

= 90 hours

$3\frac{1}{2}$ days × 24

= 84 hours

shortest **longest**

Task 38: Lengths of time

minutes → hours → days → weeks

5400 minutes

$\frac{1}{2}$ week

72 hours

4 days

5400 mins ÷ 60
= 90 hours

$3\frac{1}{2}$ days × 24
= 84 hours

4 days × 24
= 96 hours

shortest **longest**

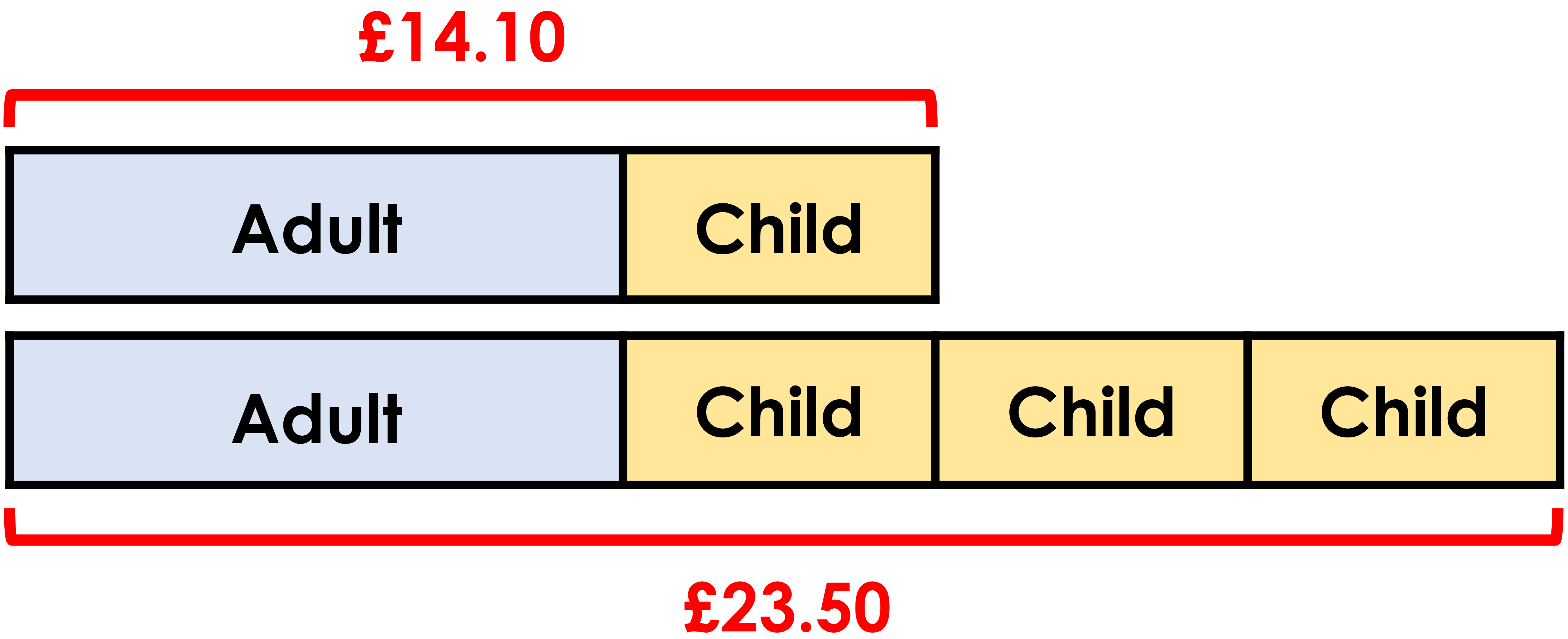
Task 38: Lengths of time

minutes → hours → days → weeks

5400 minutes	$\frac{1}{2}$ week	72 hours	4 days
↓	↓		↓
5400 mins ÷ 60 **= 90 hours**	$3\frac{1}{2}$ days × 24 **= 84 hours**		4 days × 24 **= 96 hours**

72 hours	$\frac{1}{2}$ week	5400 minutes	4 days
shortest			**longest**

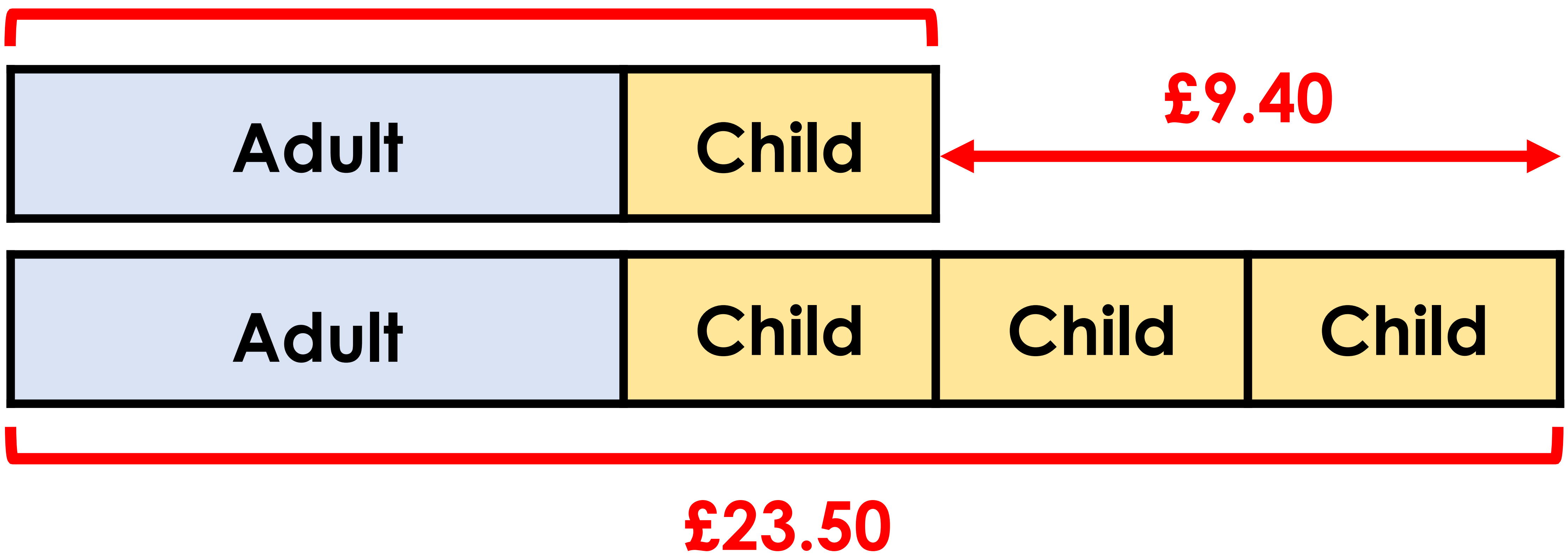
Task 39: Ticket prices



Task 39: Ticket prices

£23.50 - £14.10
= £9.40

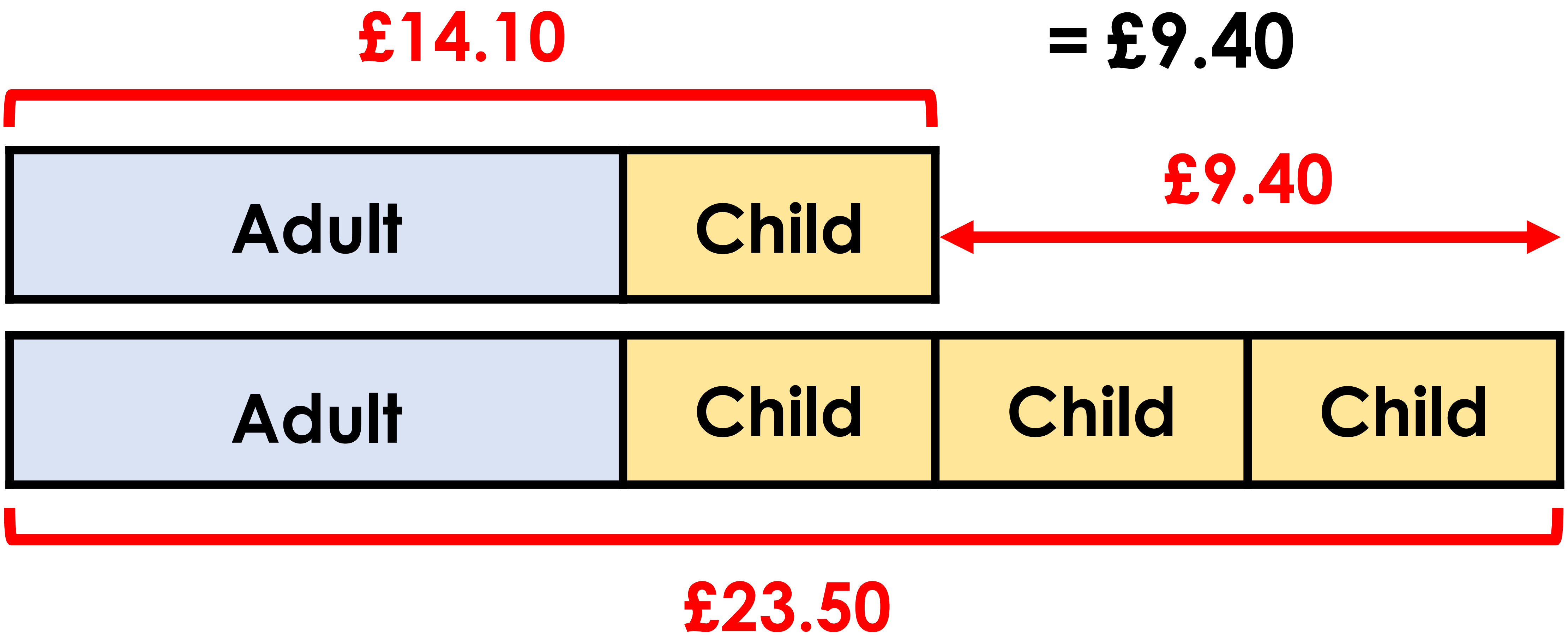
£14.10



Two child tickets = £9.40

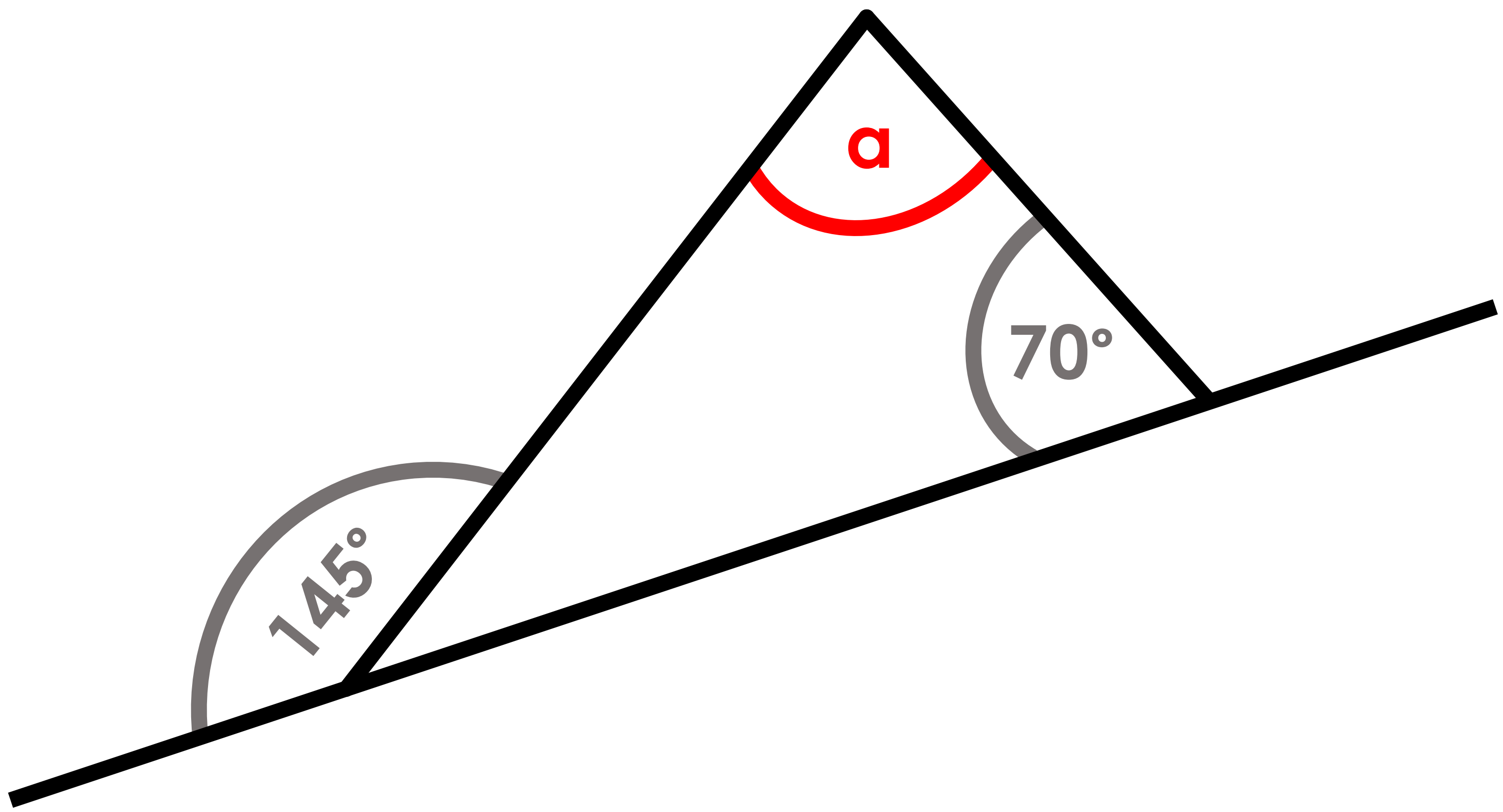
Task 39: Ticket prices

£23.50 - £14.10
= £9.40



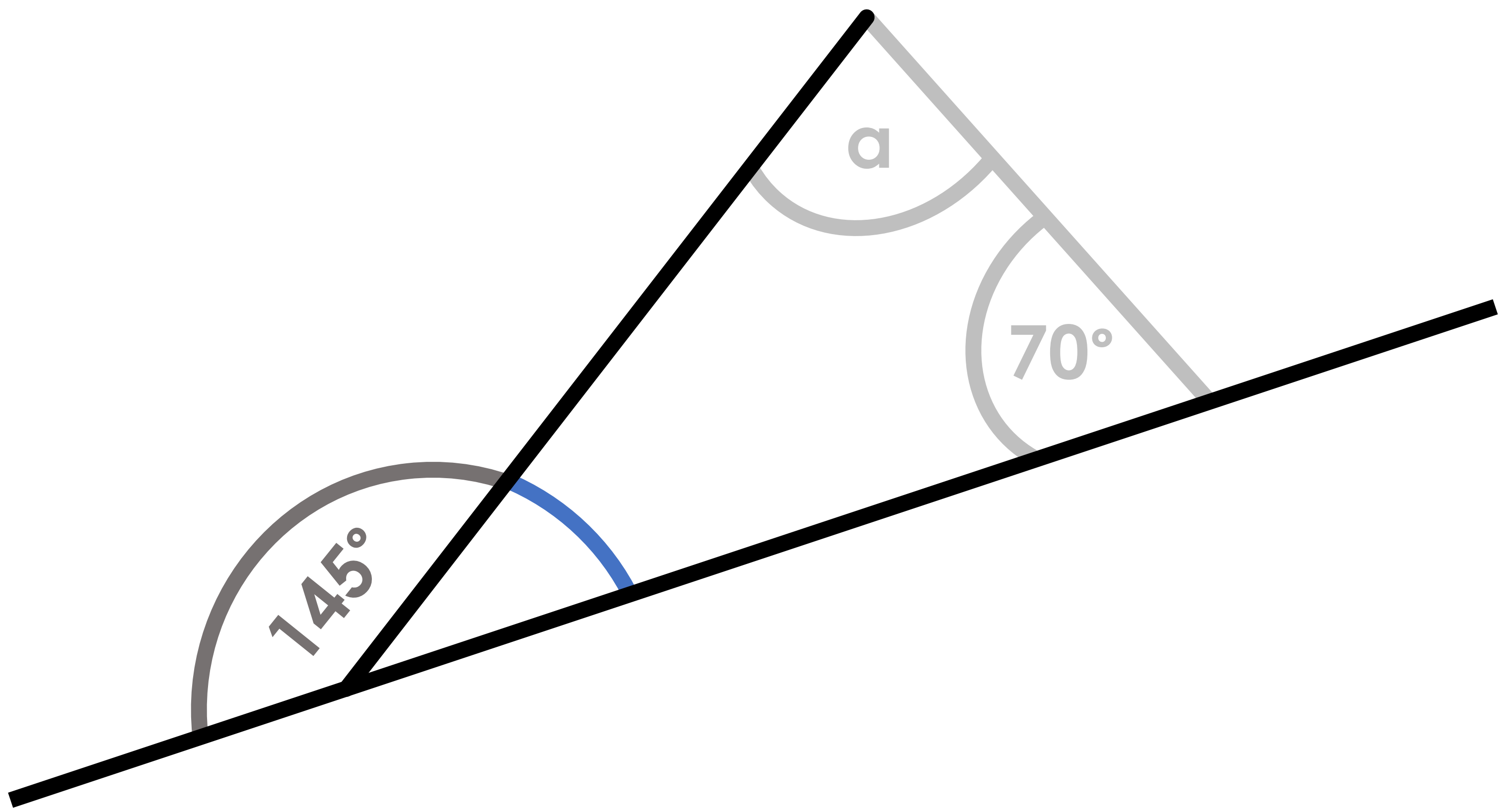
One child ticket = £9.40 ÷ 2 = <u>£4.70</u>

Task 40: Missing angles



What is the size of angle a?

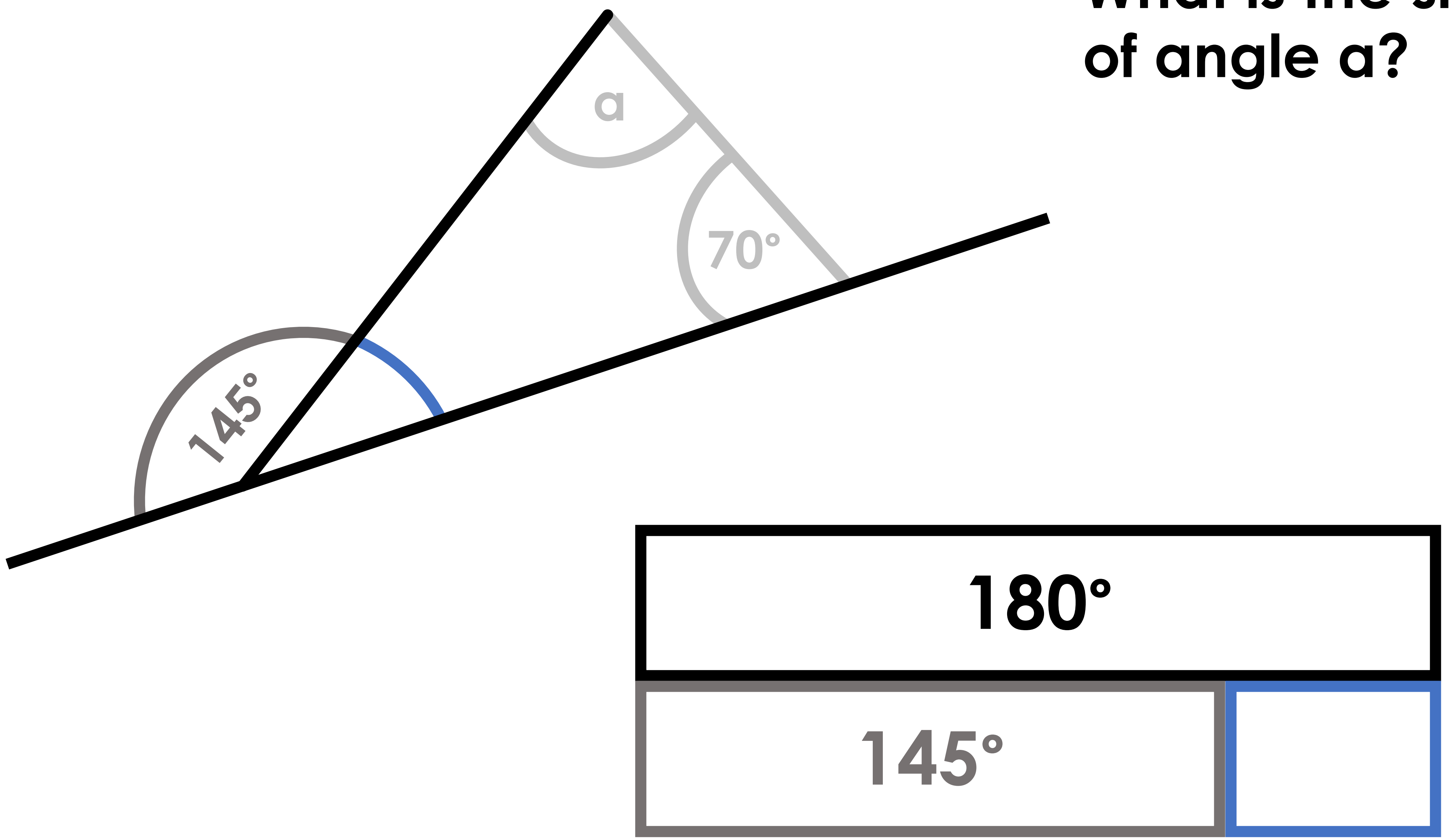
Task 40: Missing angles



What is the size of angle a?

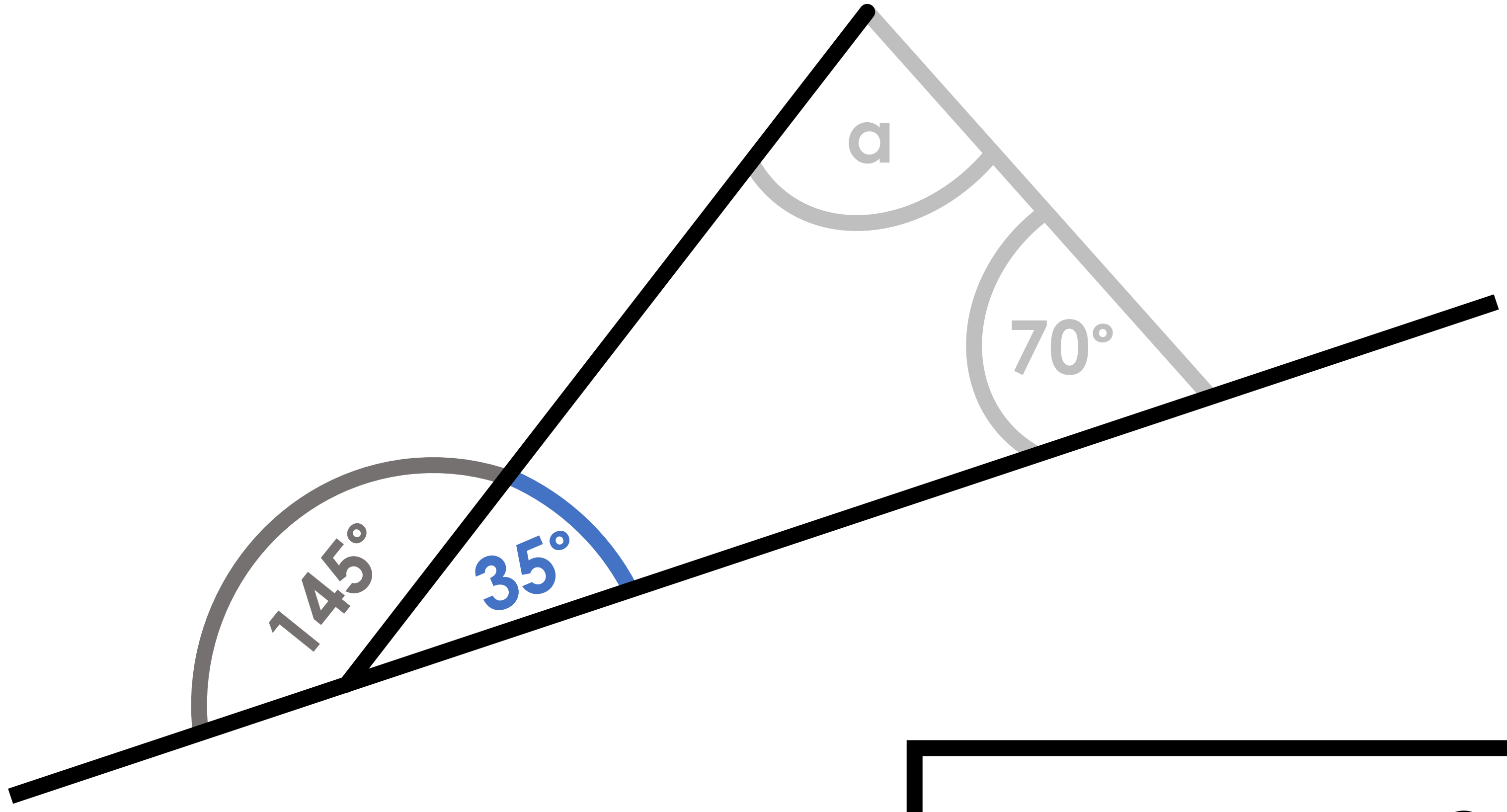
Task 40: Missing angles

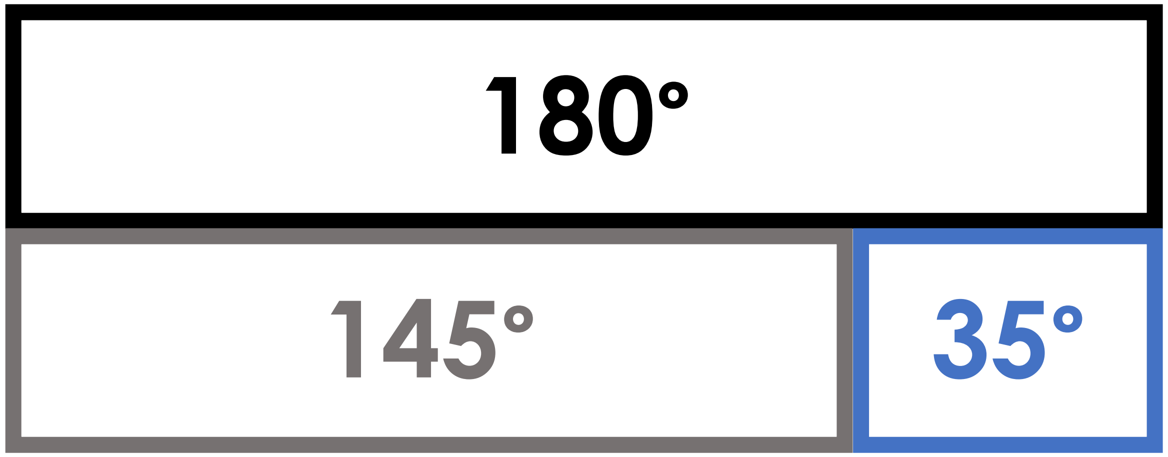
What is the size of angle a?



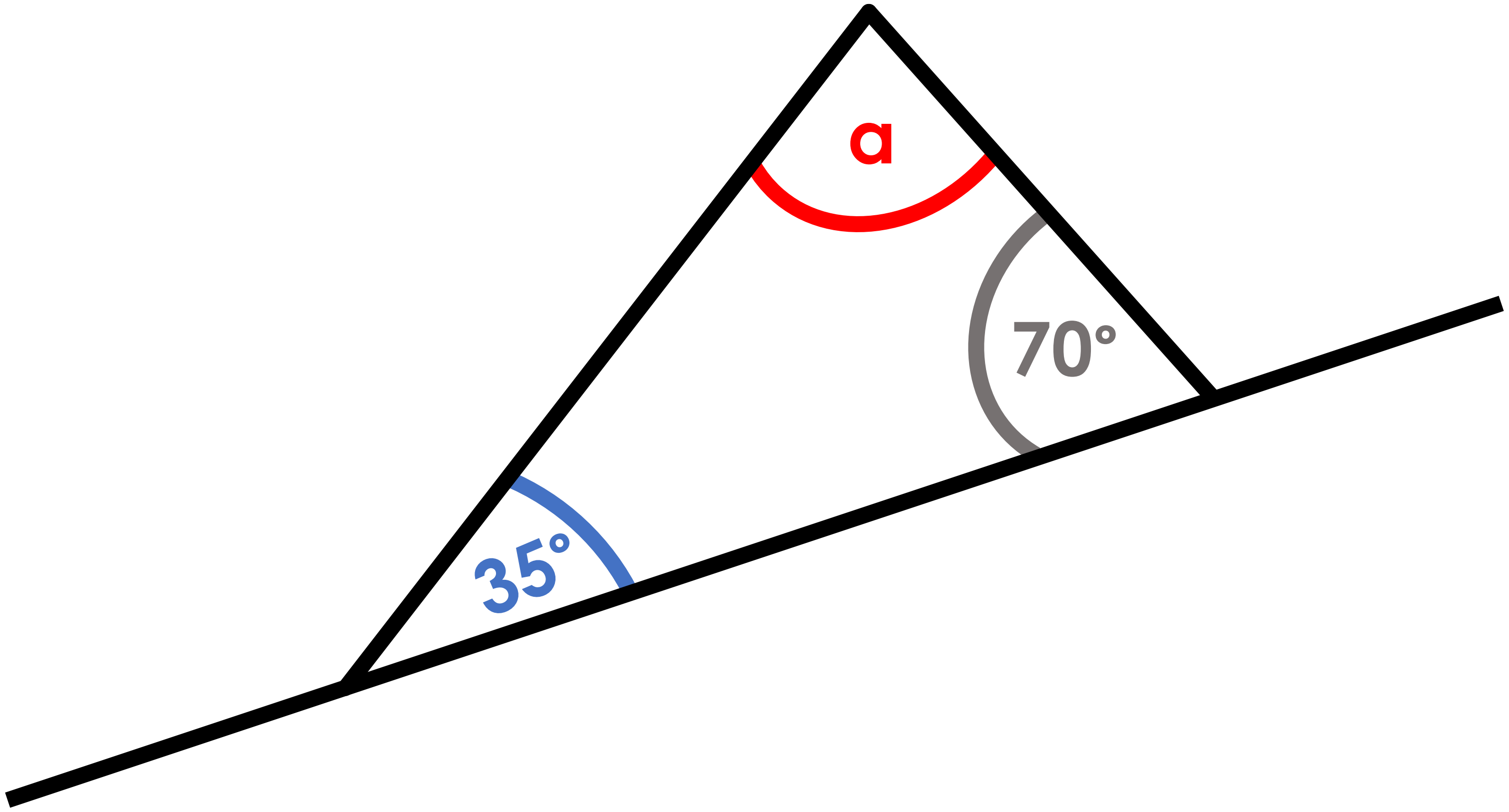
Task 40: Missing angles

What is the size of angle a?





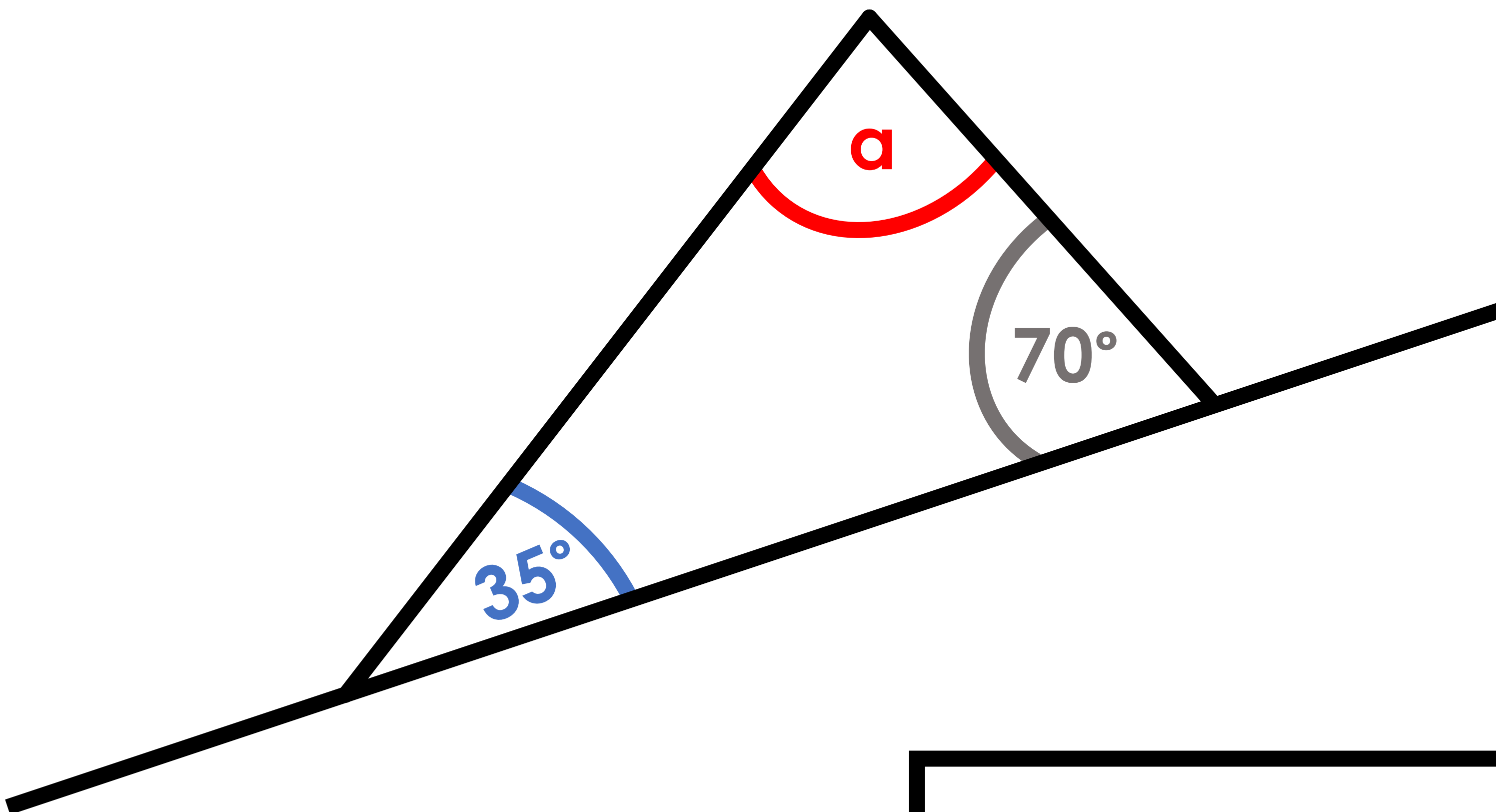
Task 40: Missing angles

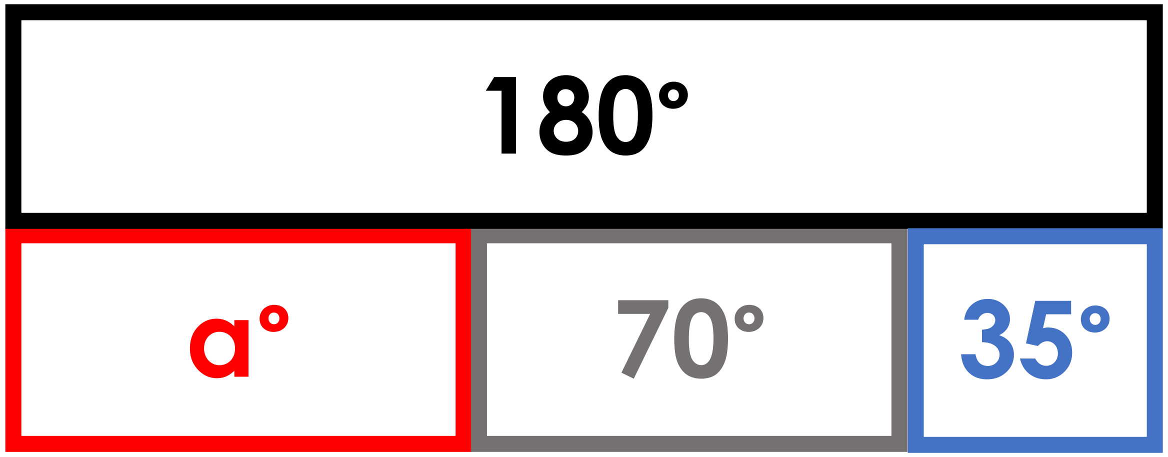


What is the size of angle a?

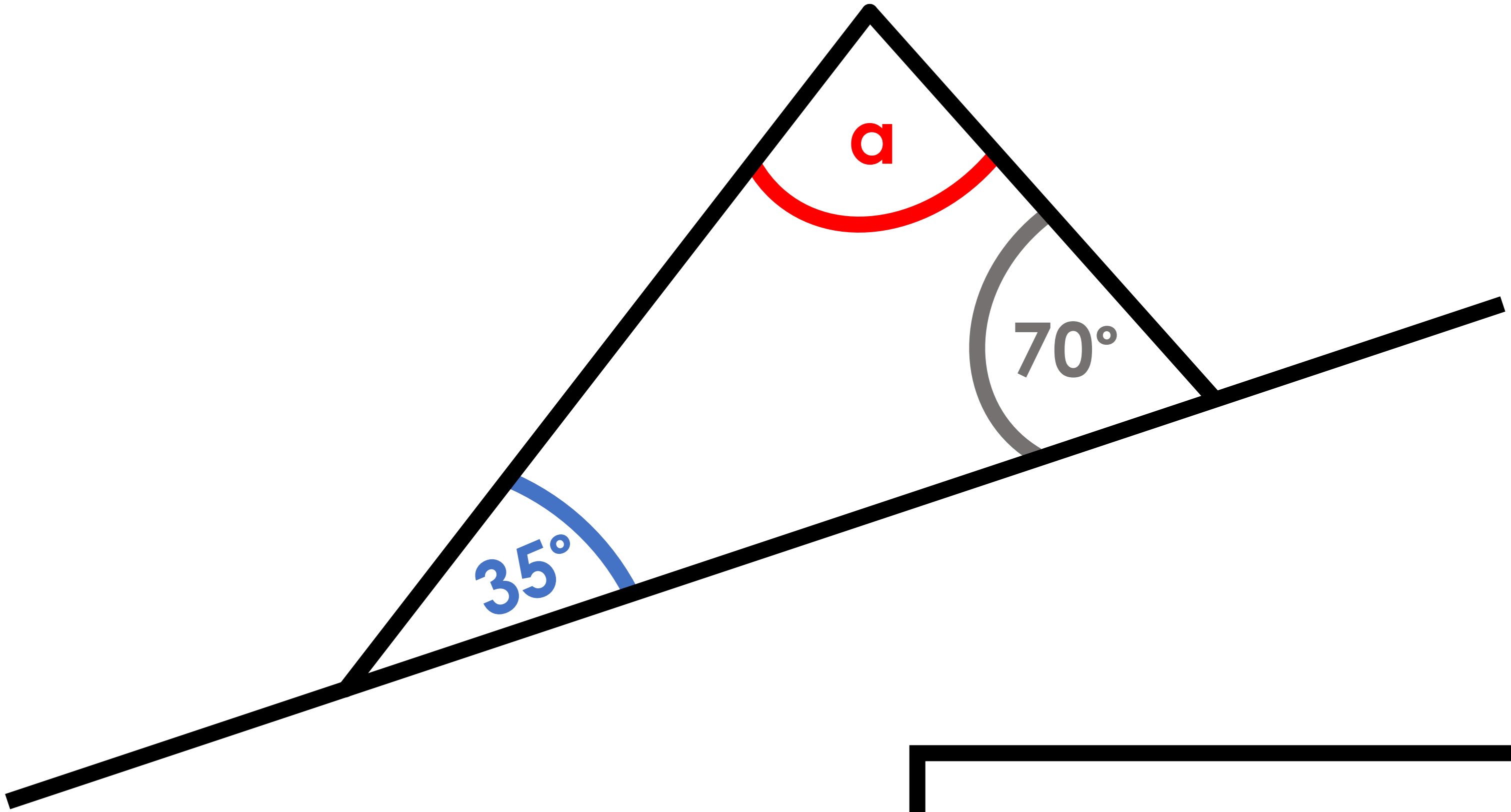
Task 40: Missing angles

What is the size of angle a?





Task 40: Missing angles

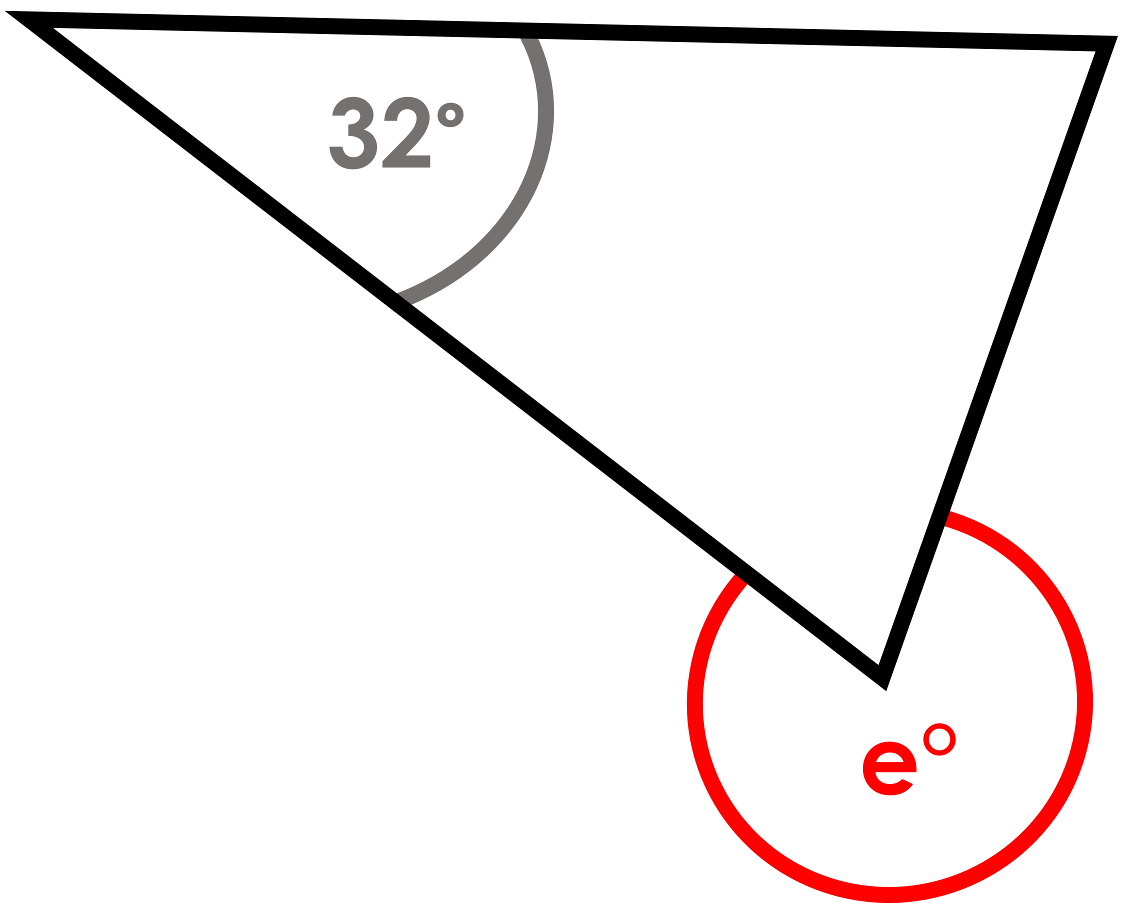


What is the size of angle a?

a = 75°

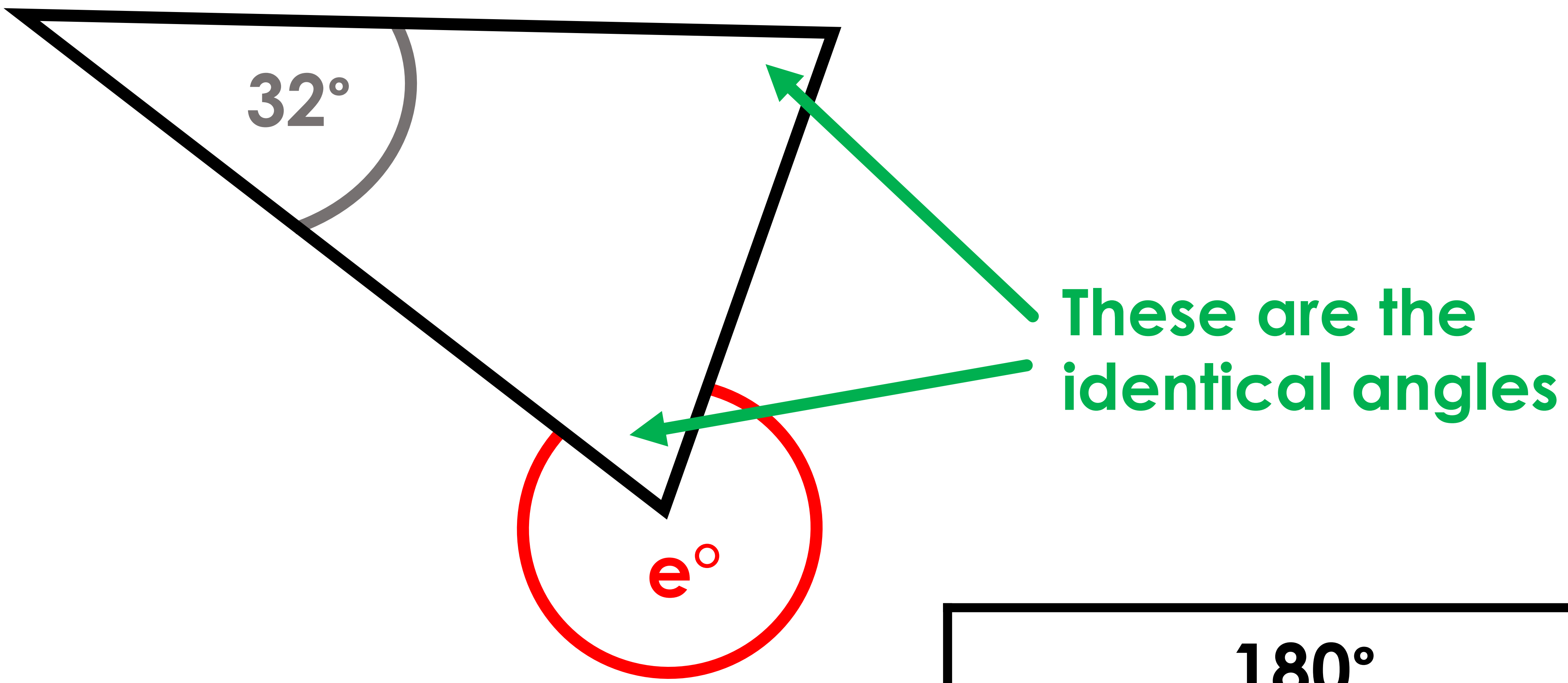
180°		
75°	70°	35°

Task 41: Isosceles triangle angles



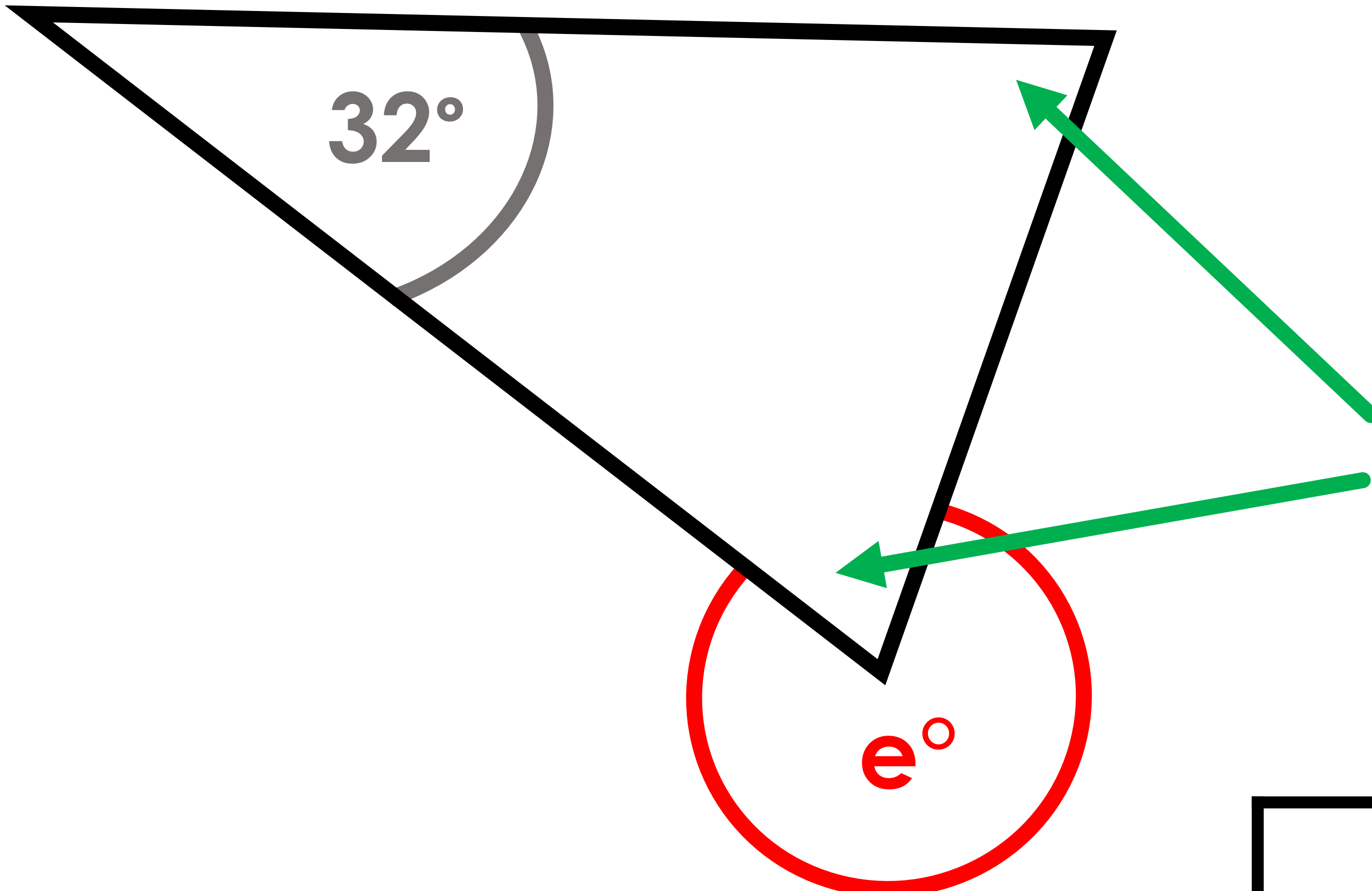
Isosceles triangles have two identical angles

Task 41: Isosceles triangle angles



180°		
32°		

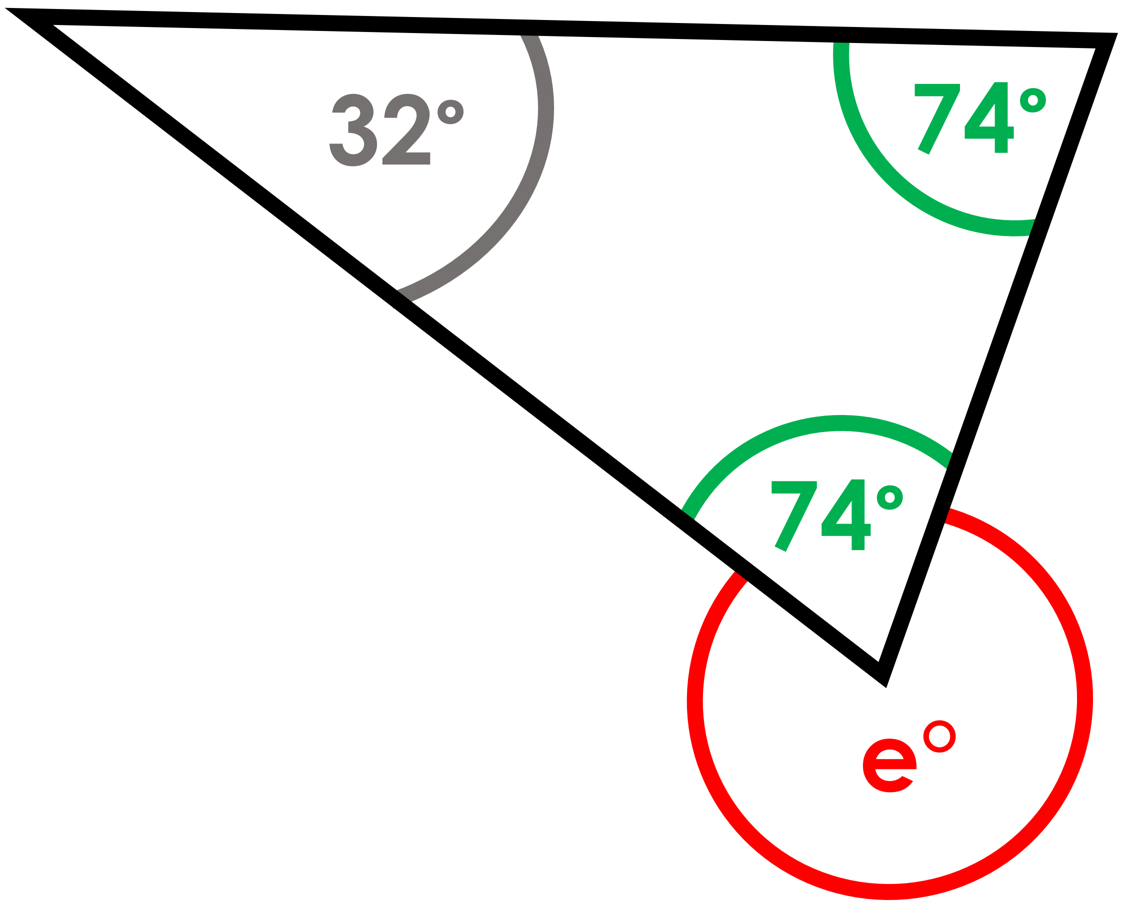
Task 41: Isosceles triangle angles

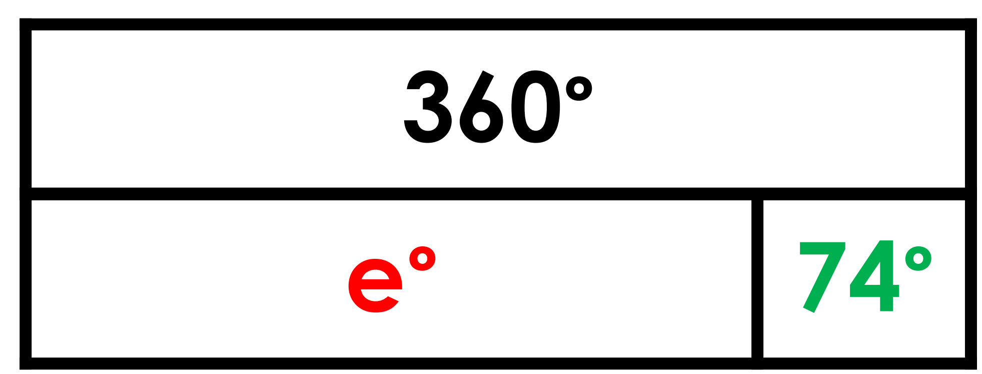


$(180° - 32°) \div 2$
$= 74°$

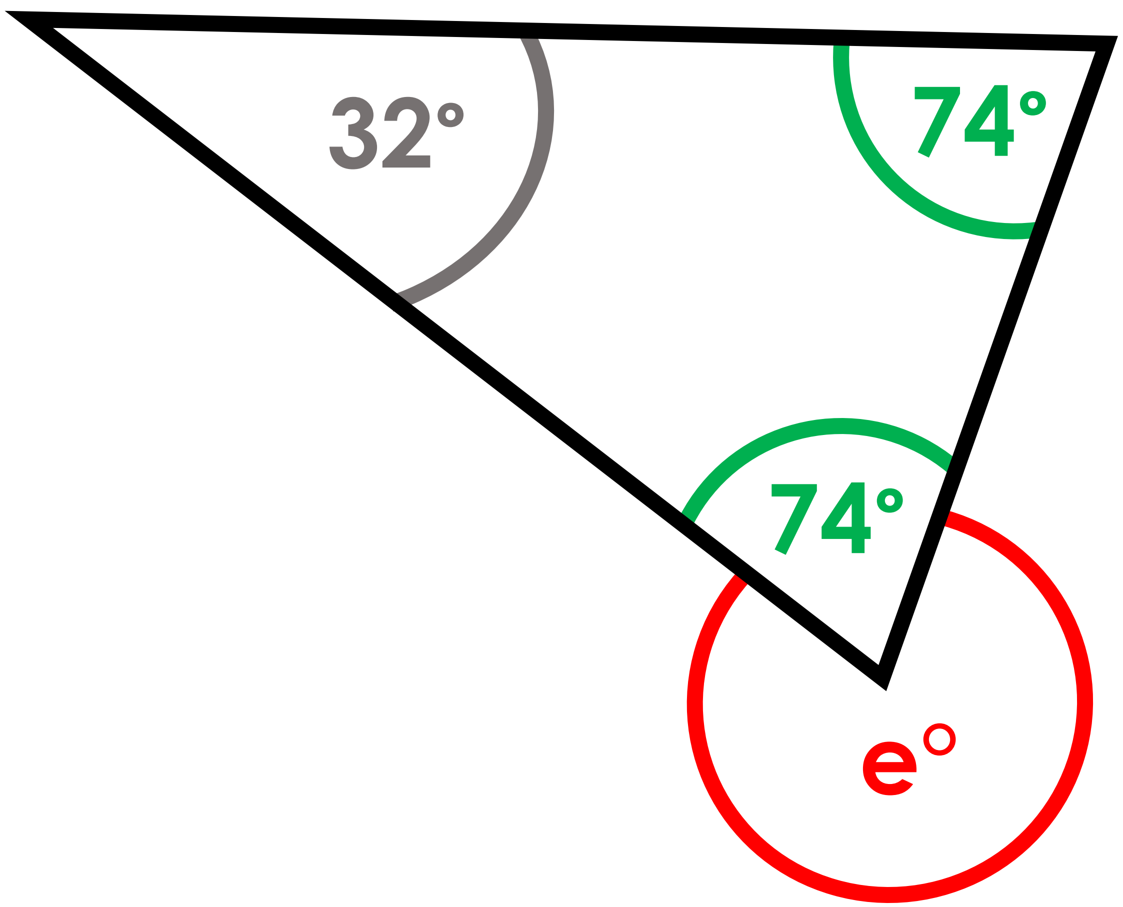
180°		
32°	74°	74°

Task 41: Isosceles triangle angles





Task 41: Isosceles triangle angles

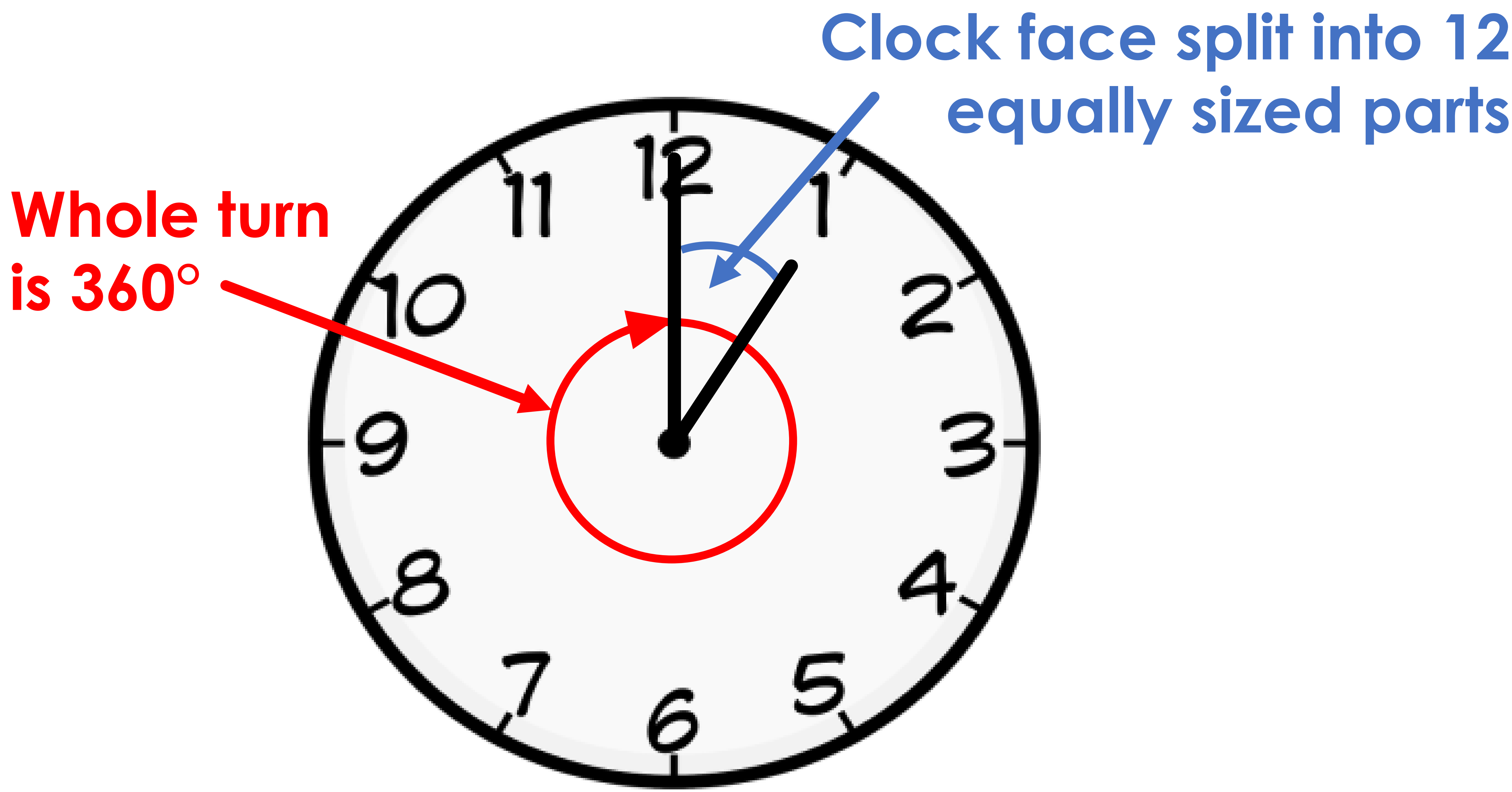


$360° - 74° = 286°$

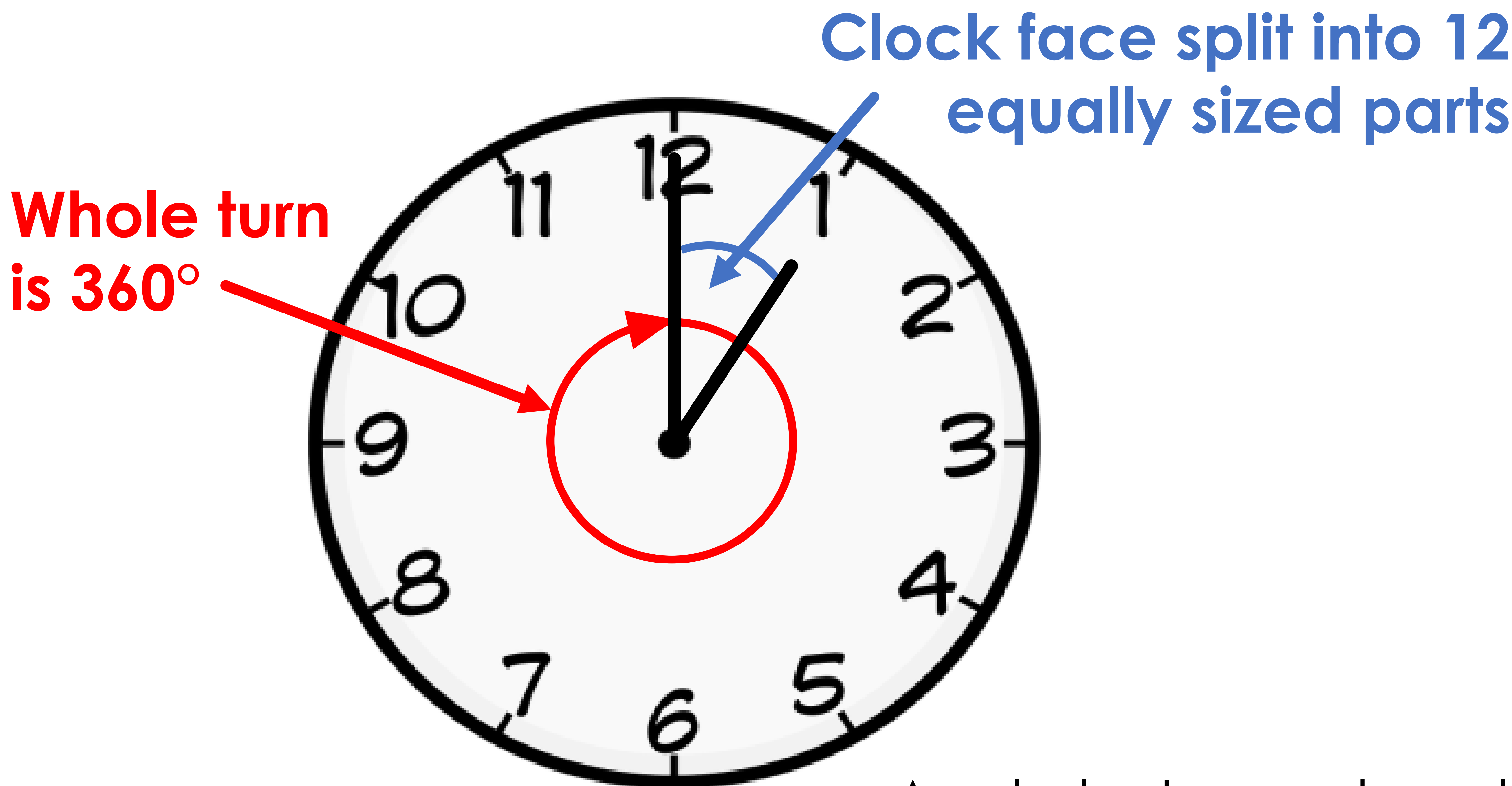
360°	
286°	74°

$e = 286°$

Task 42: Clock hands angles



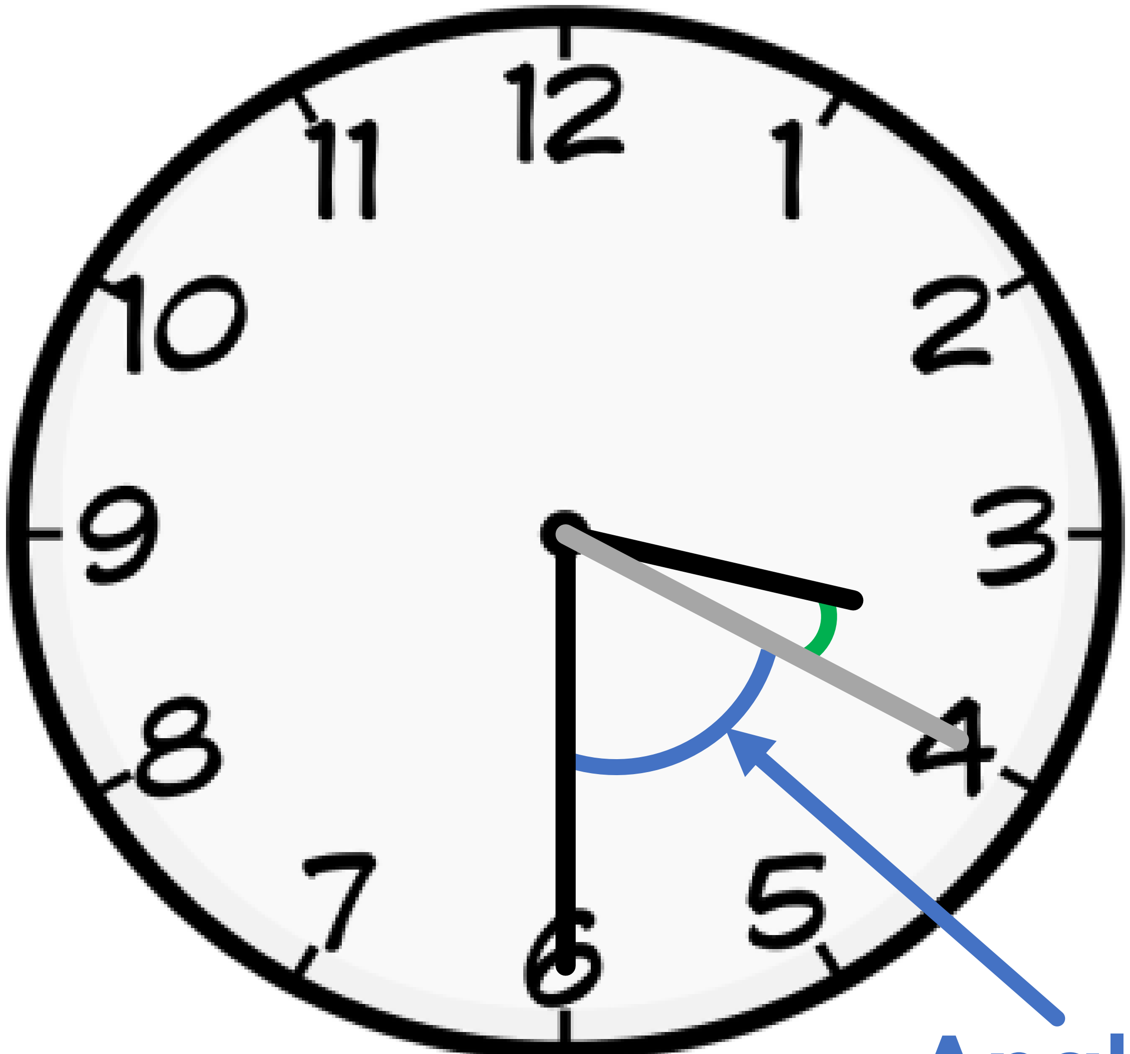
Task 42: Clock hands angles



Angle between hands:

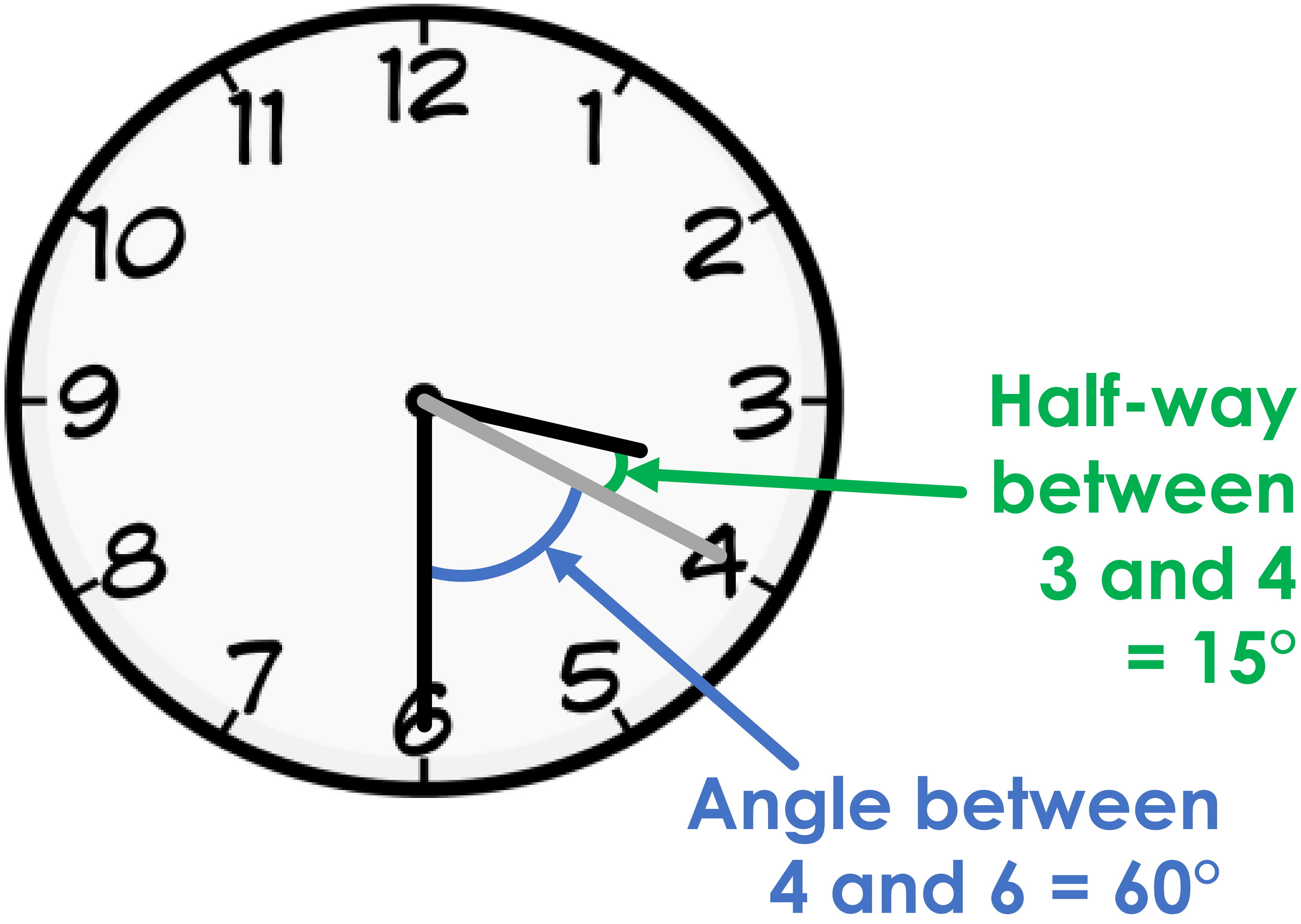
$360° \div 12 = 30°$

Task 42: Clock hands angles

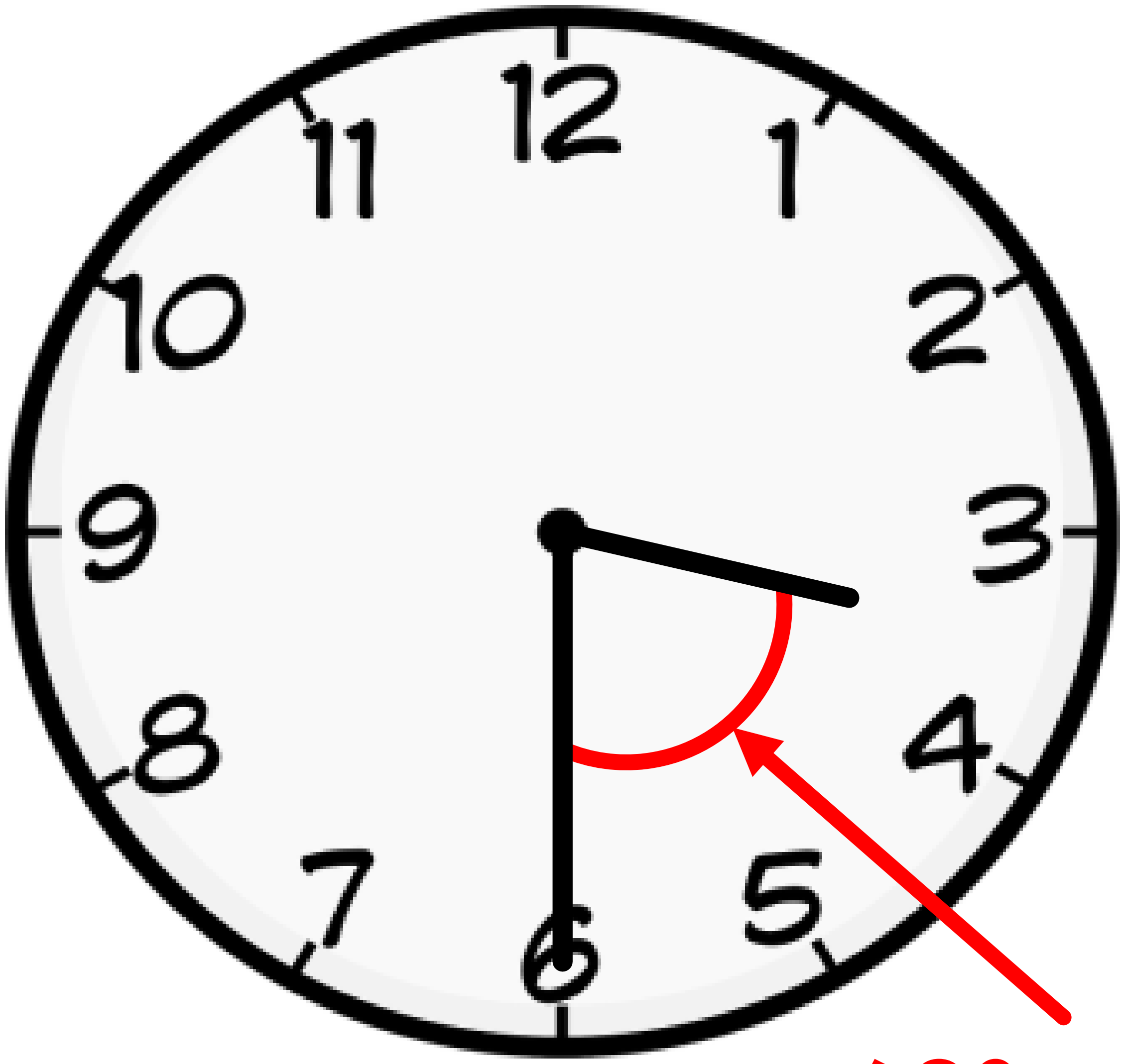


Angle between
4 and 6 = 60°

Task 42: Clock hands angles

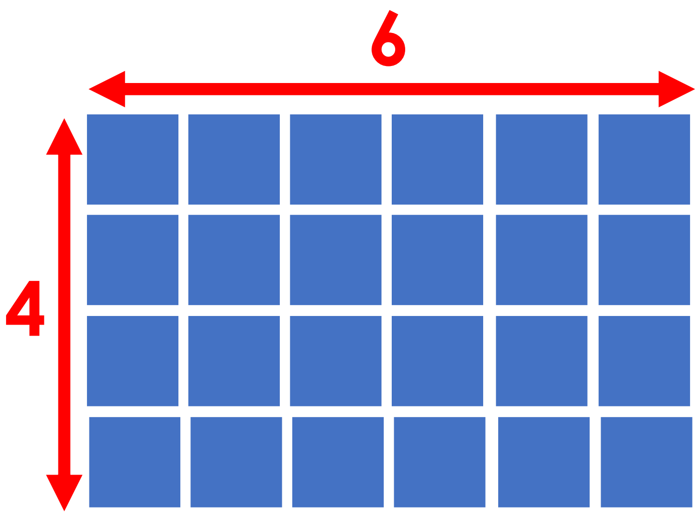


Task 42: Clock hands angles

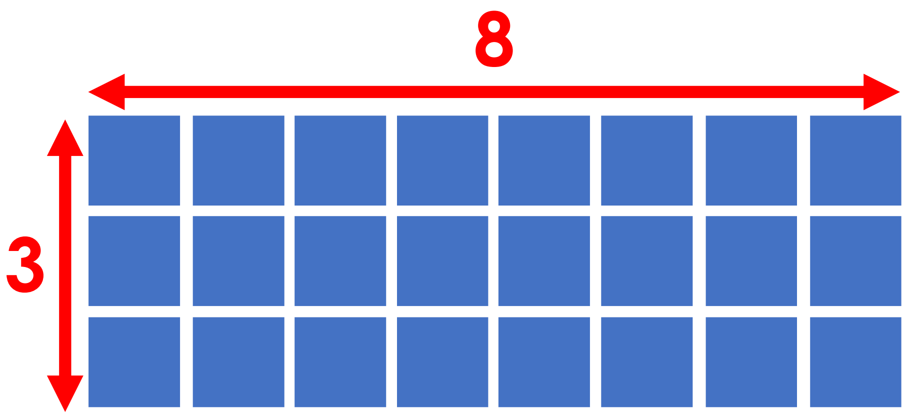


$60° + 15° = 75°$

Task 43: Change the perimeter

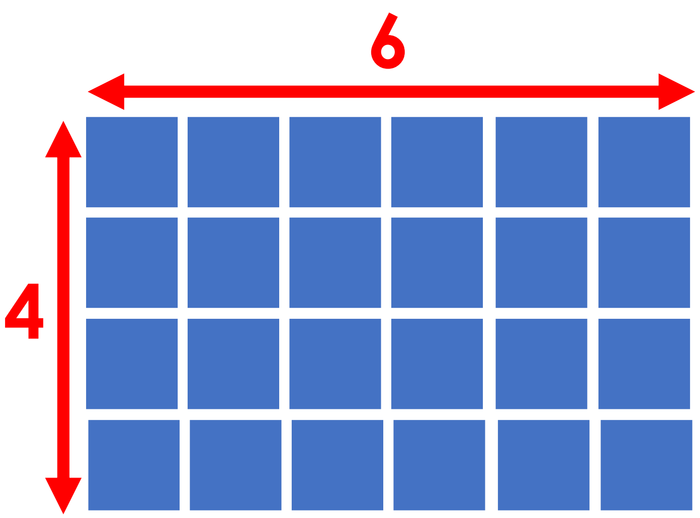


area = 24 squares
perimeter = 20

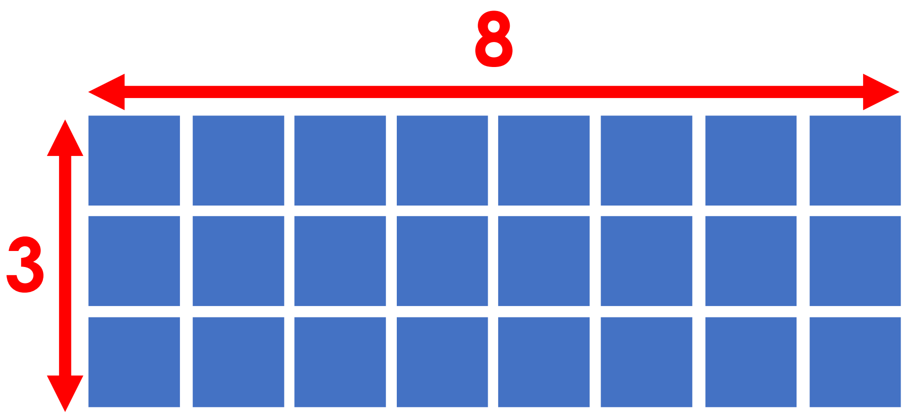


area = 24 squares
perimeter = 22

Task 43: Change the perimeter



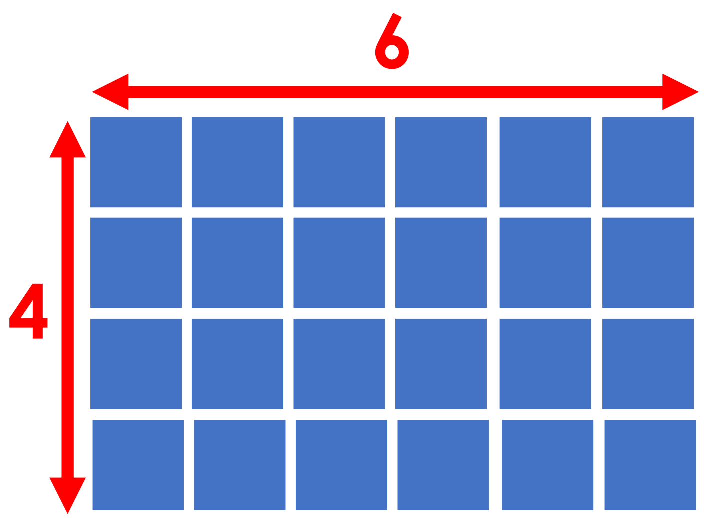
area = 24 squares
perimeter = 20



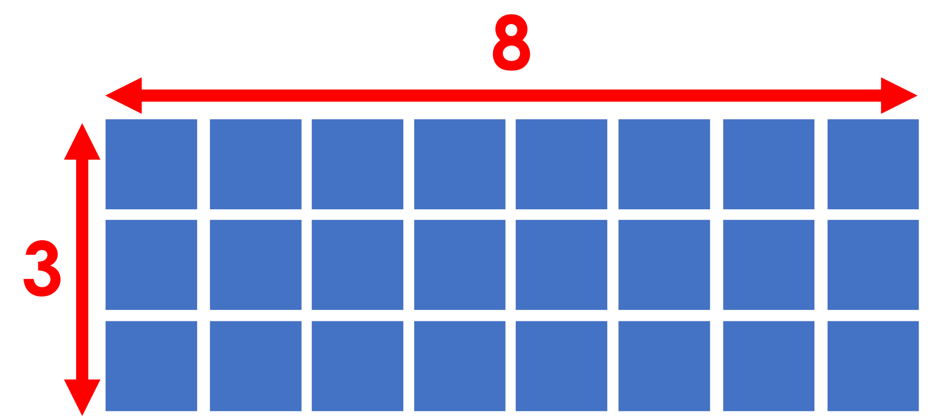
area = 24 squares
perimeter = 22

‘For rectangles with the same area, thinner rectangles have a larger perimeter.’

Task 43: Change the perimeter

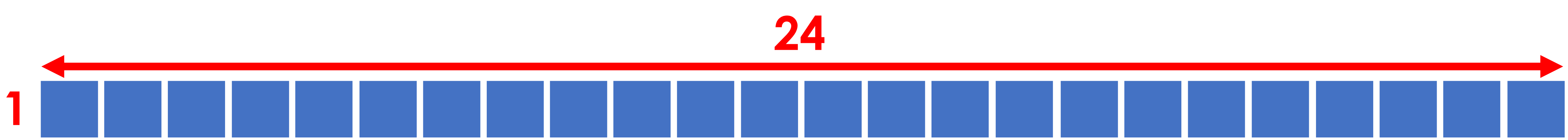


area = 24 squares
perimeter = 20



area = 24 squares
perimeter = 22

'For rectangles with the same area, thinner rectangles have a larger perimeter.'

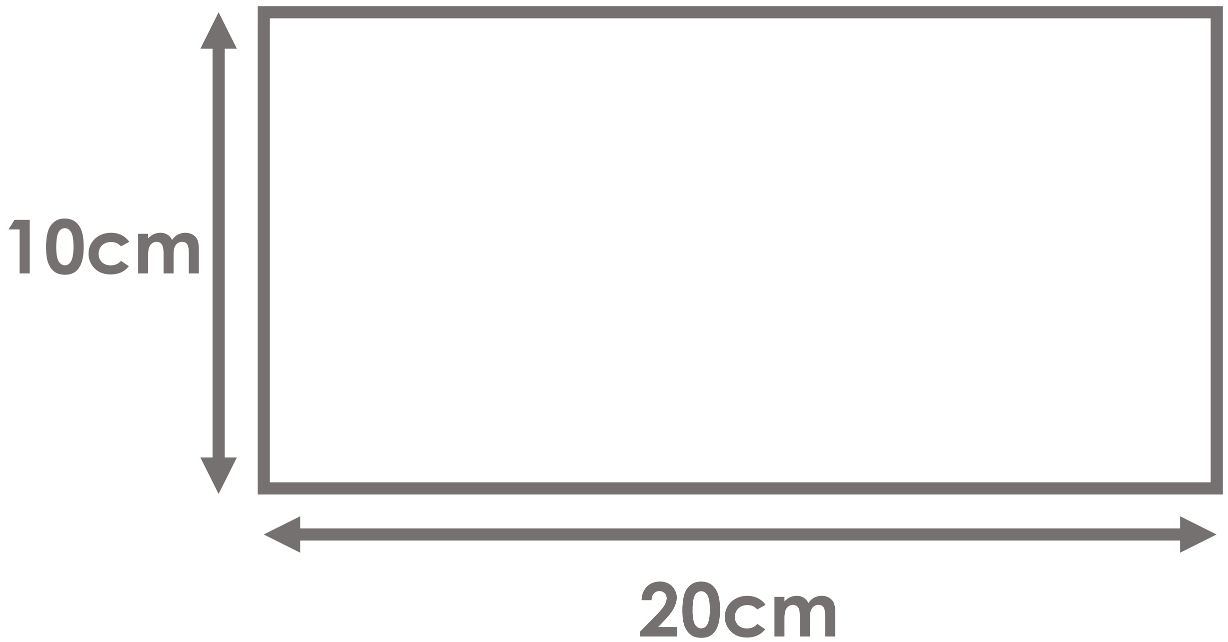


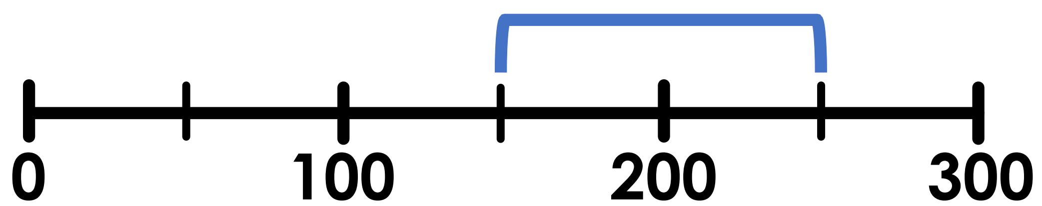
area = 24 squares perimeter = 50

Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 1: length = 20cm, width = 10cm

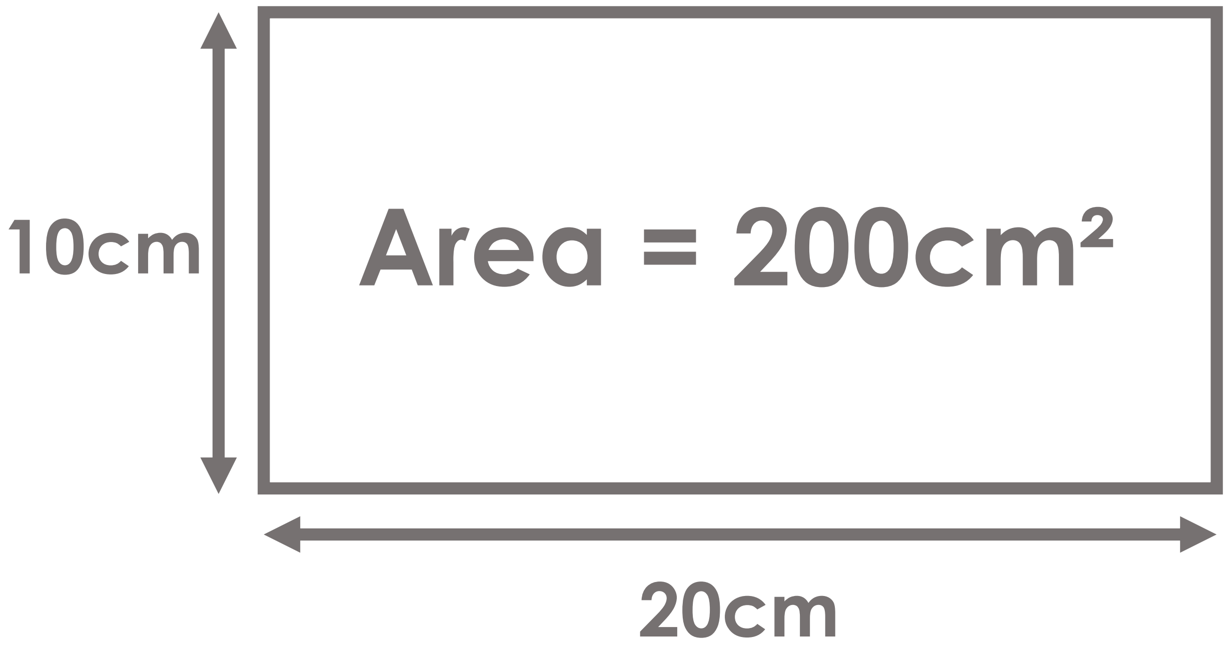


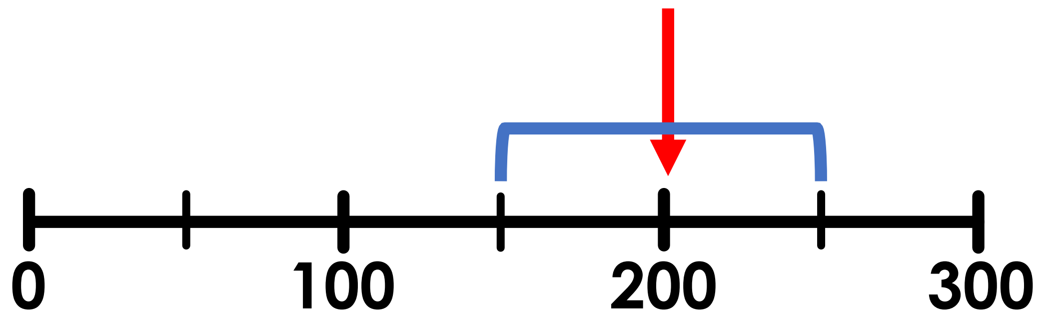


Task 44: Rectangle length

- Length is double width.
- Area to nearest $100cm^2$ is $200cm^2$.
- ***Smallest*** length of rectangle.

Trial 1: length = 20cm, width = 10cm

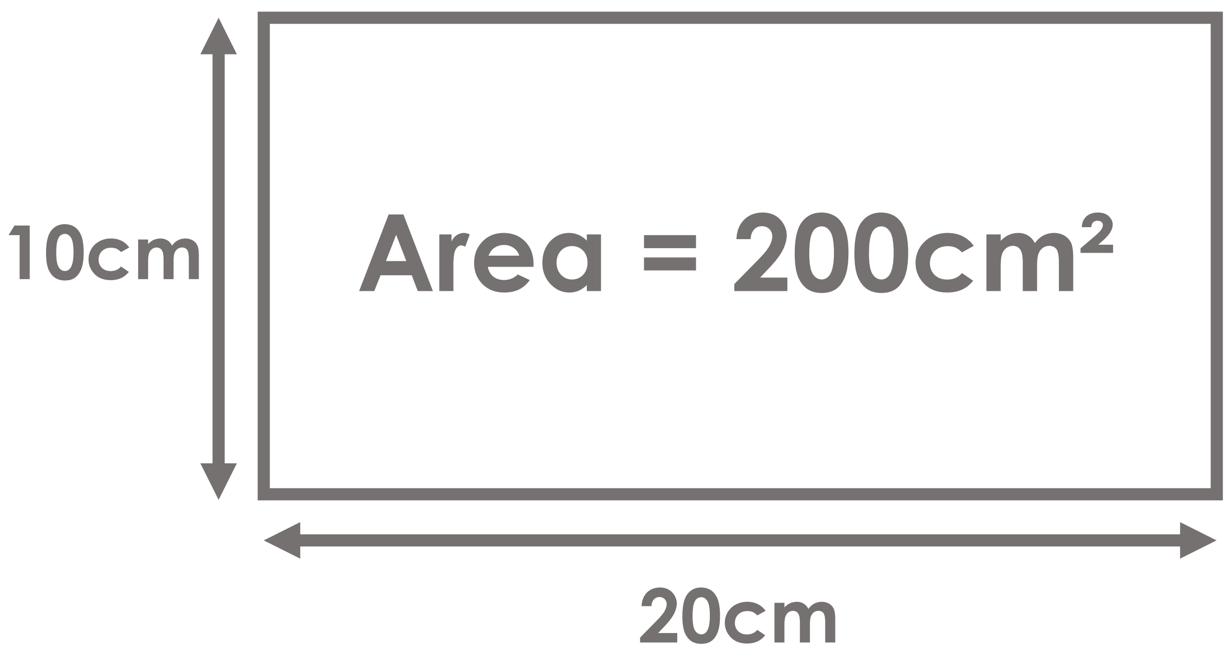


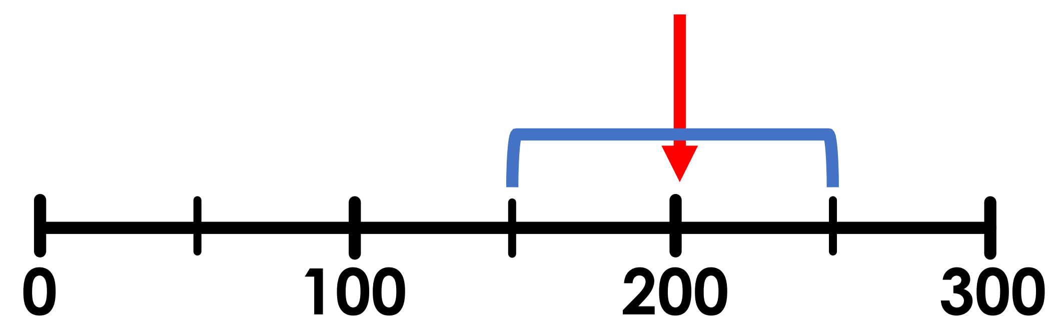


Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 1: length = 20cm, width = 10cm





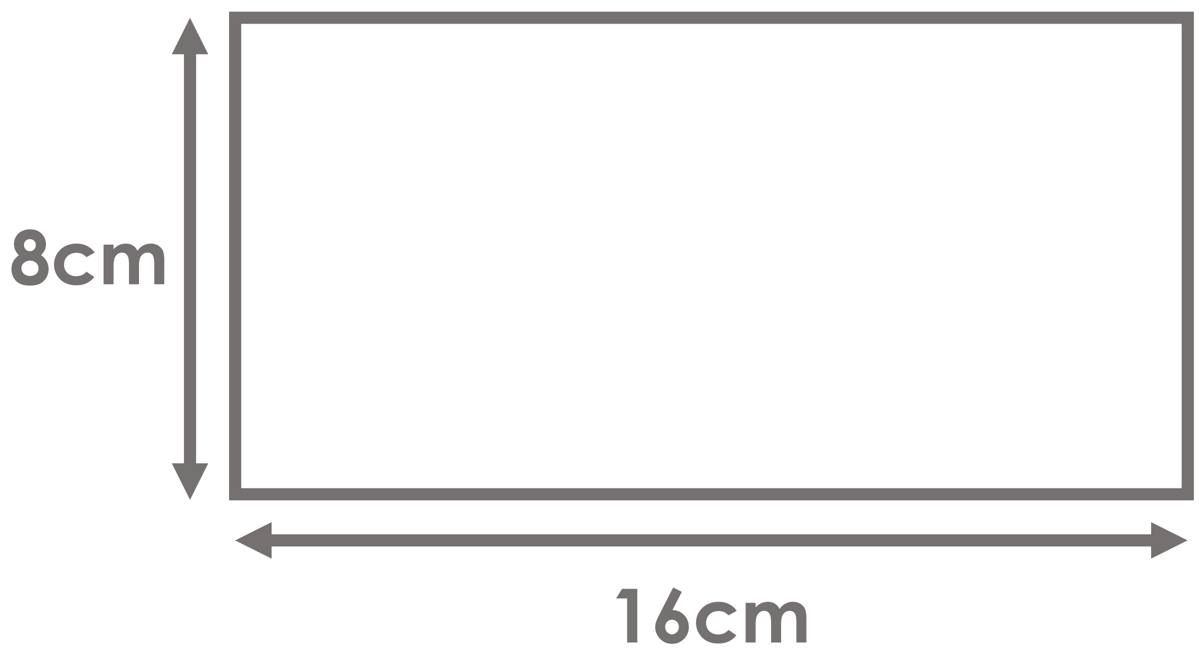
Does round to 200. ✓

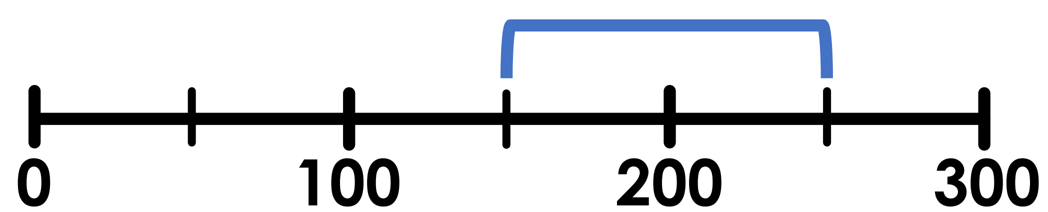
Next try a smaller rectangle.

Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 2: length = 16cm, width = 8cm

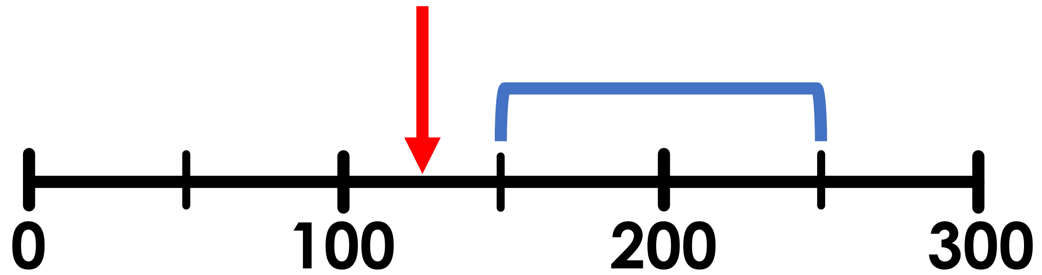




Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

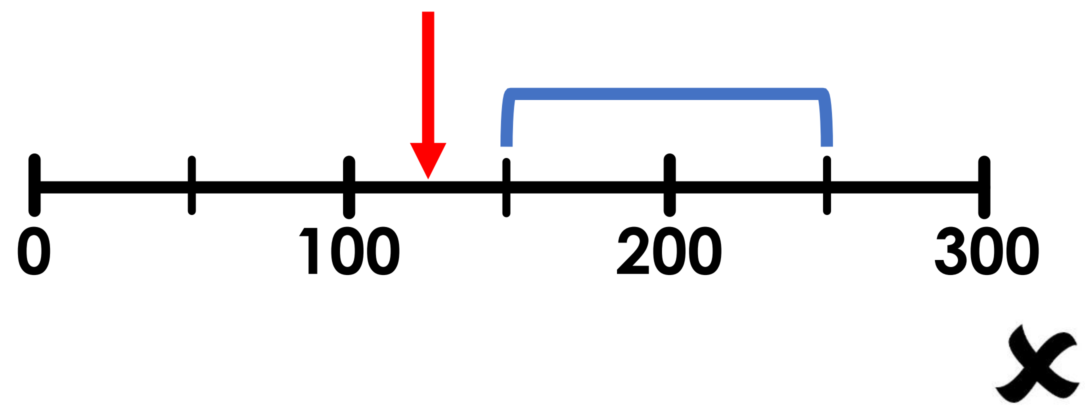
Trial 2: length = 16cm, width = 8cm



Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 2: length = 16cm, width = 8cm



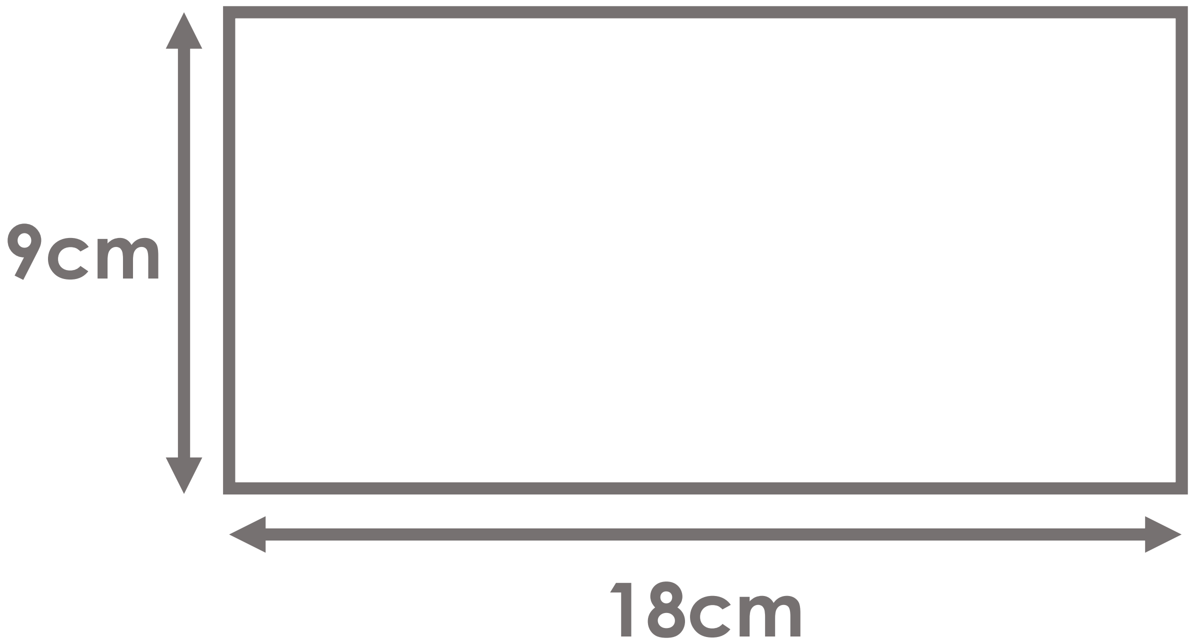
Does not round to 200.

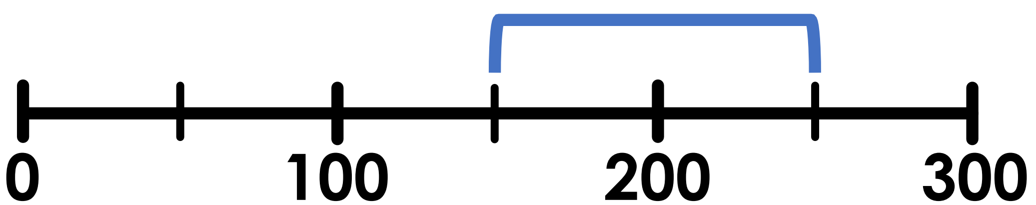
Next try a larger rectangle.

Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 3: length = 18cm, width = 9cm

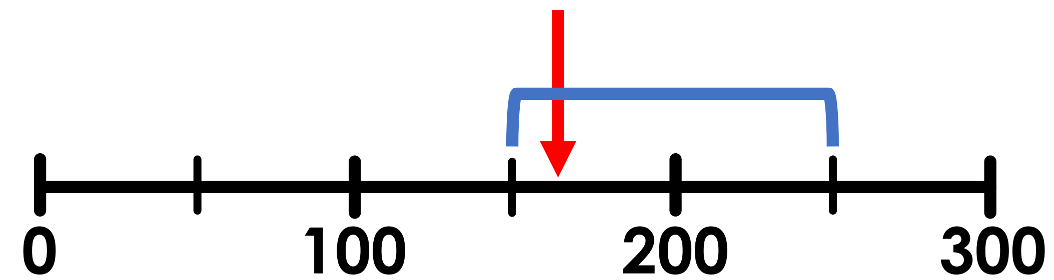




Task 44: Rectangle length

- Length is double width.
- Area to nearest $100cm^2$ is $200cm^2$.
- ***Smallest*** length of rectangle.

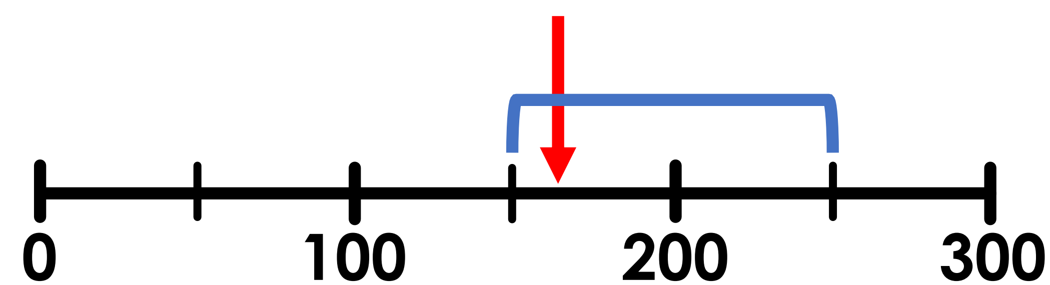
Trial 3: length = 18cm, width = 9cm



Task 44: Rectangle length

- Length is double width.
- Area to nearest 100cm² is 200cm².
- ***Smallest*** length of rectangle.

Trial 3: length = 18cm, width = 9cm

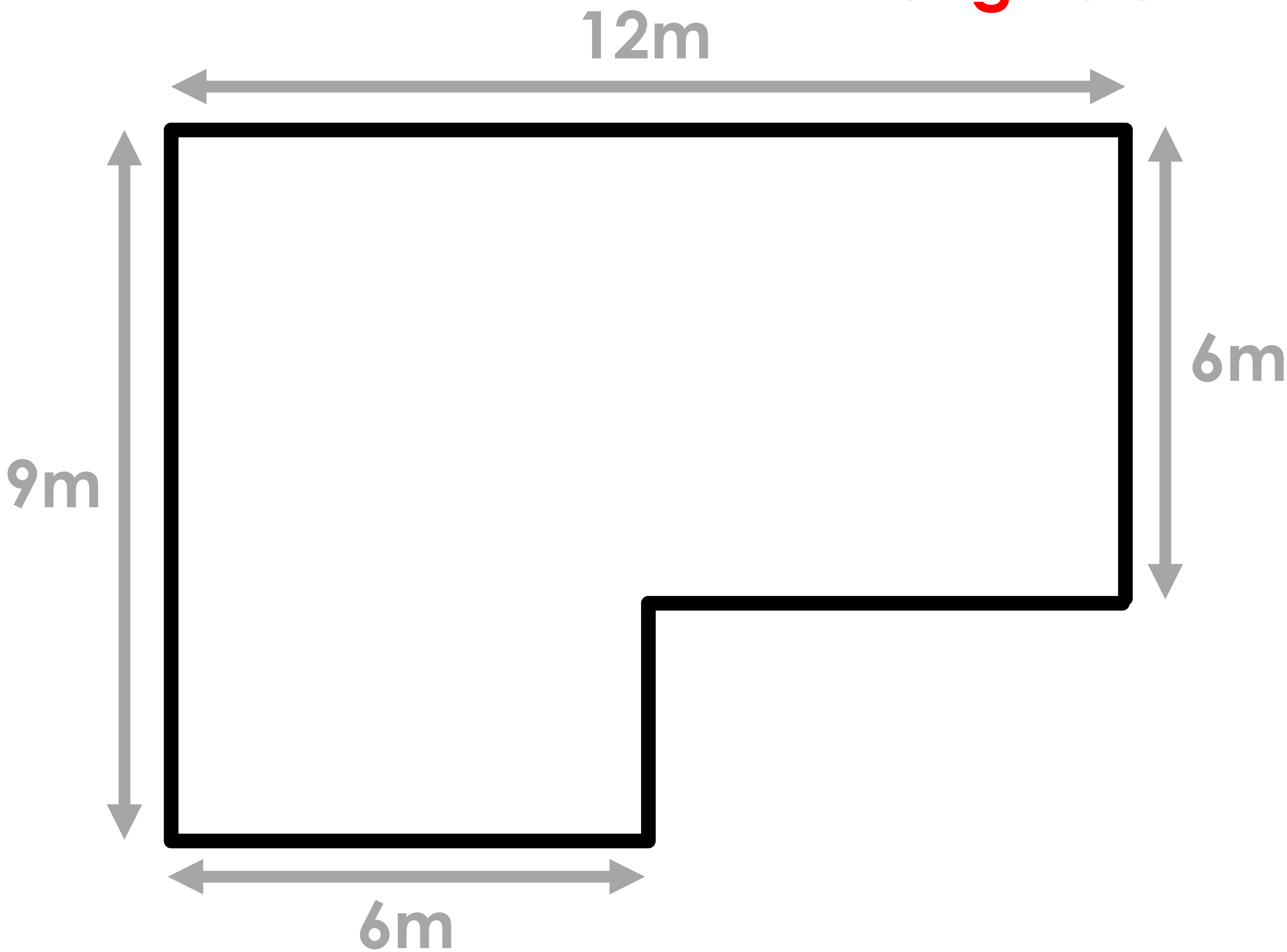


Does round to 200. ✓

This is the smallest possible rectangle. <u>Length = 18cm</u>

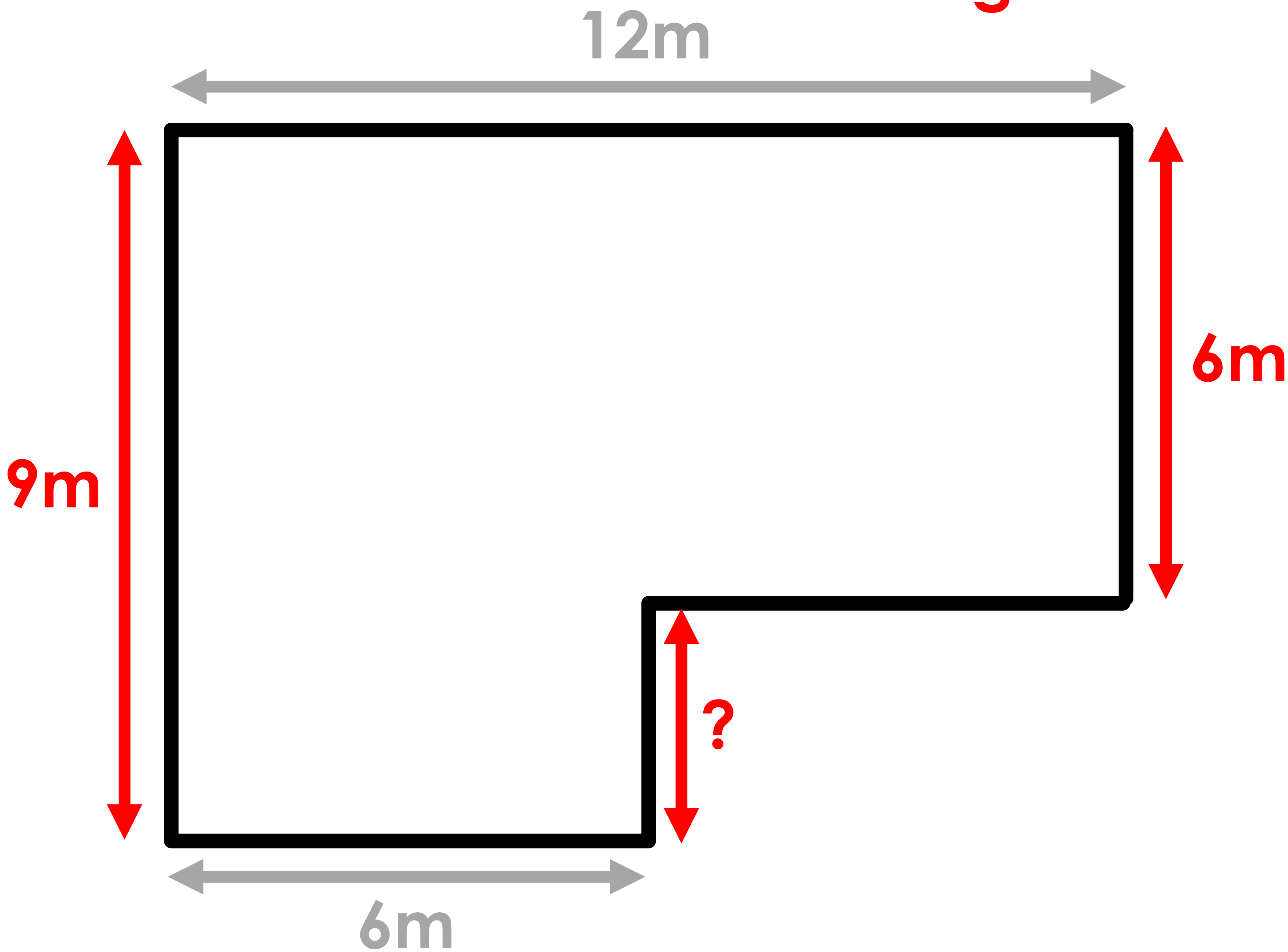
Task 45: Compound shape

Lengths of missing sides



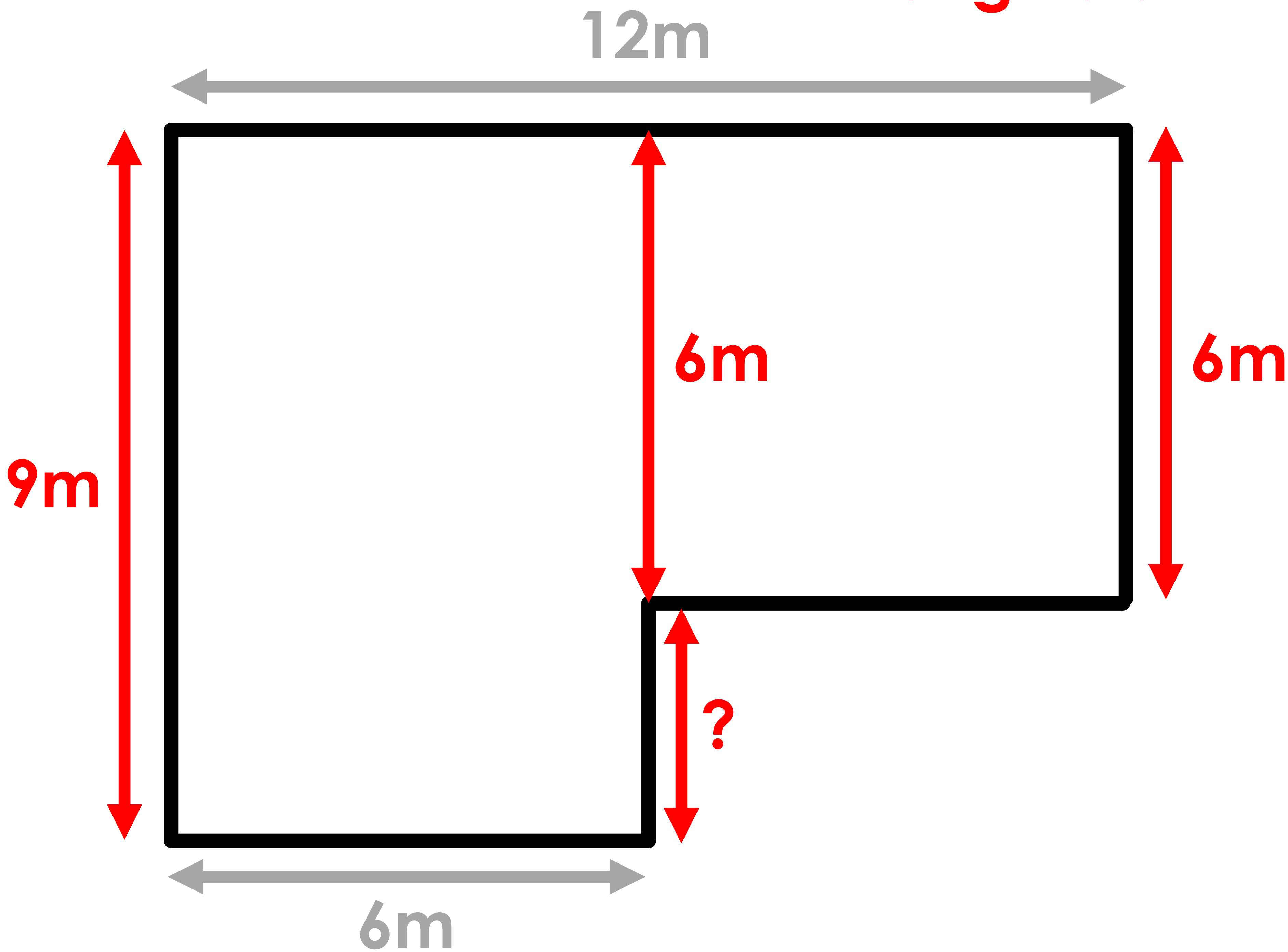
Task 45: Compound shape

Lengths of missing sides



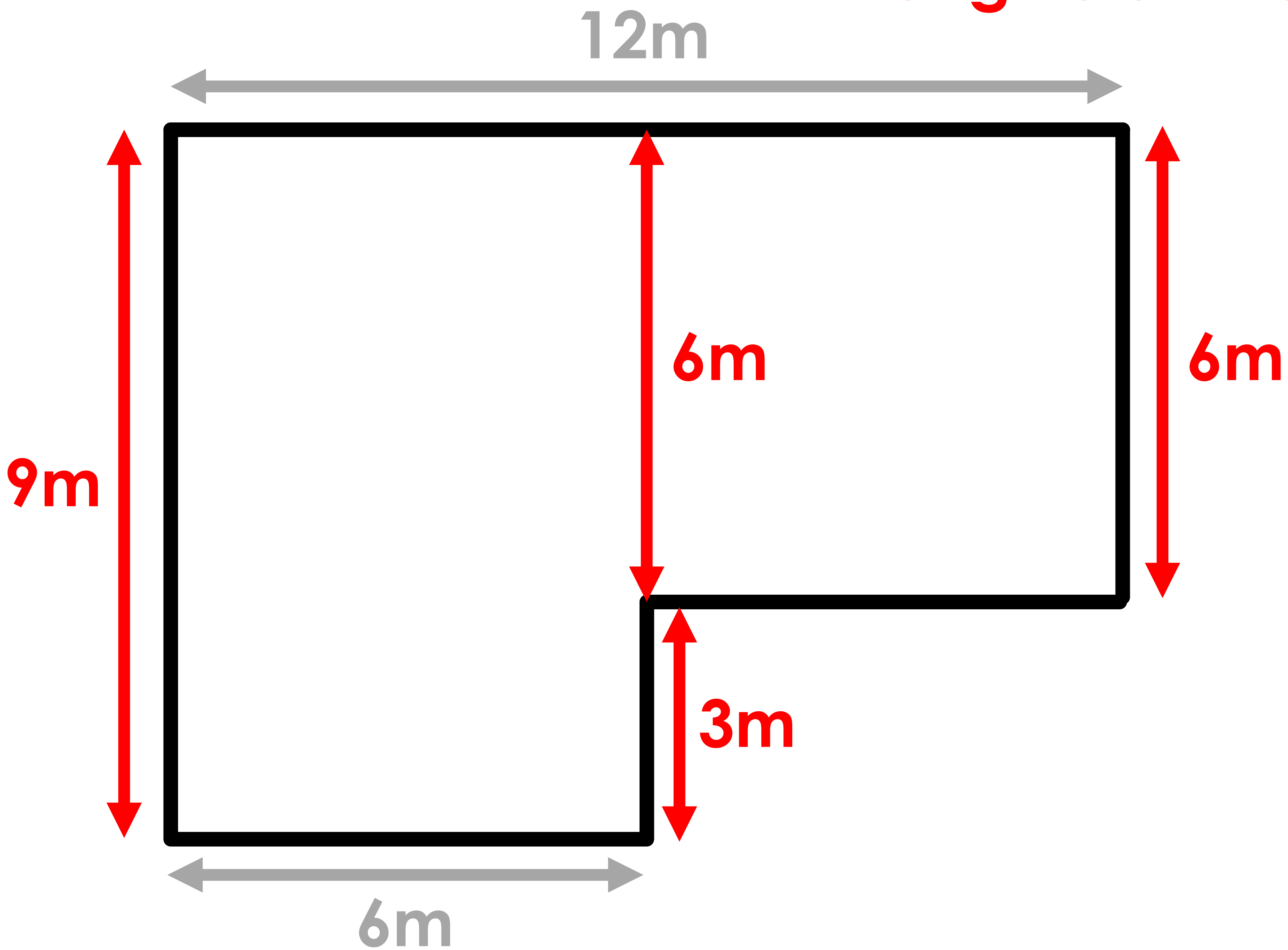
Task 45: Compound shape

Lengths of missing sides



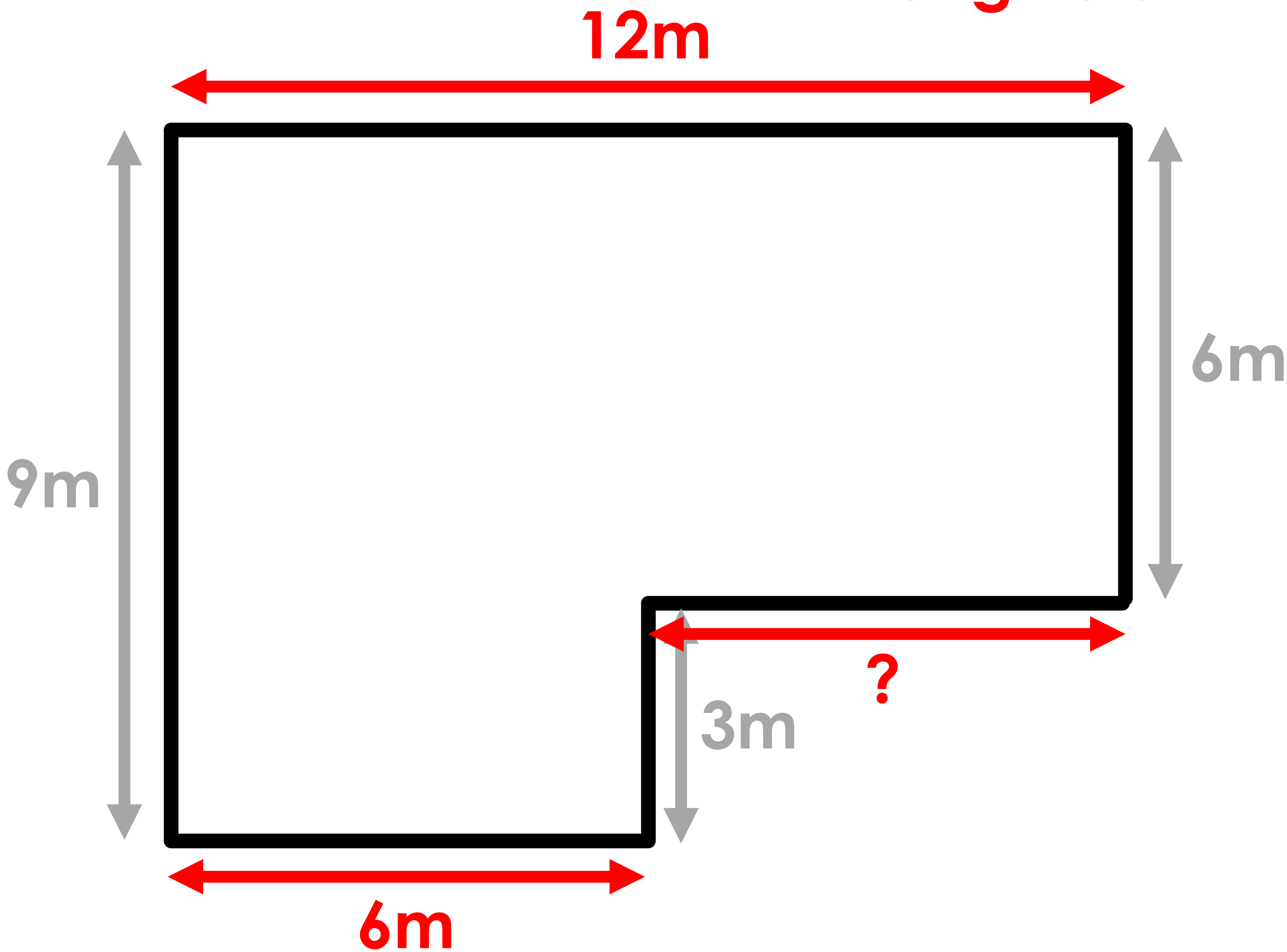
Task 45: Compound shape

Lengths of missing sides



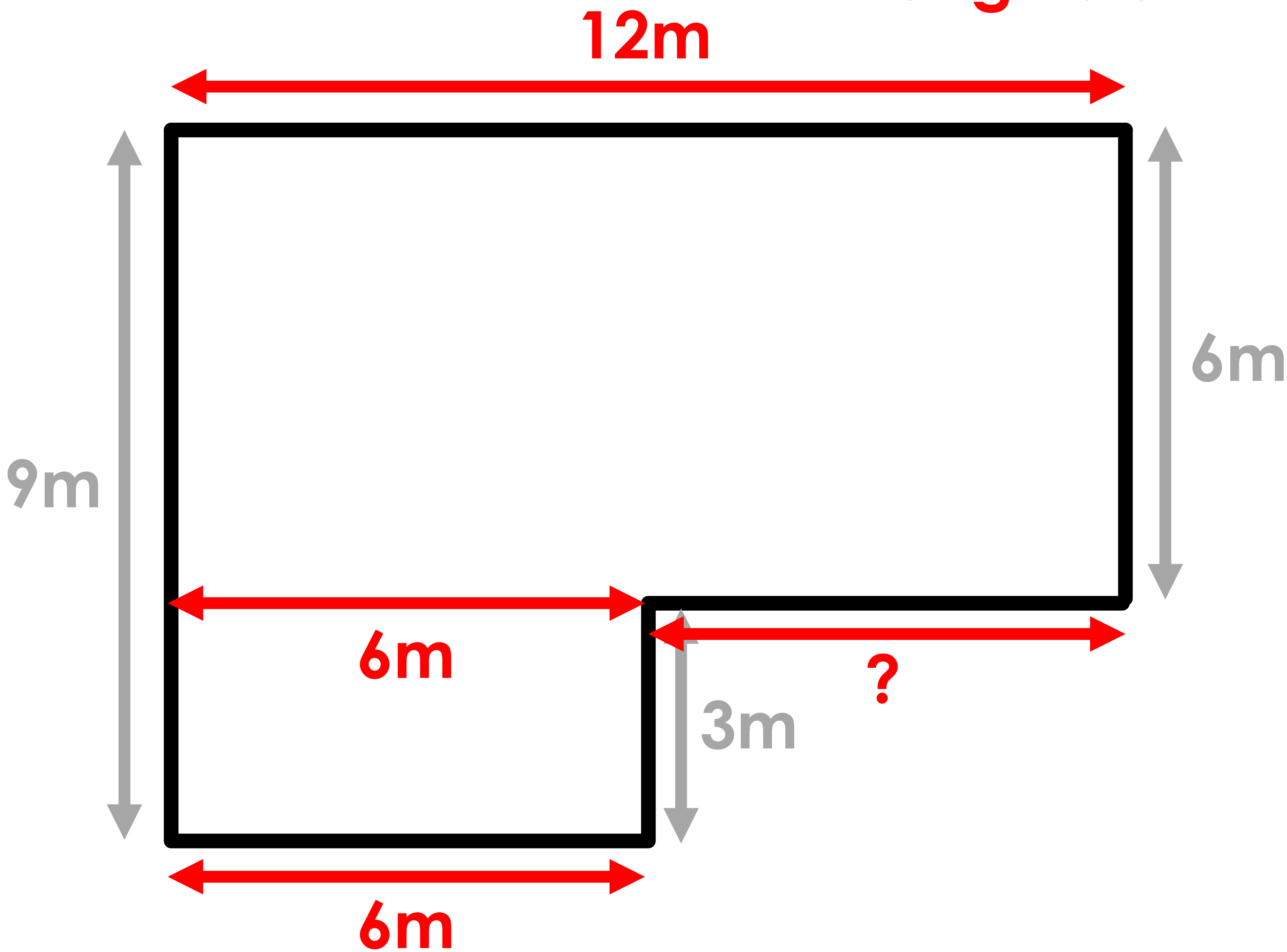
Task 45: Compound shape

Lengths of missing sides



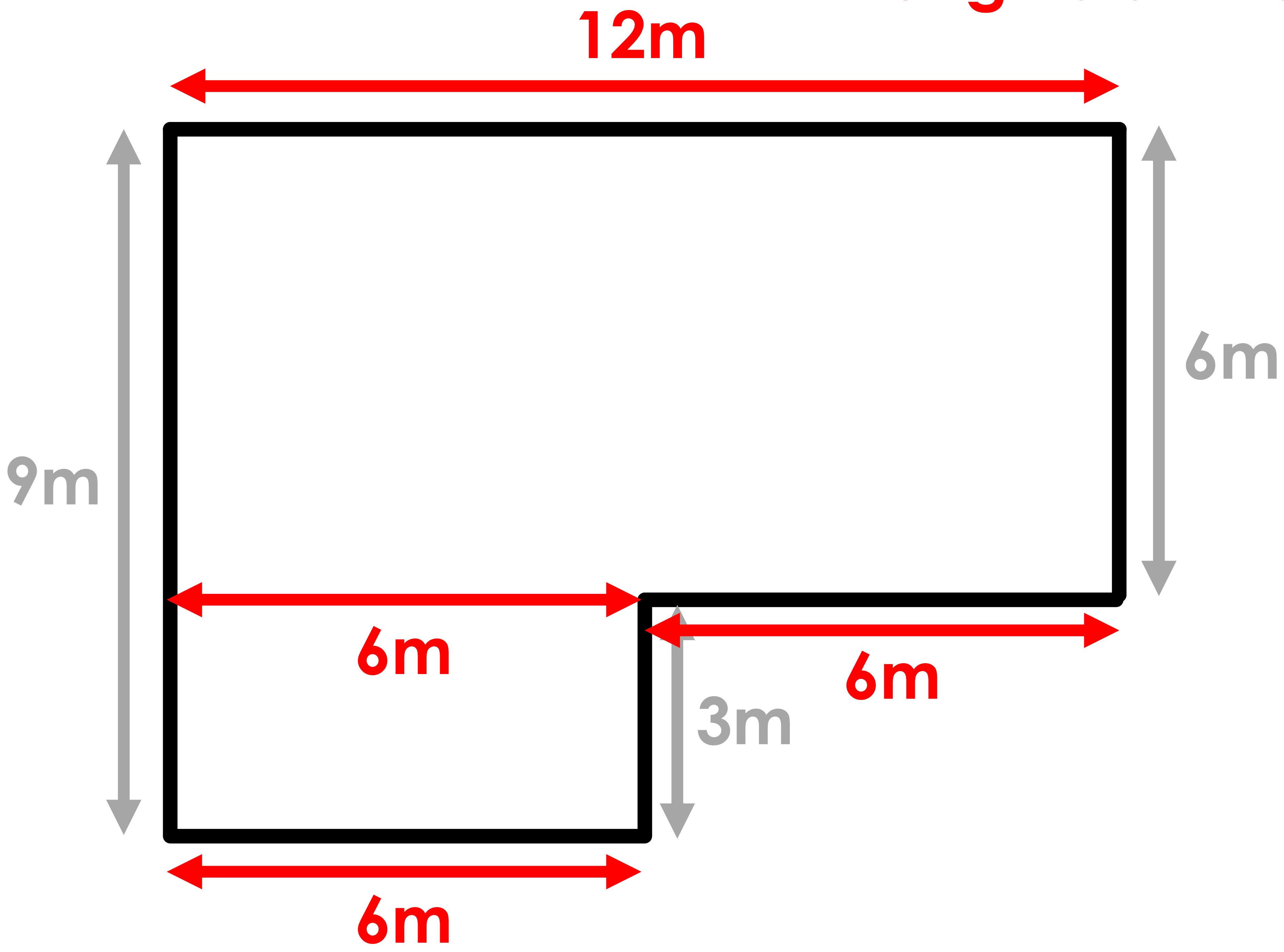
Task 45: Compound shape

Lengths of missing sides



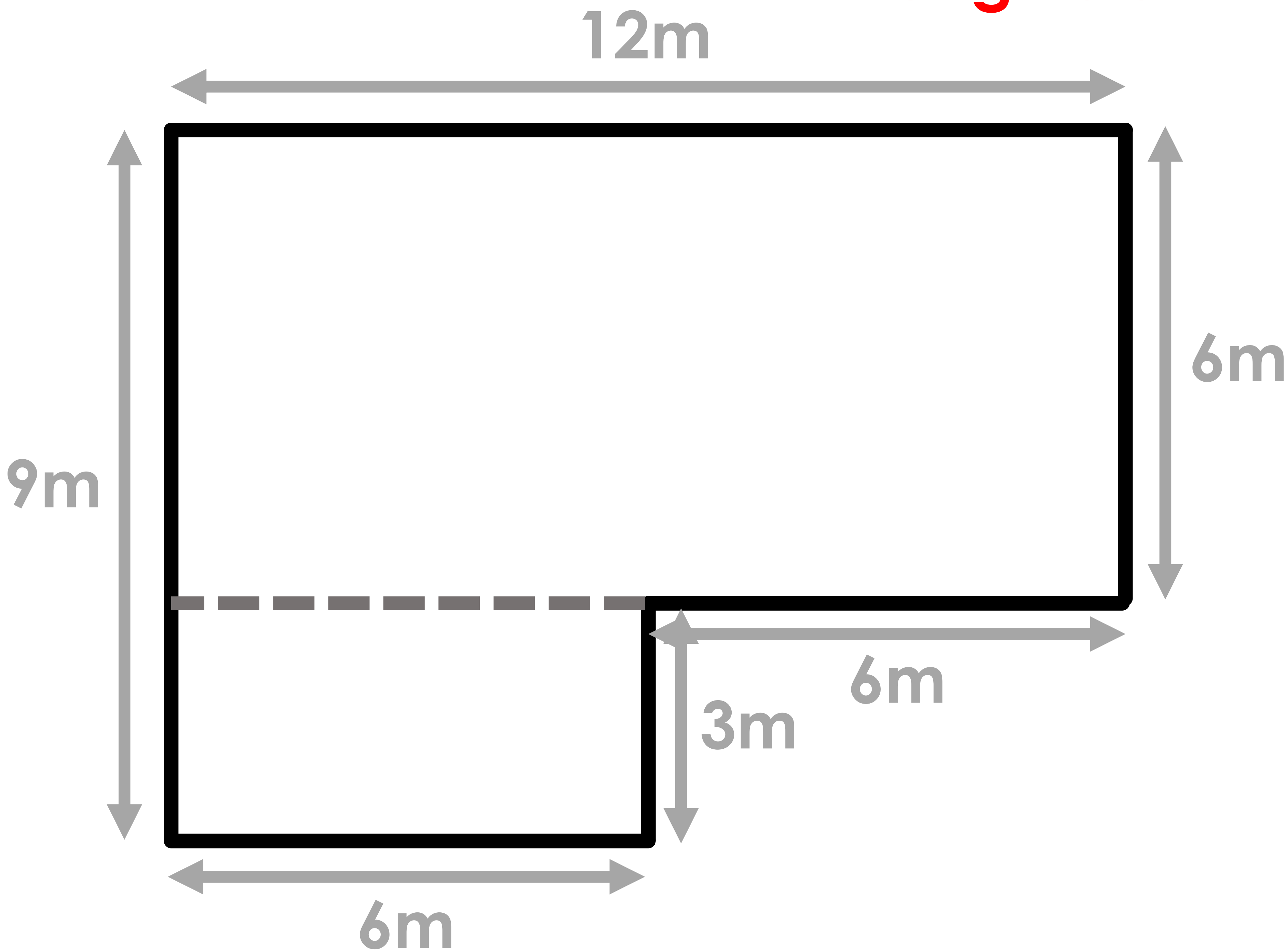
Task 45: Compound shape

Lengths of missing sides



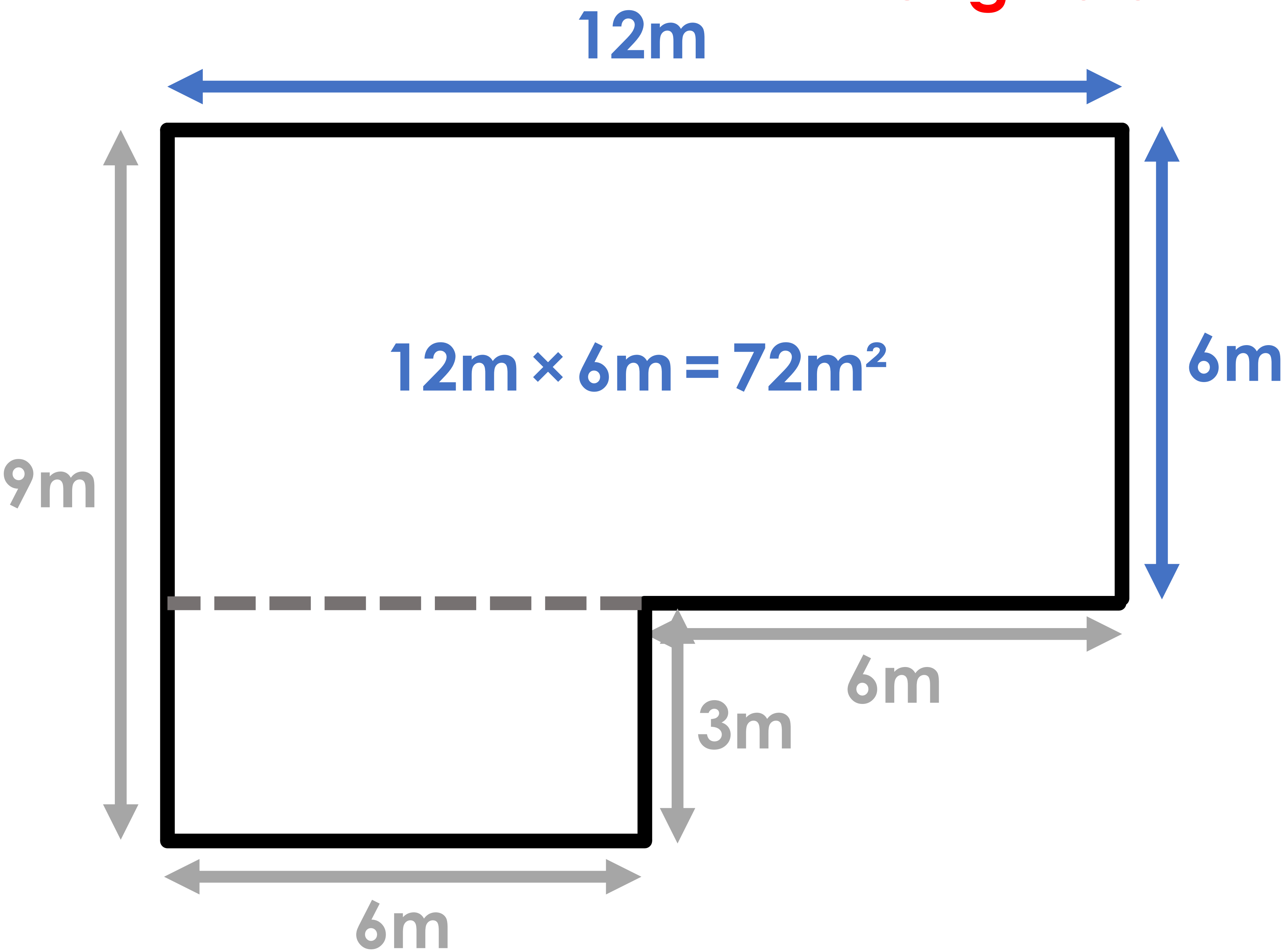
Task 45: Compound shape

Lengths of missing sides



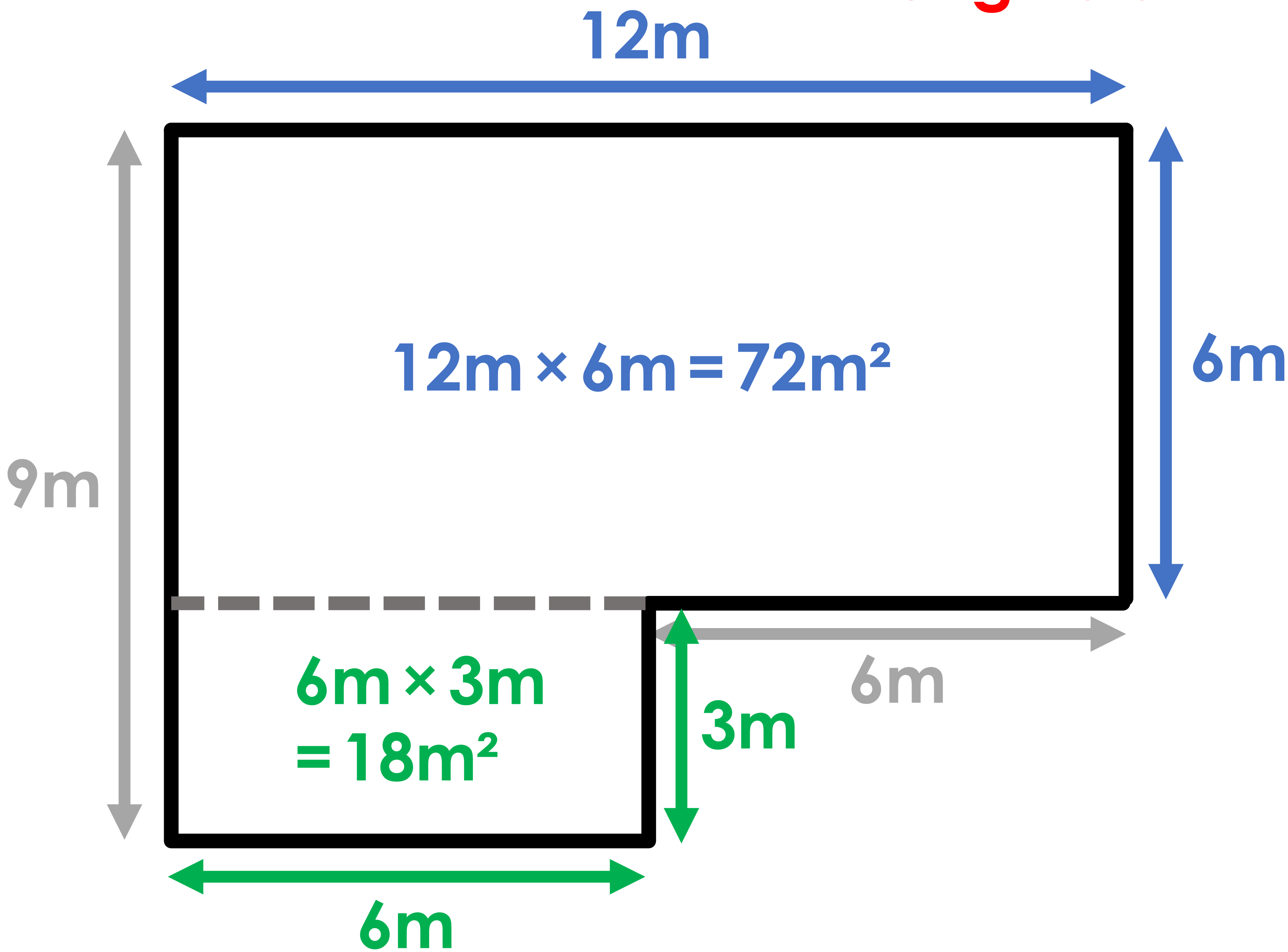
Task 45: Compound shape

Lengths of missing sides



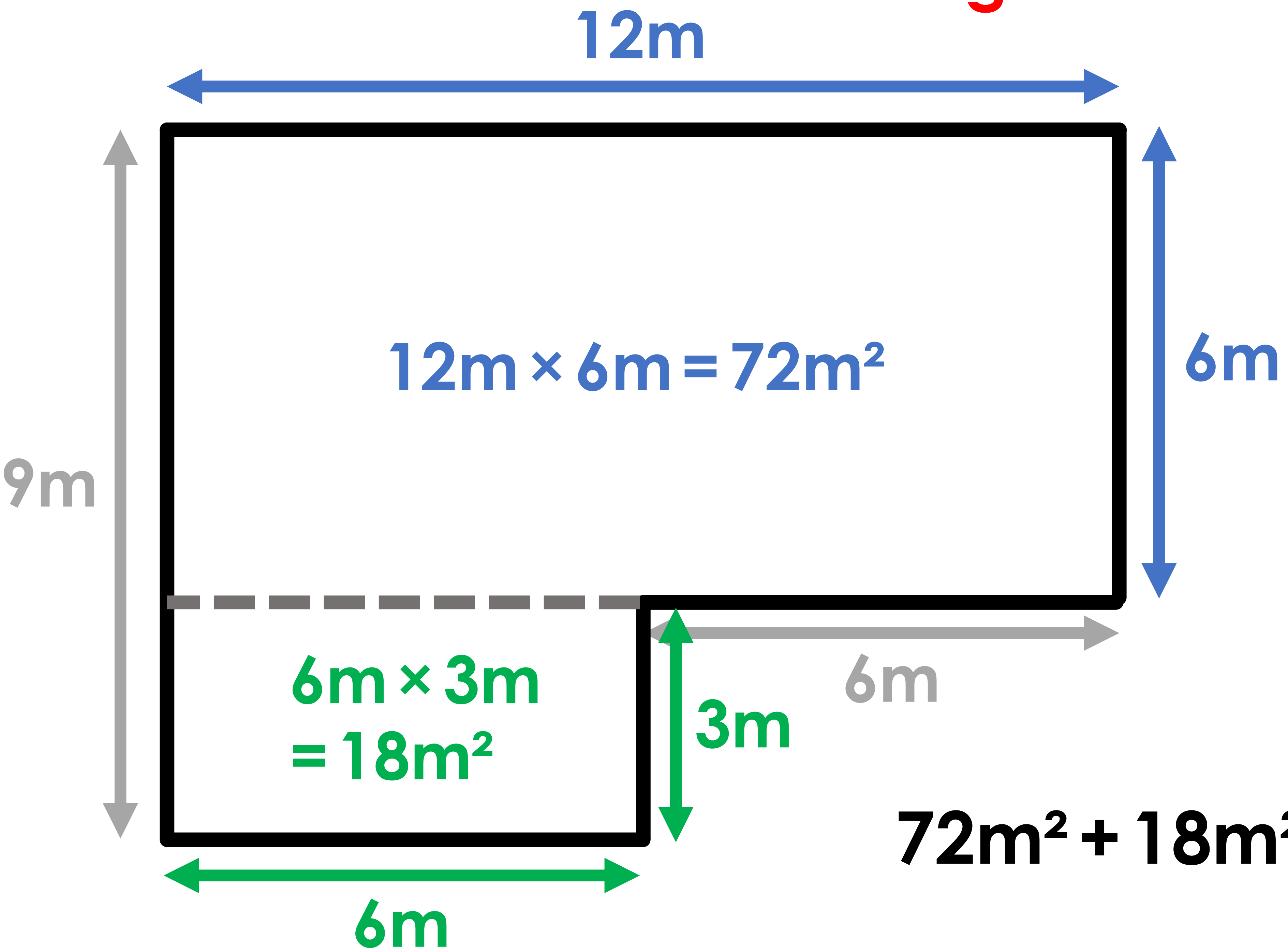
Task 45: Compound shape

Lengths of missing sides



Task 45: Compound shape

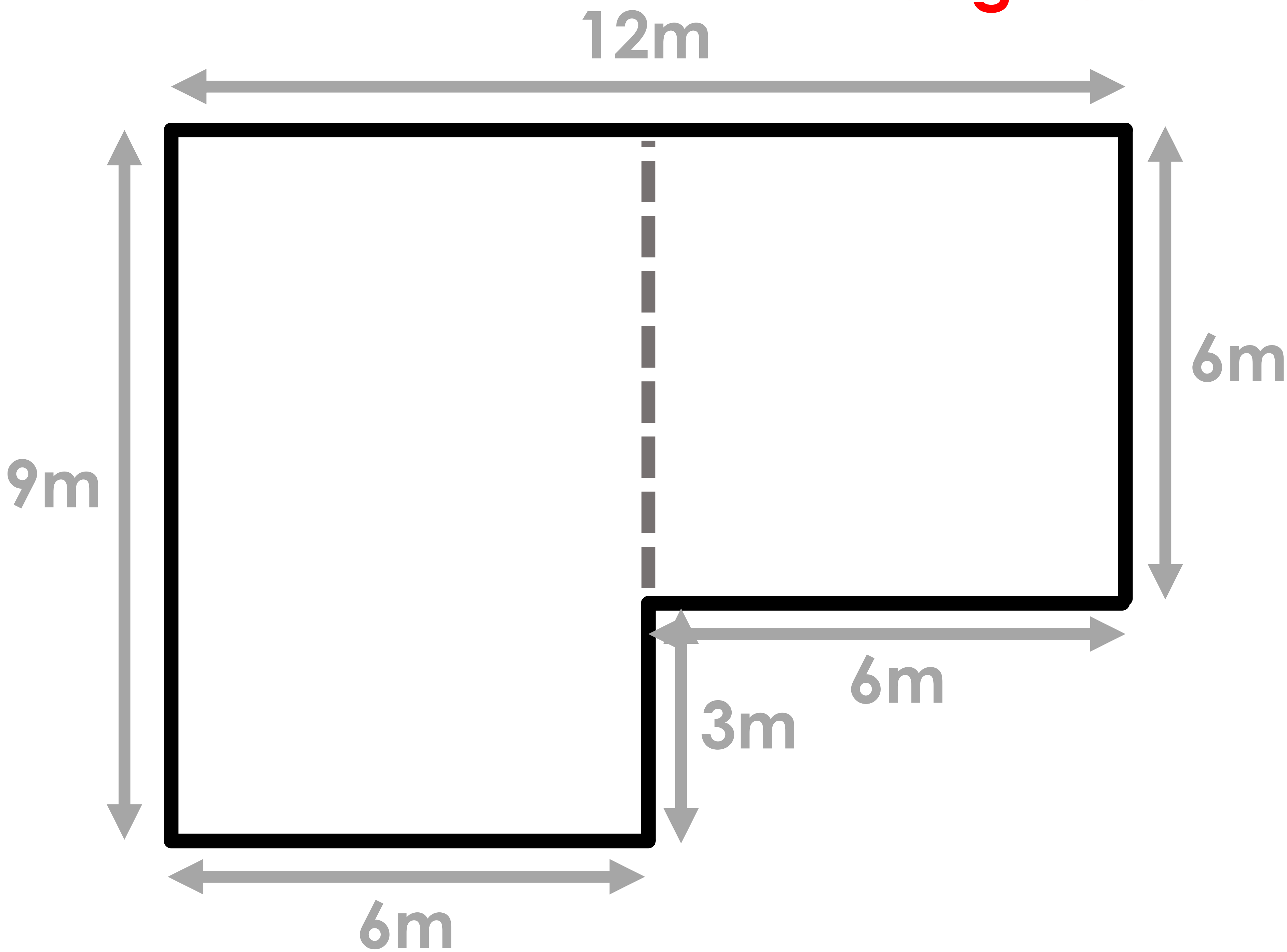
Lengths of missing sides



$72m^2 + 18m^2 = \underline{90m^2}$

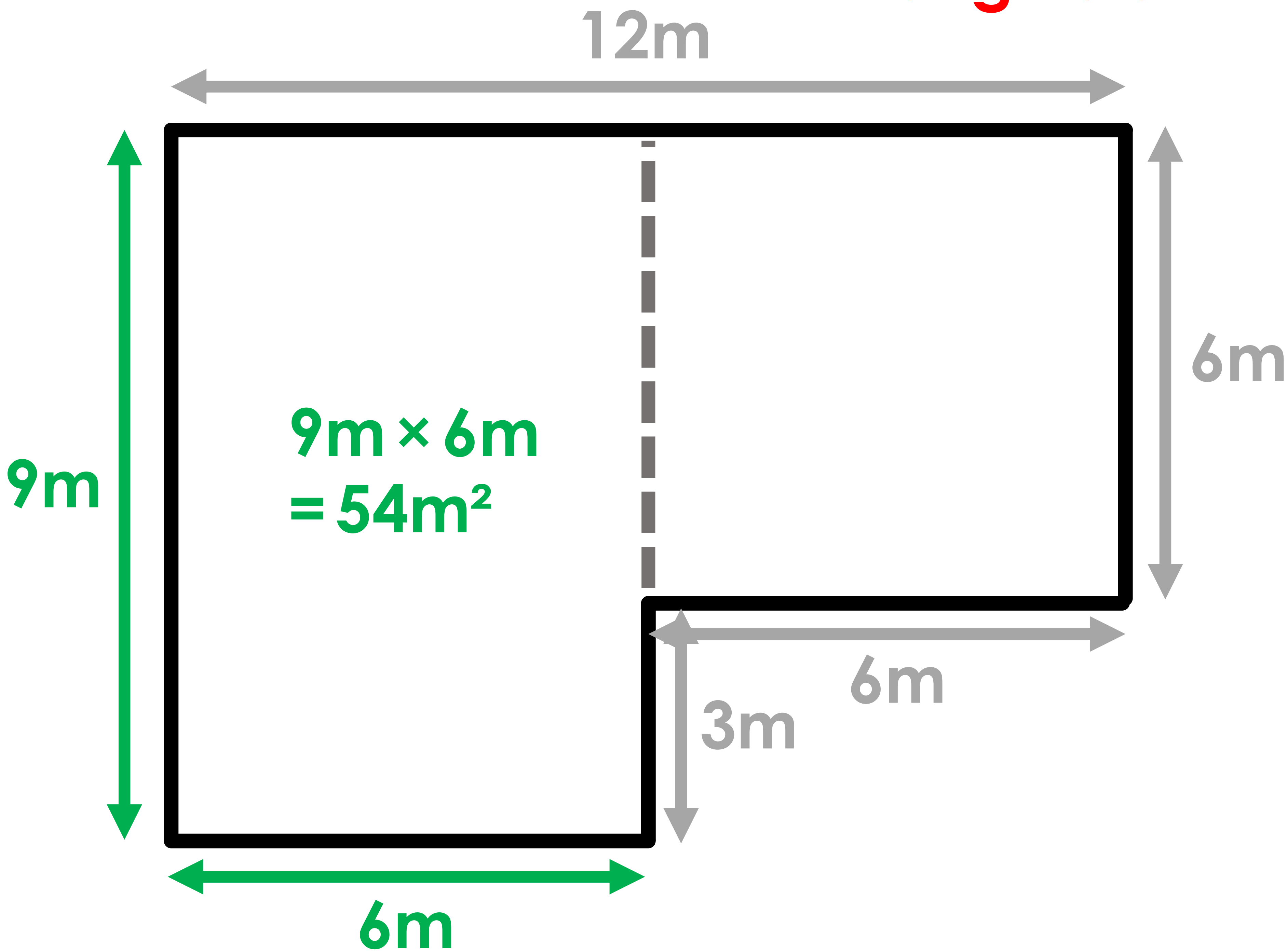
Task 45: Compound shape

Lengths of missing sides



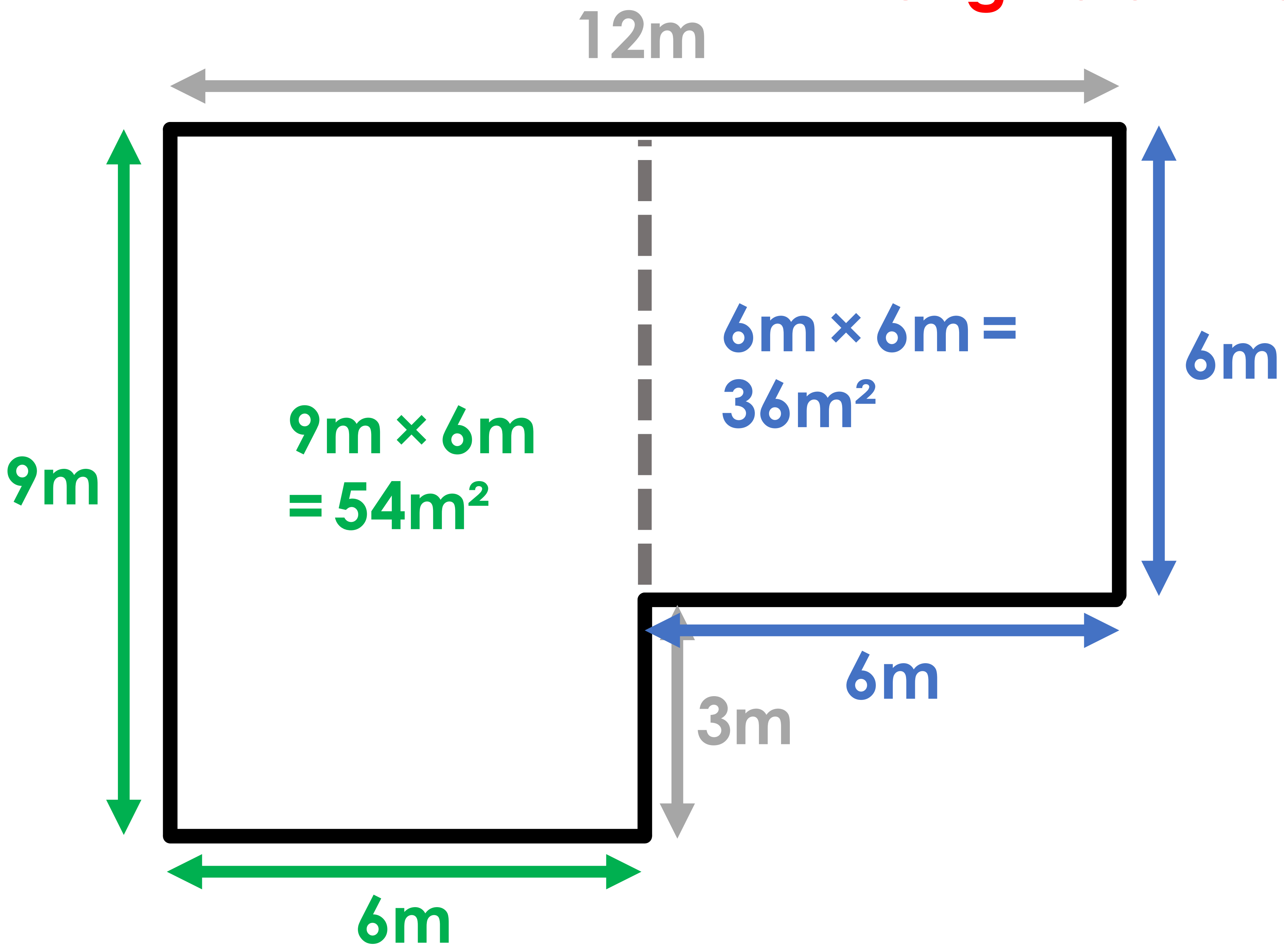
Task 45: Compound shape

Lengths of missing sides



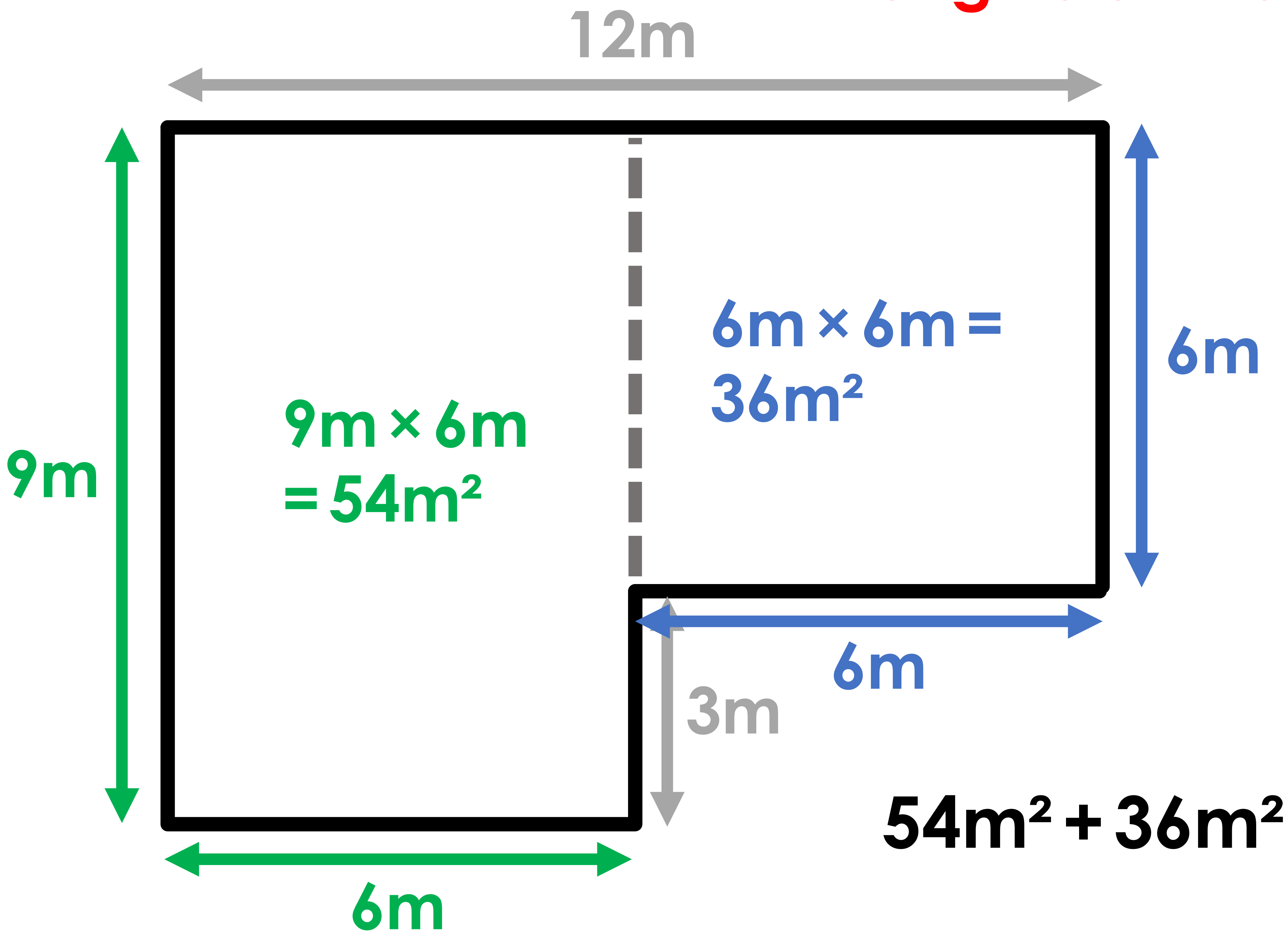
Task 45: Compound shape

Lengths of missing sides



Task 45: Compound shape

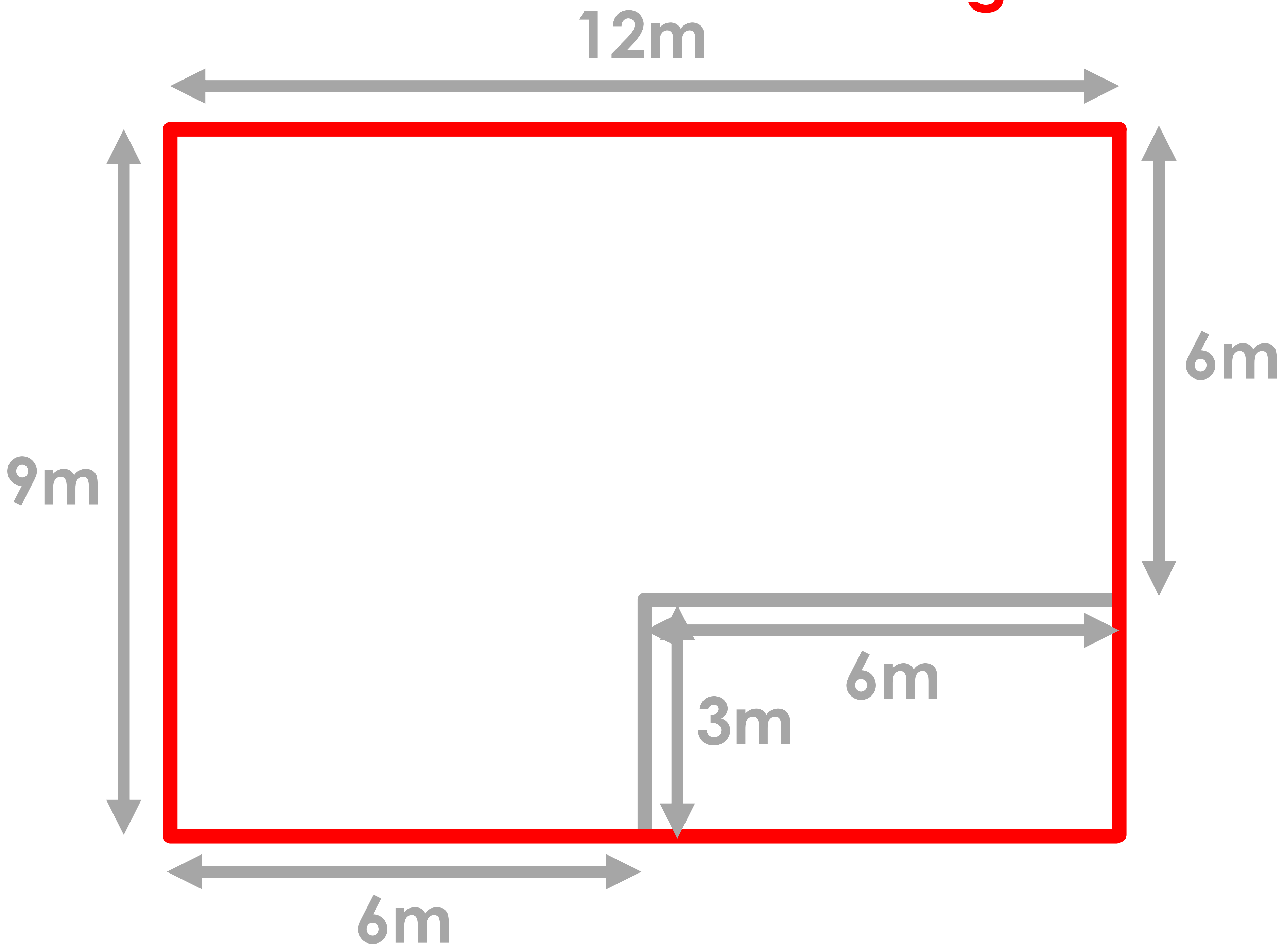
Lengths of missing sides



$54m^2 + 36m^2 = \underline{90m^2}$

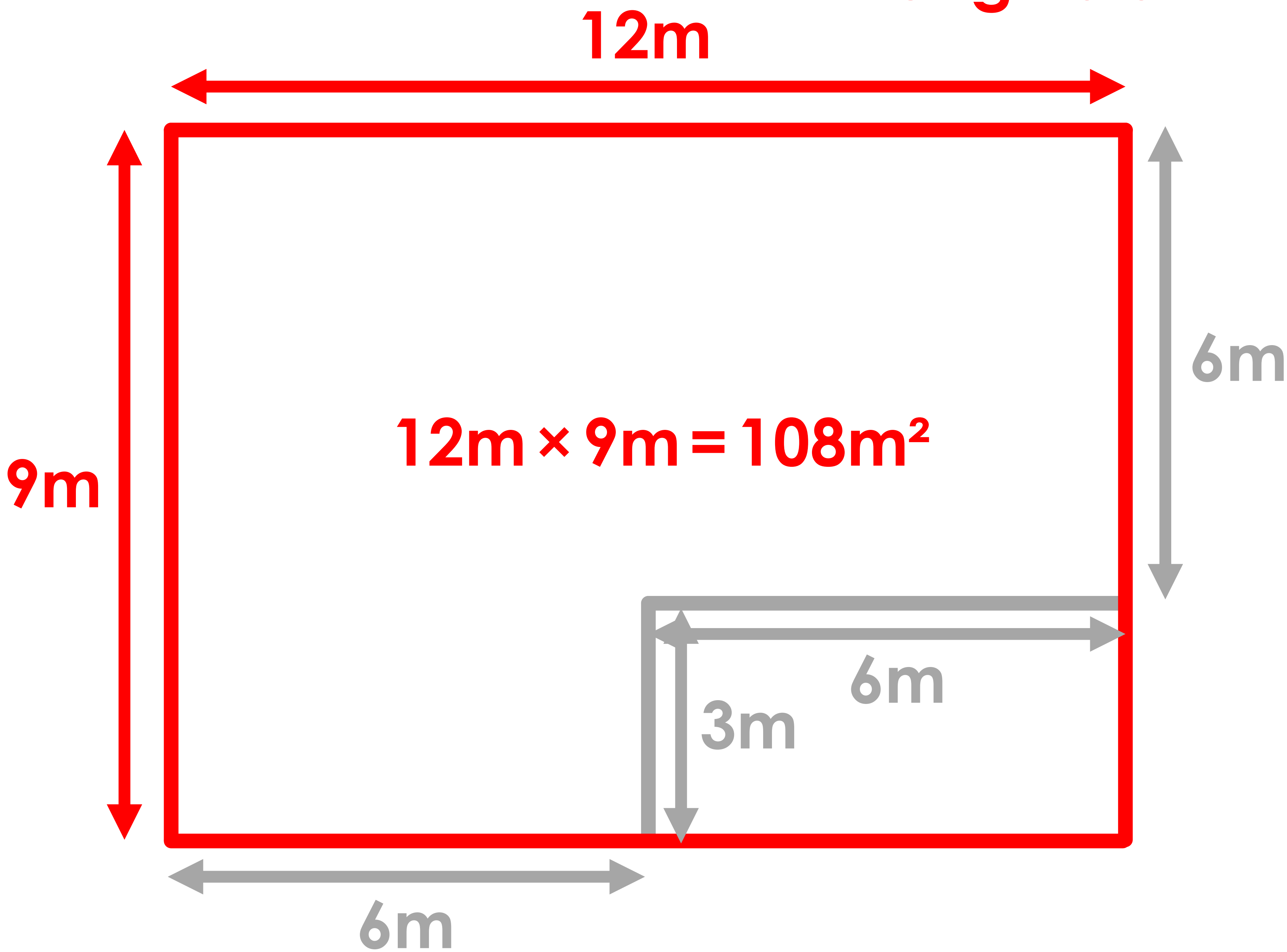
Task 45: Compound shape

Lengths of missing sides



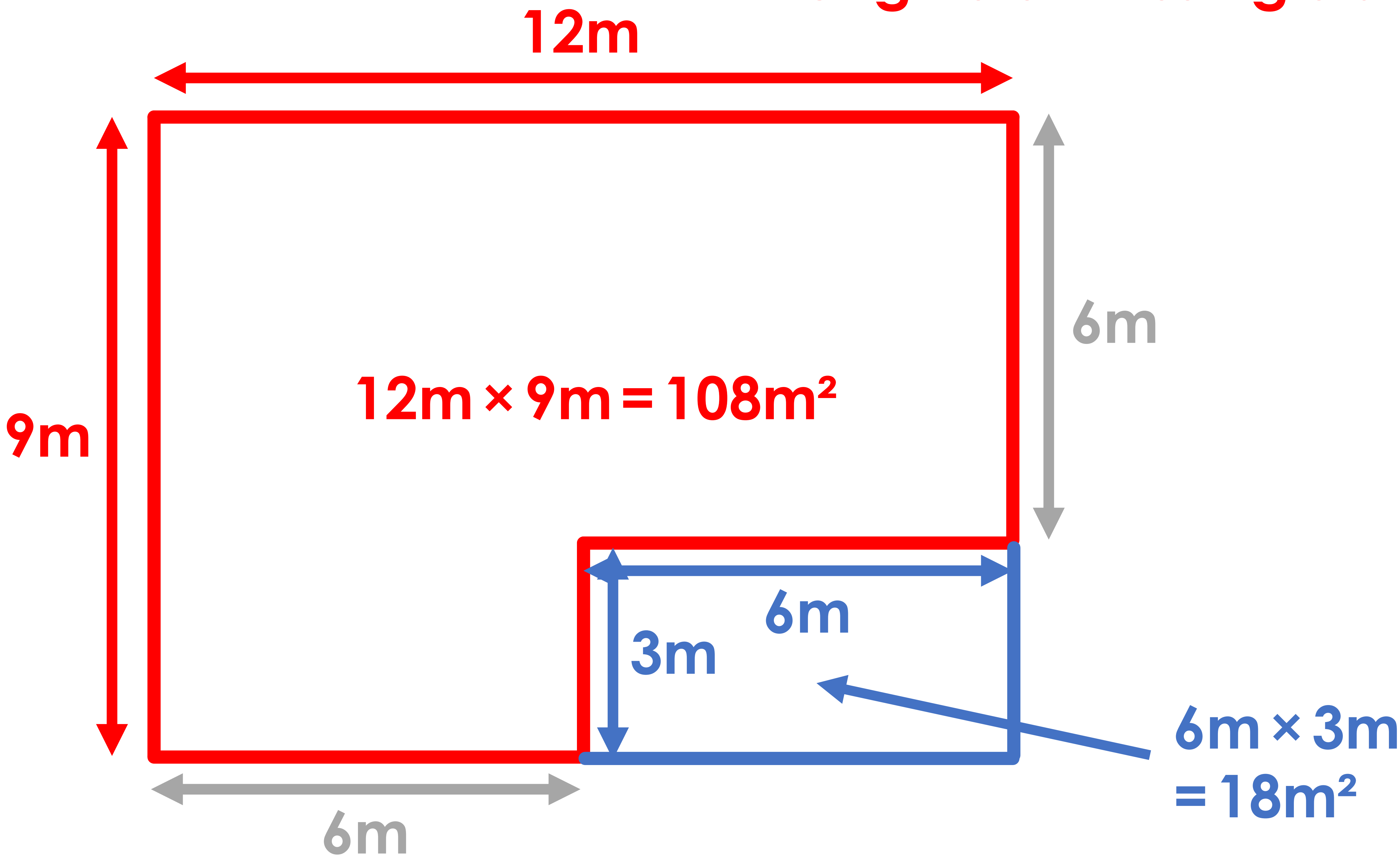
Task 45: Compound shape

Lengths of missing sides

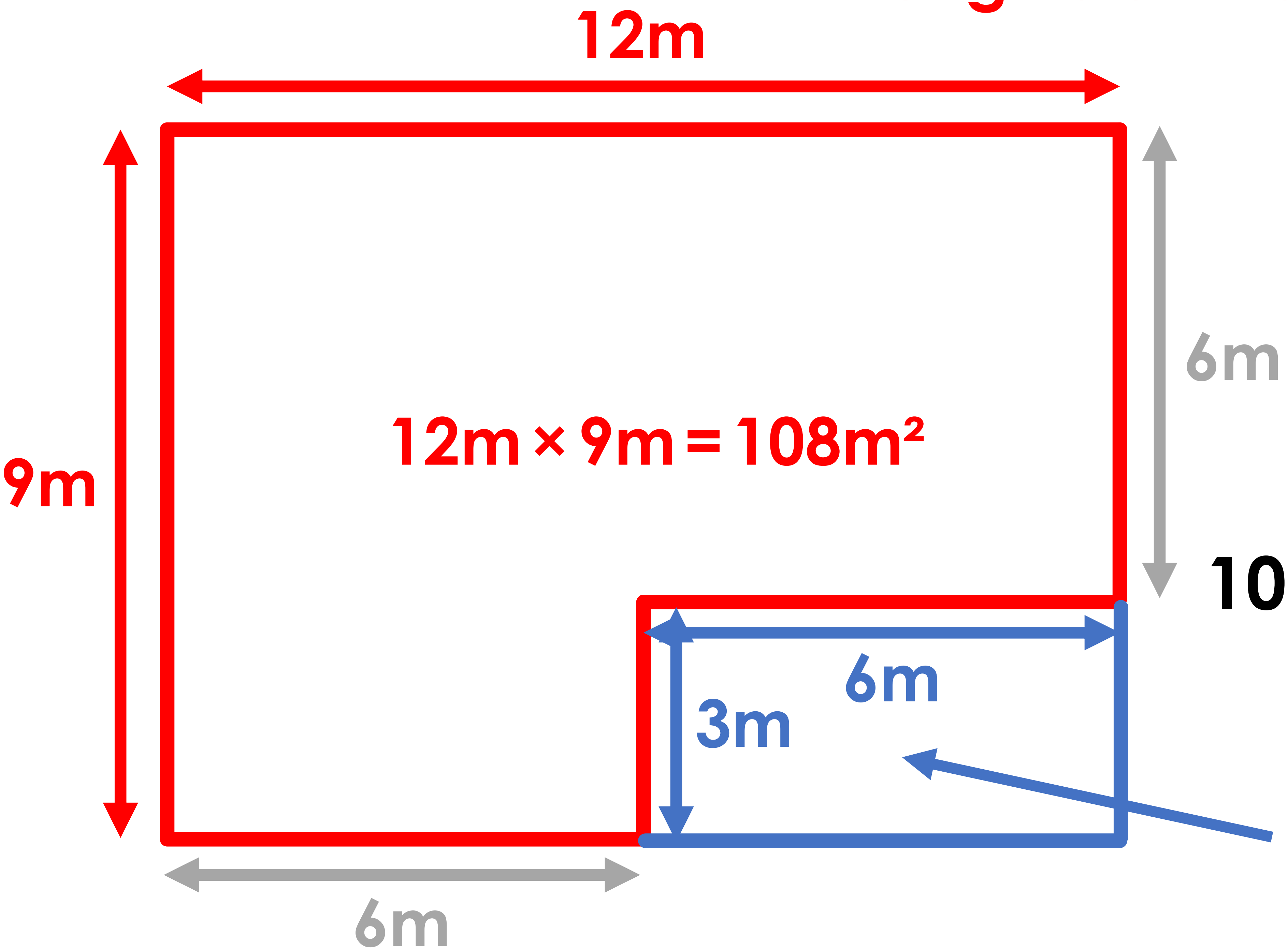


Task 45: Compound shape

Lengths of missing sides



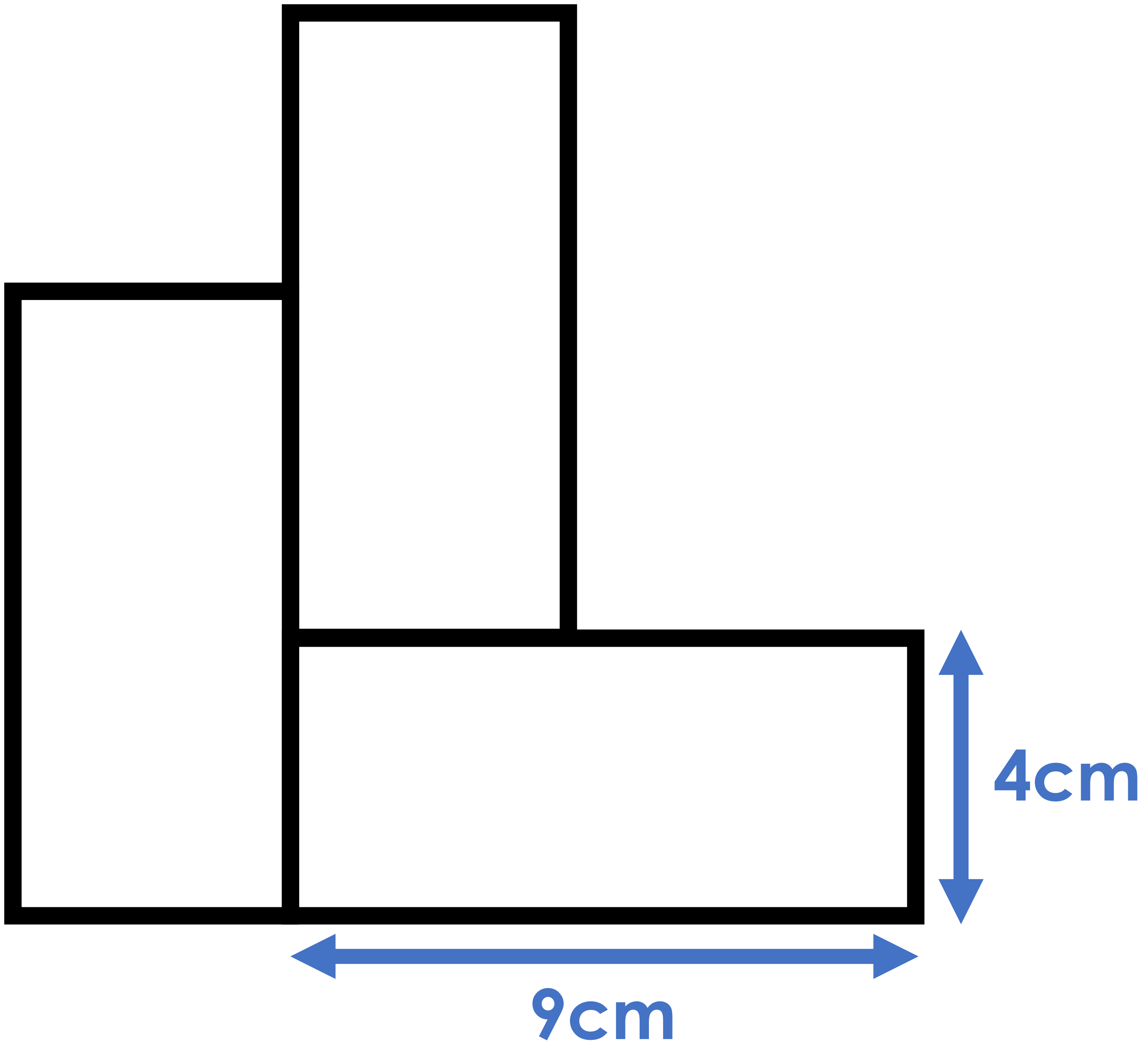
Lengths of missing sides



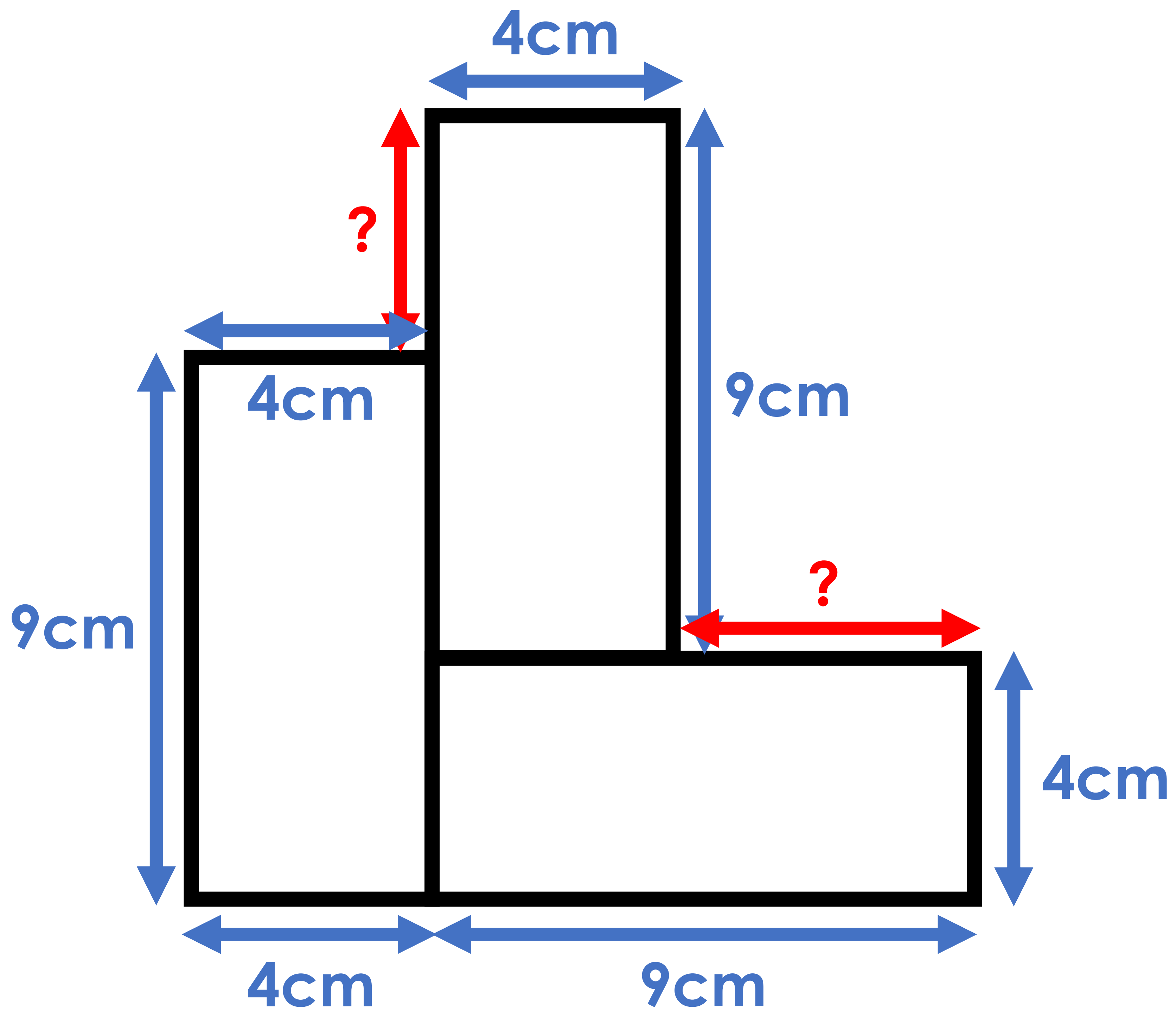
$108m^2 - 18m^2$
$= \underline{90m^2}$

$6m \times 3m$
$= 18m^2$

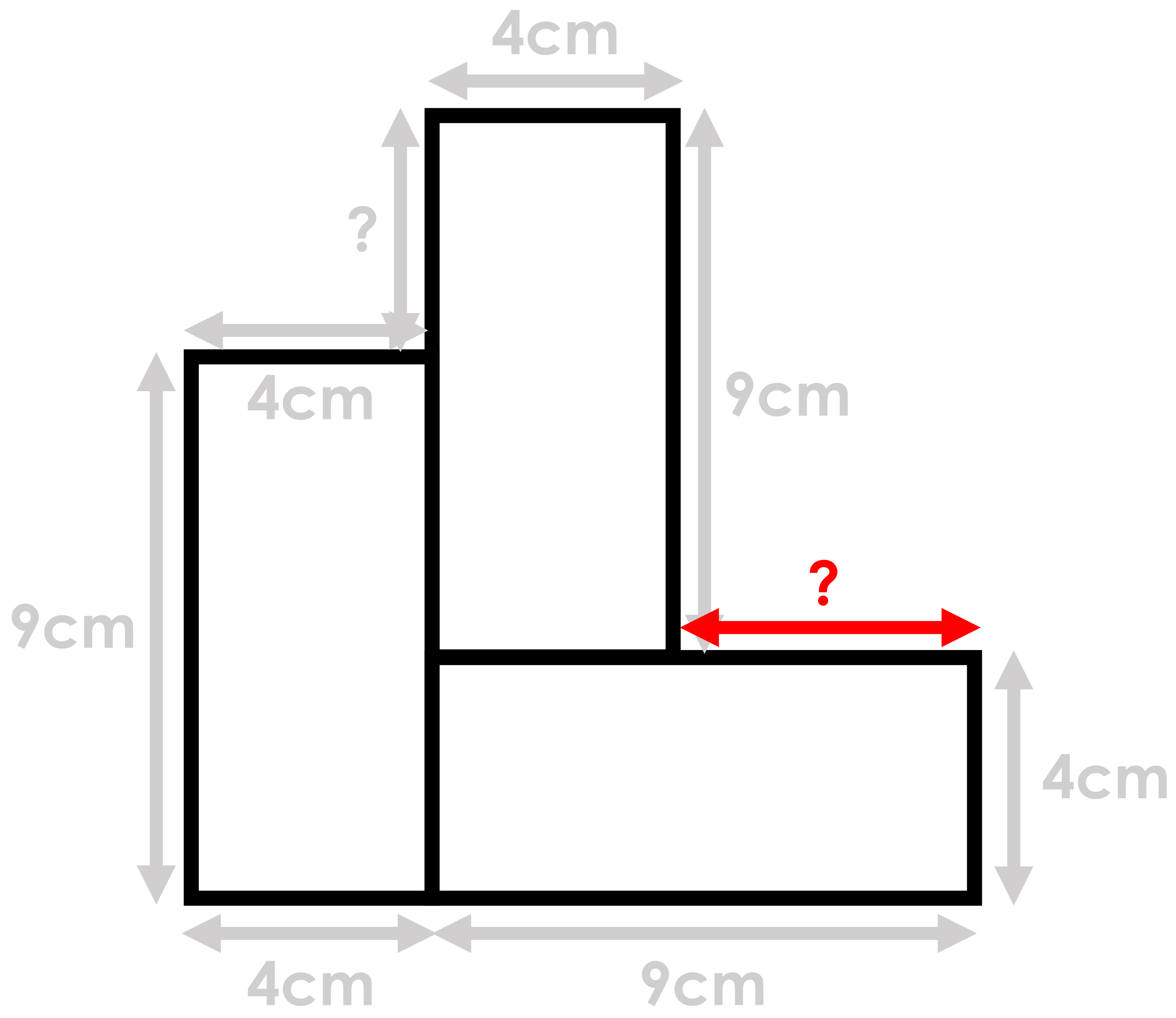
Task 46: Combined shapes



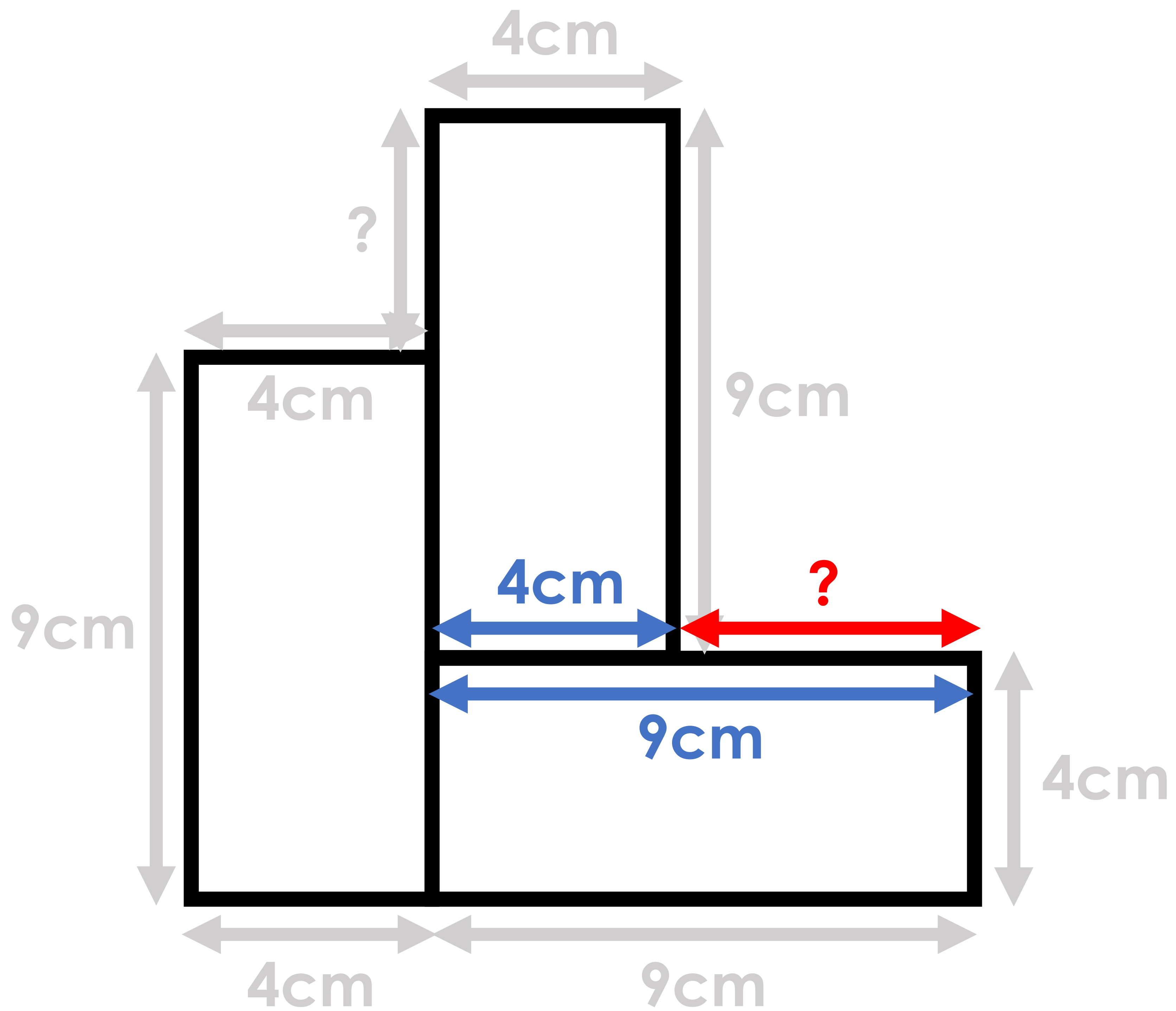
Task 46: Combined shapes



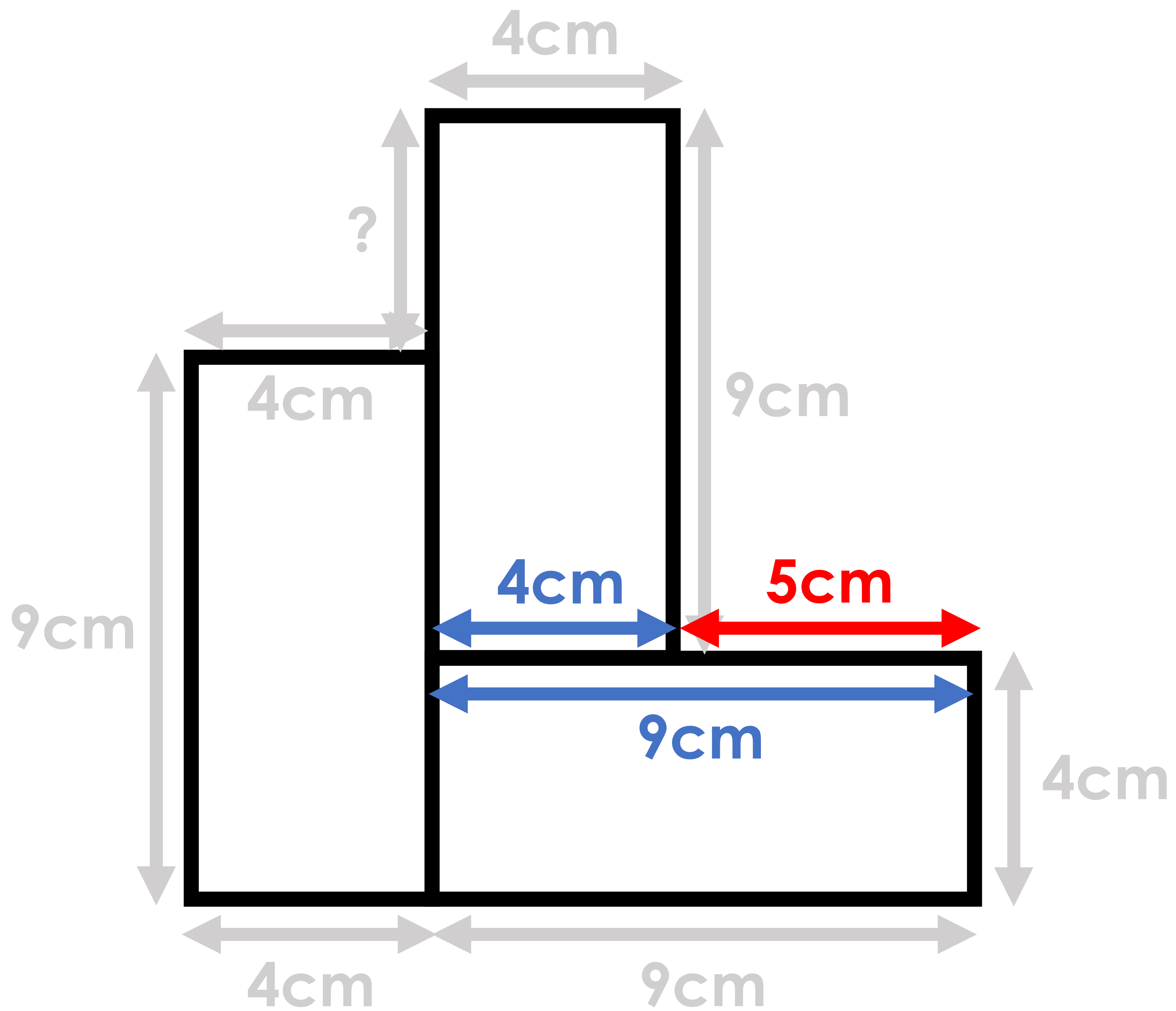
Task 46: Combined shapes



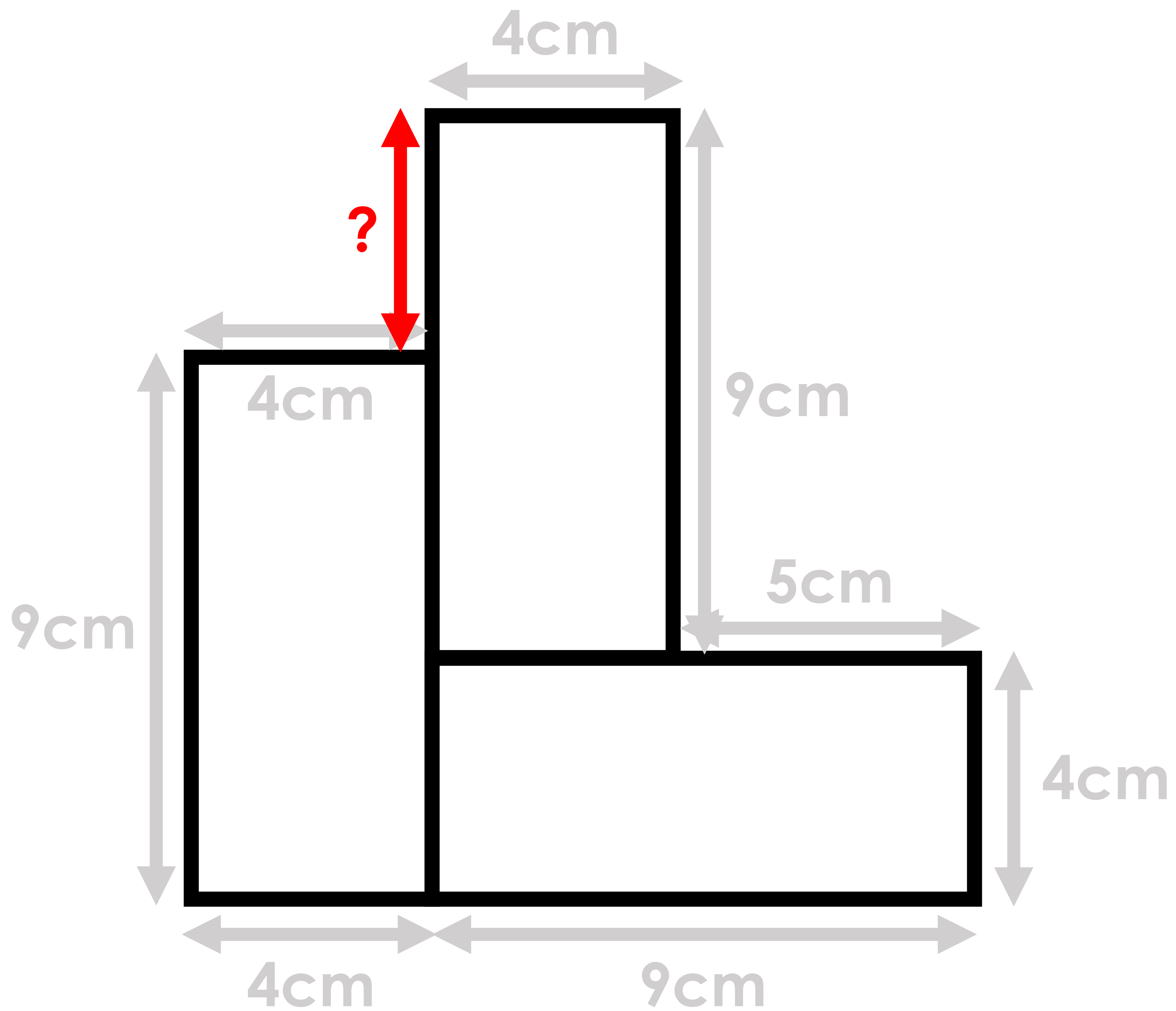
Task 46: Combined shapes



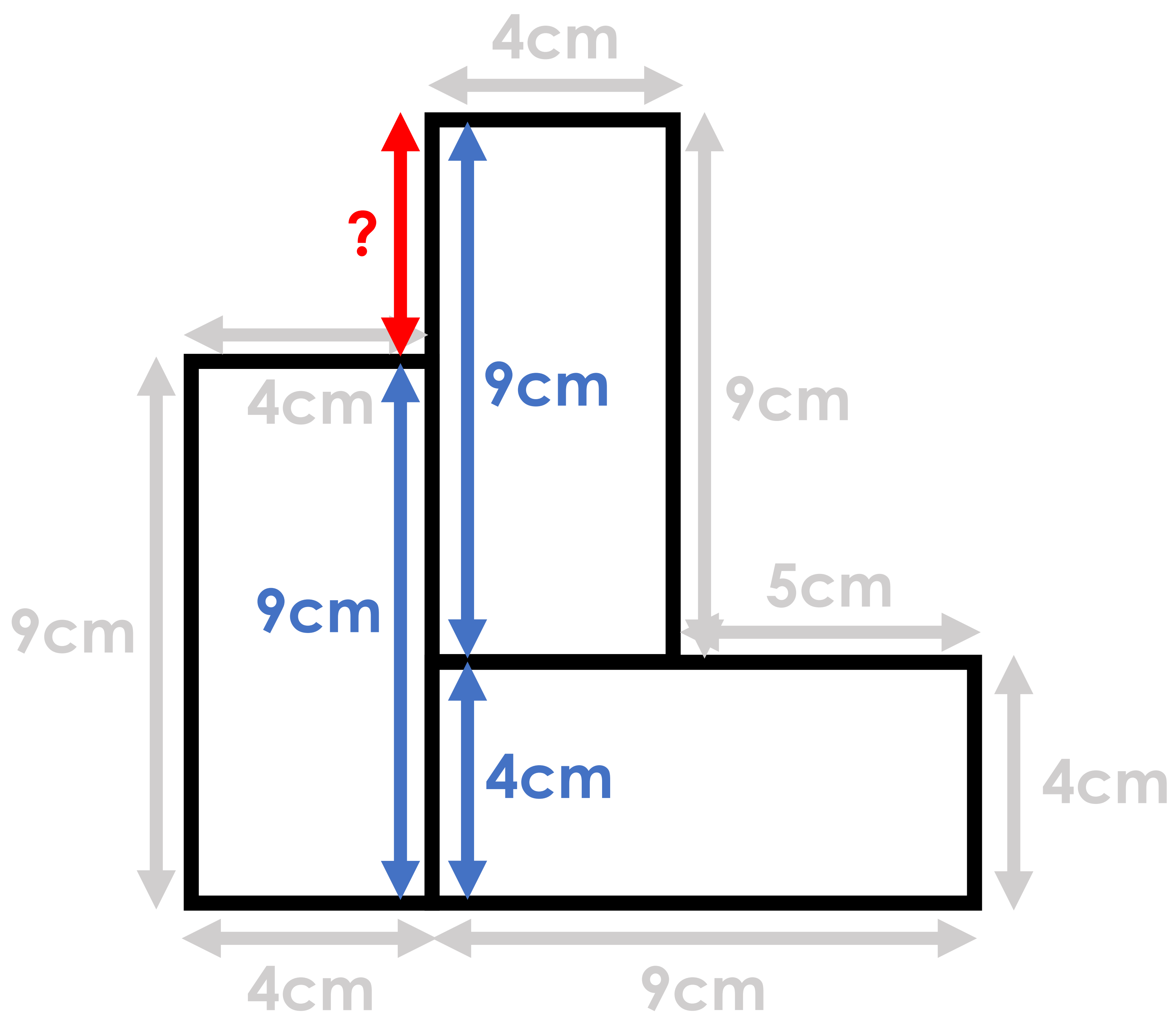
Task 46: Combined shapes



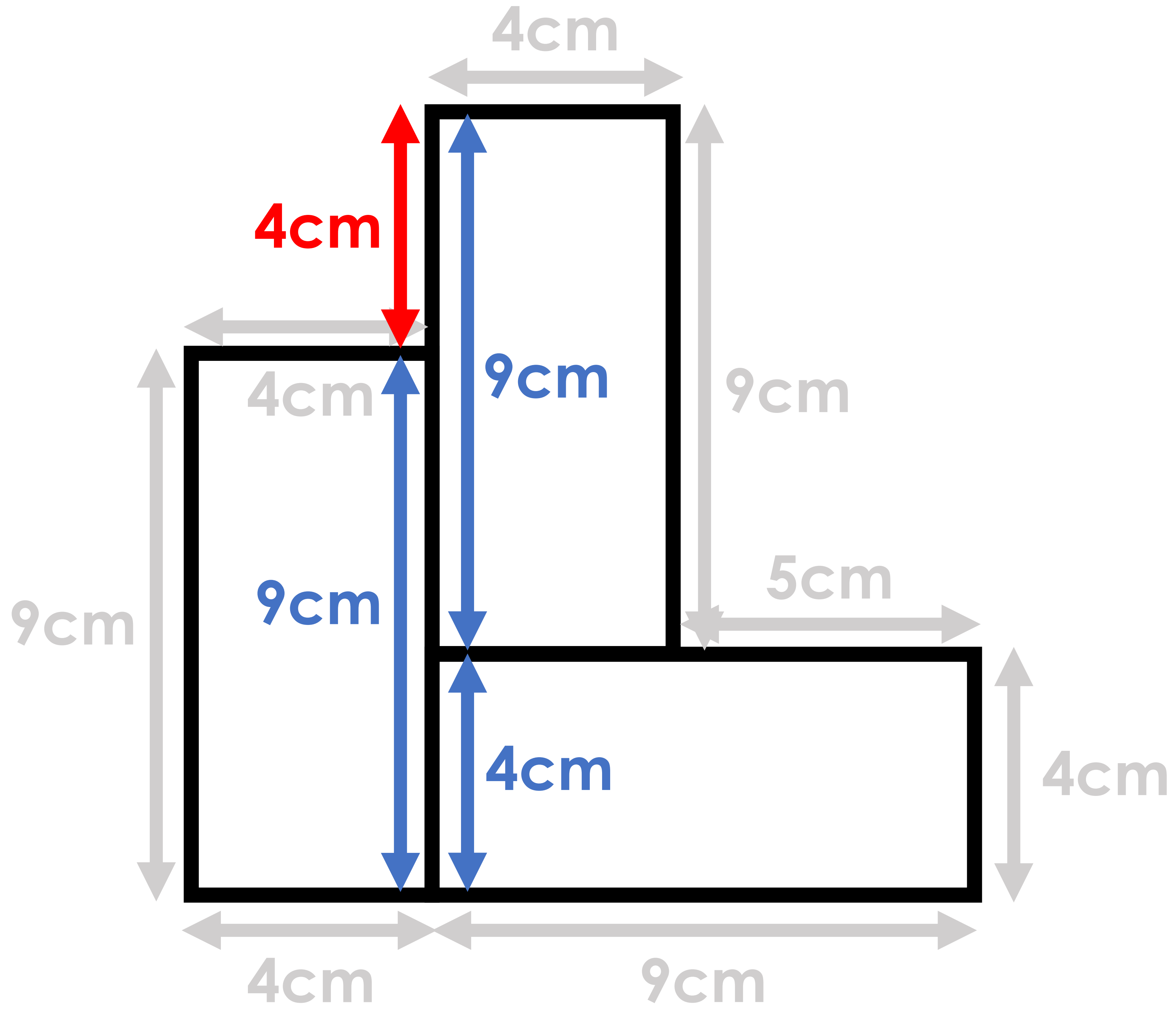
Task 46: Combined shapes



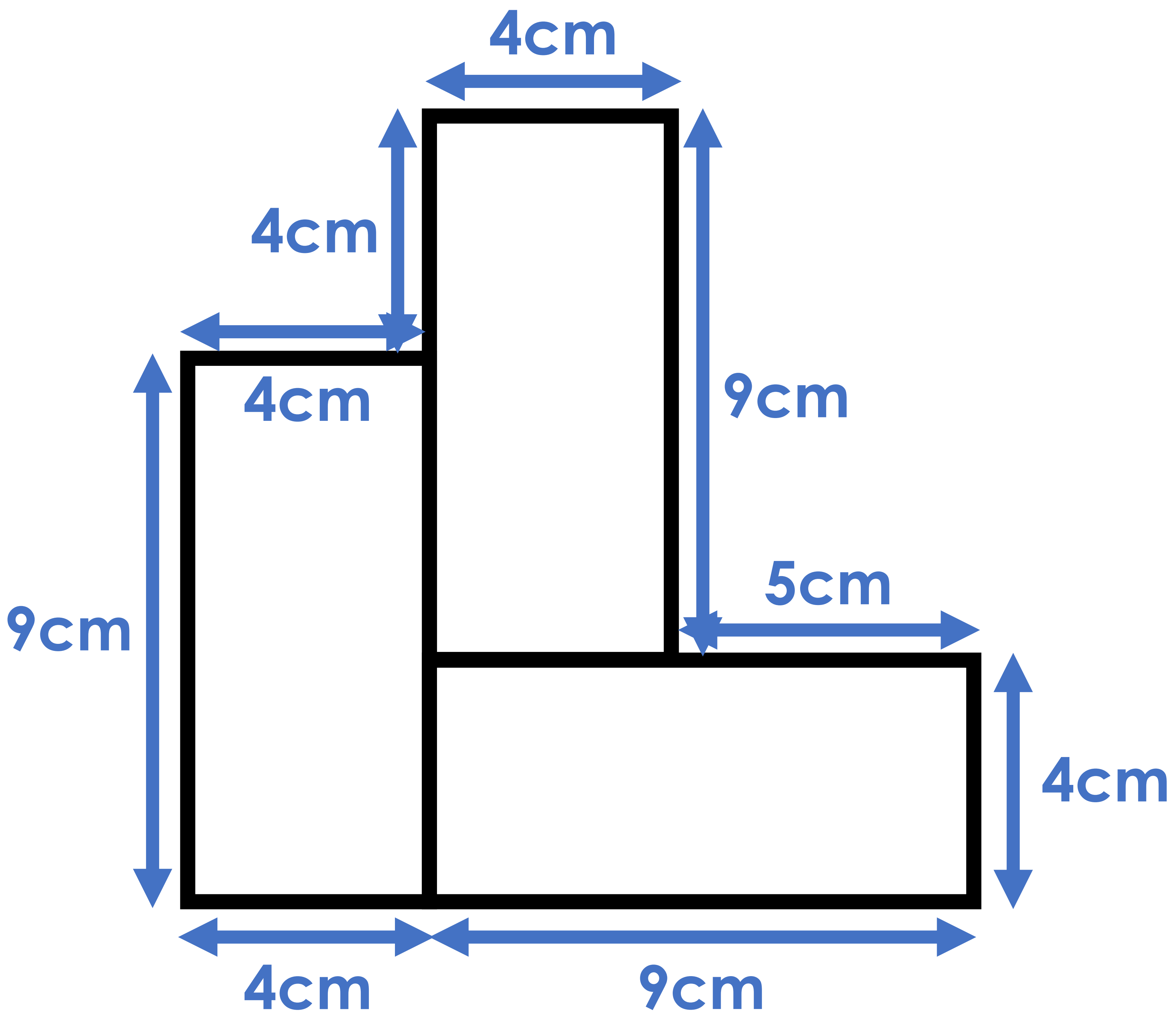
Task 46: Combined shapes



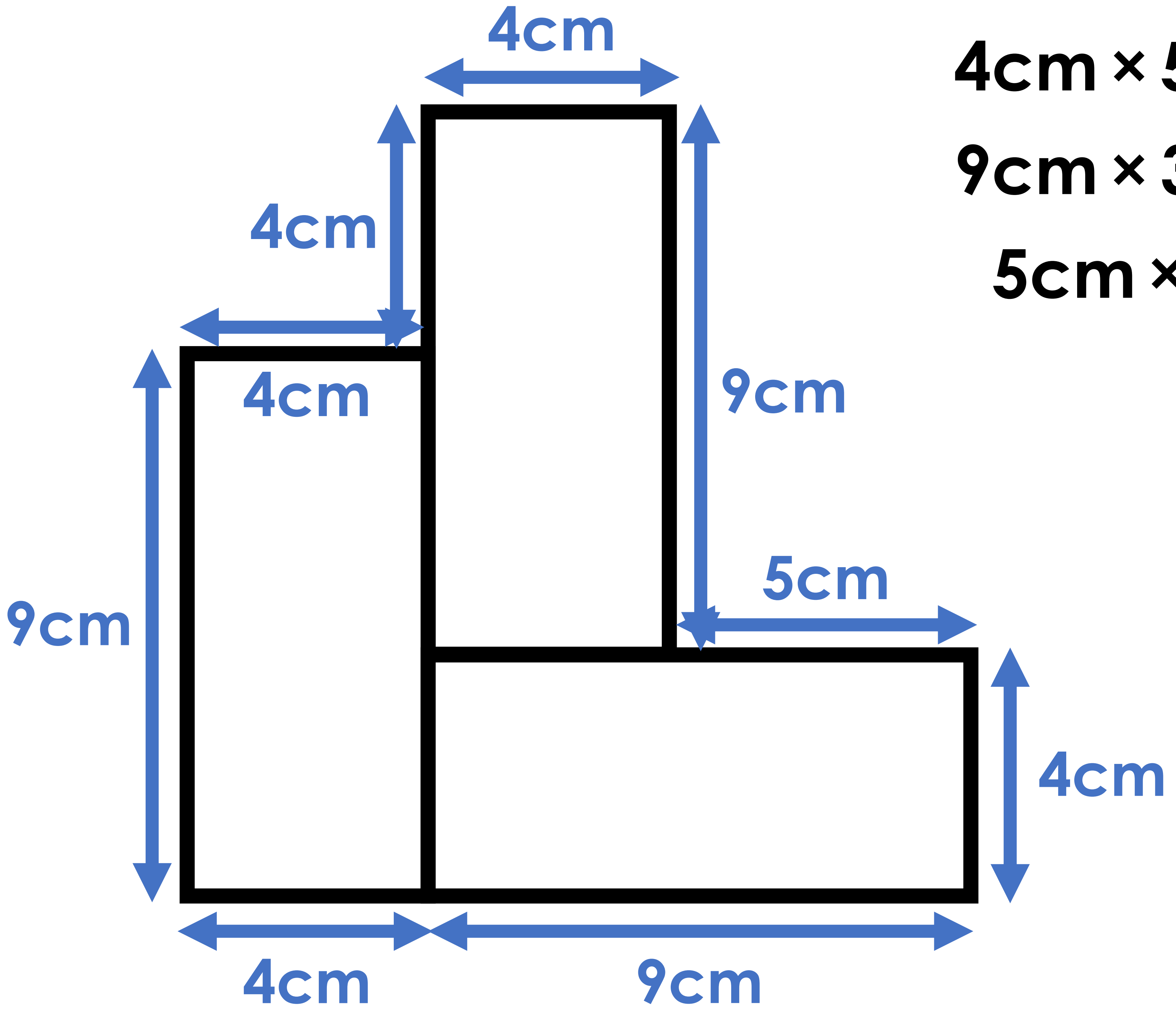
Task 46: Combined shapes



Task 46: Combined shapes



Task 46: Combined shapes



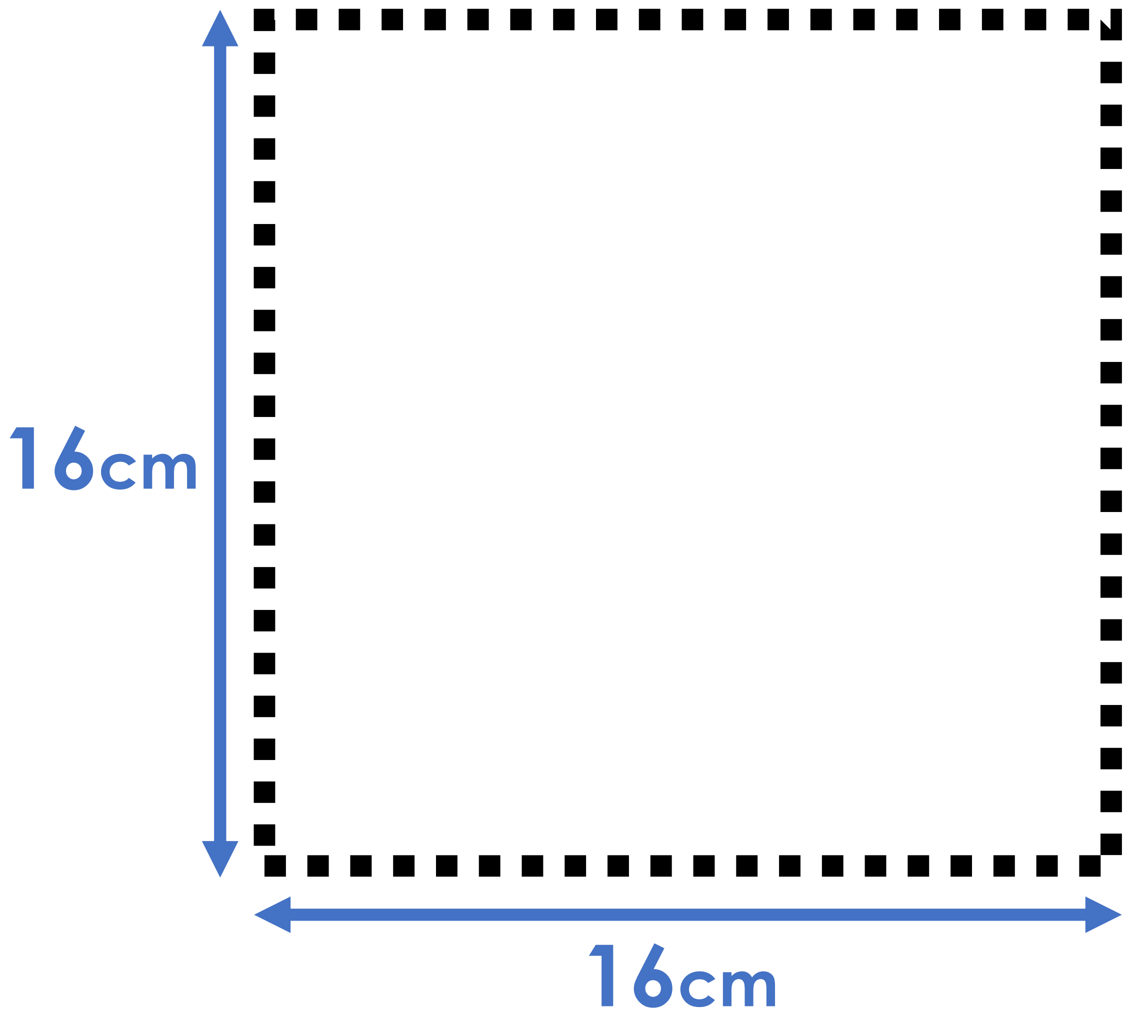
$4cm \times 5 = 20cm$

$9cm \times 3 = 27cm$

$5cm \times 1 = 5cm$

$\underline{=52cm}$

Task 47: Triangle area

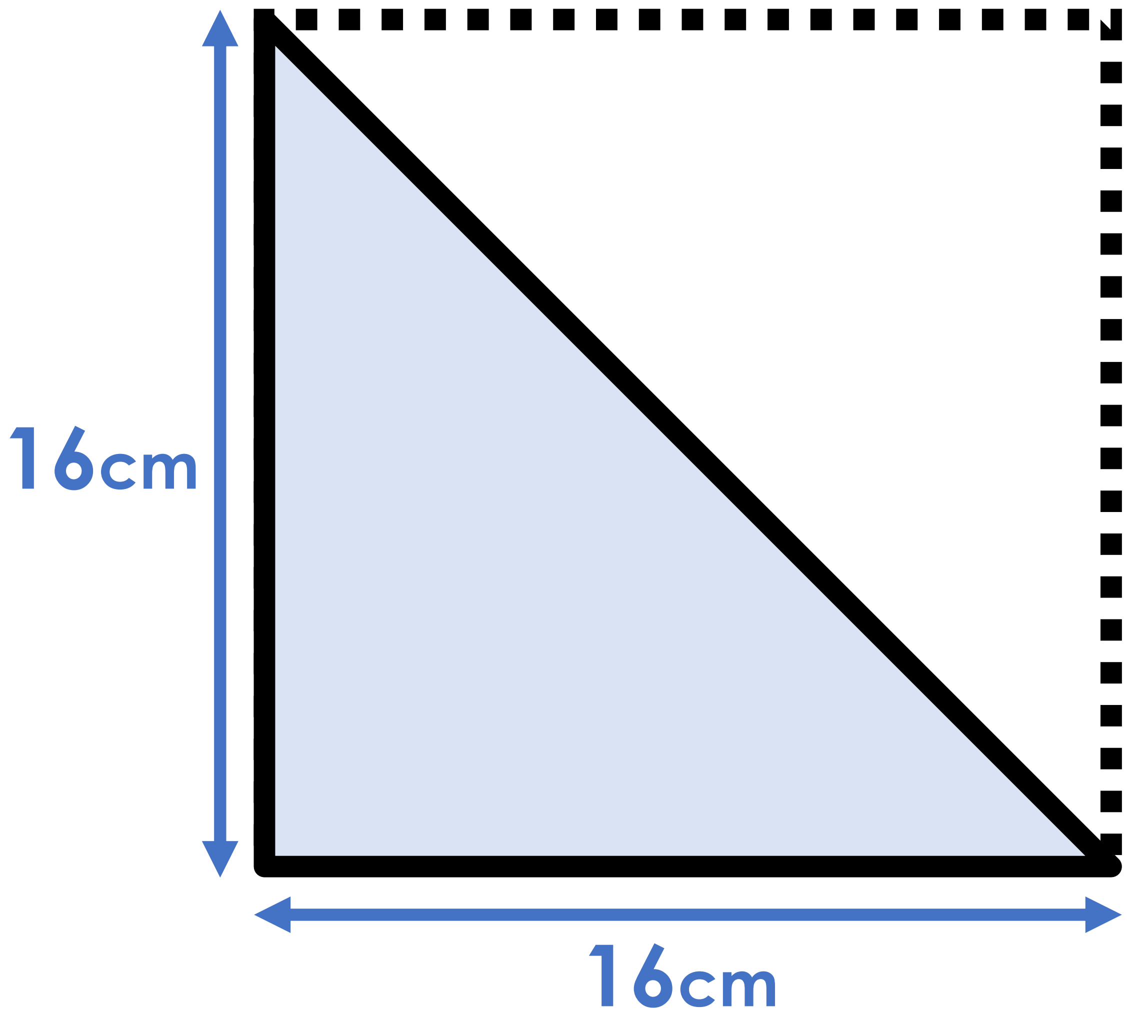


When length B = 16cm

Area of square:

$16^2 = 256cm^2$

Task 47: Triangle area

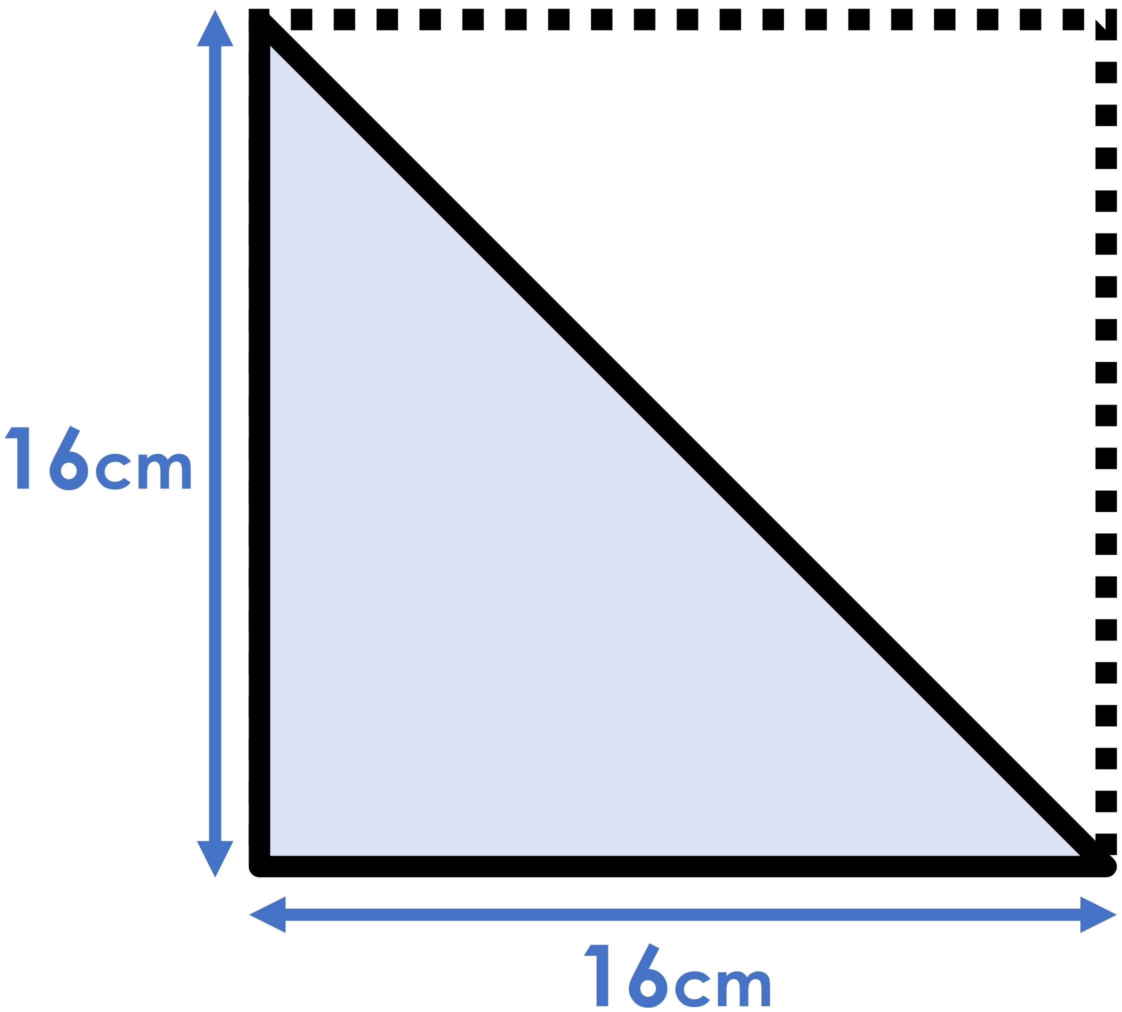


When length B = 16cm

Area of triangle:

$16^2 \div 2 = 128cm^2$

Task 47: Triangle area



***When length B = 16**cm*

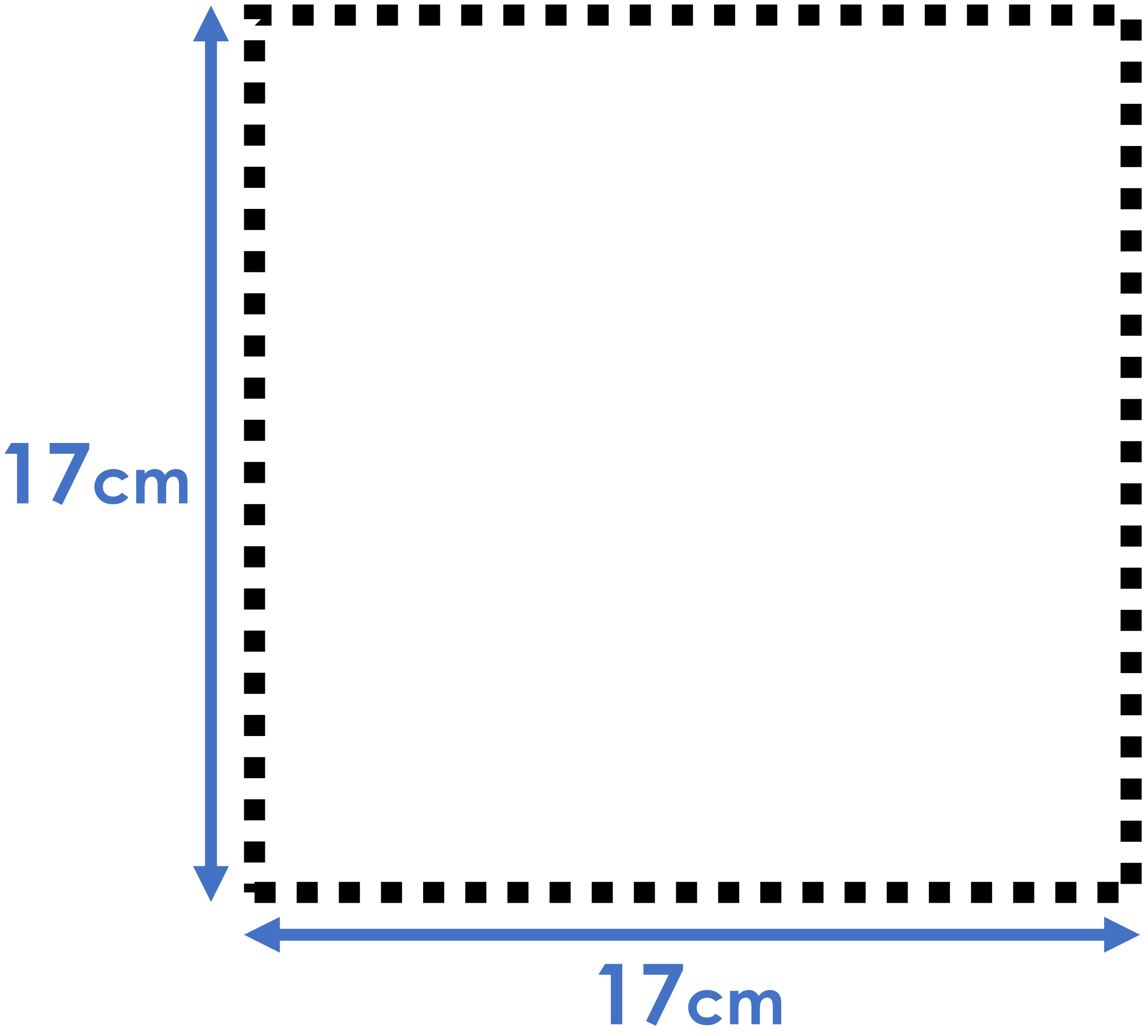
Area of triangle:

$16^2 \div 2 = 128$cm²

Less than 150cm² ✓

Now try 17cm

Task 47: Triangle area

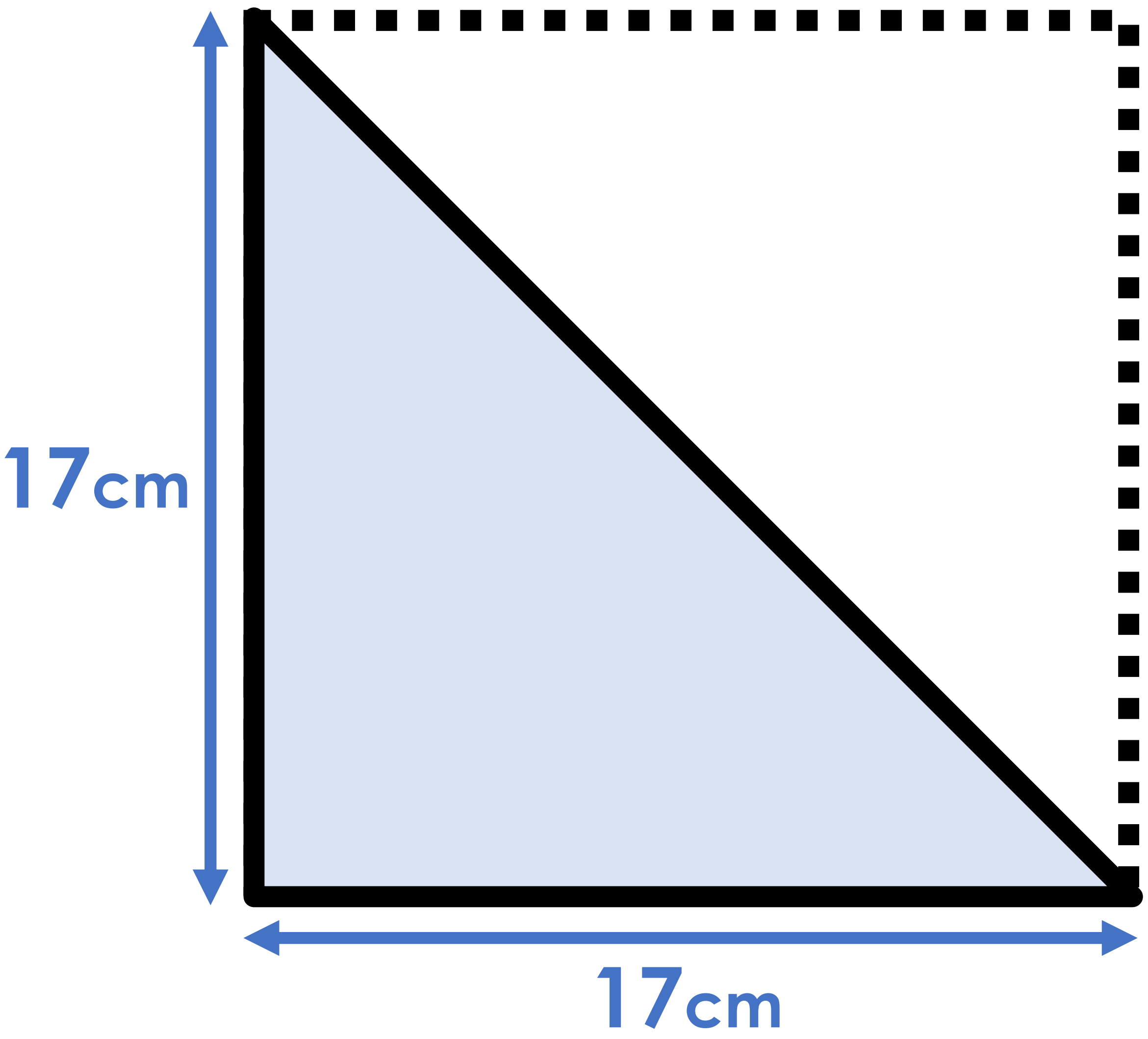


When length B = 17cm

Area of square:

$17^2 \div 2 = 289cm^2$

Task 47: Triangle area

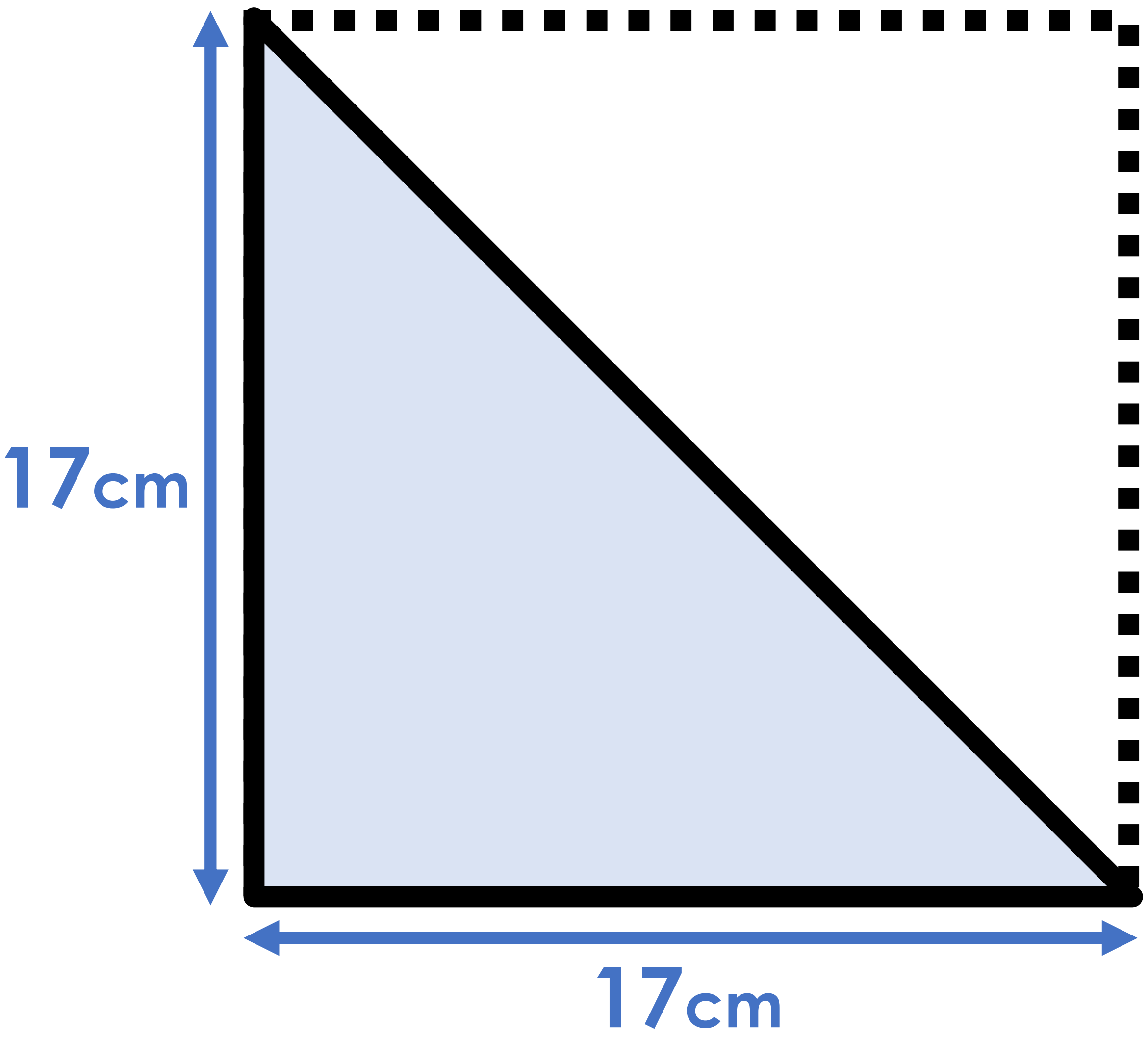


When length B = 17cm

Area of triangle:

$17^2 \div 2 = 144.5\text{cm}^2$

Task 47: Triangle area



When length B = 17cm

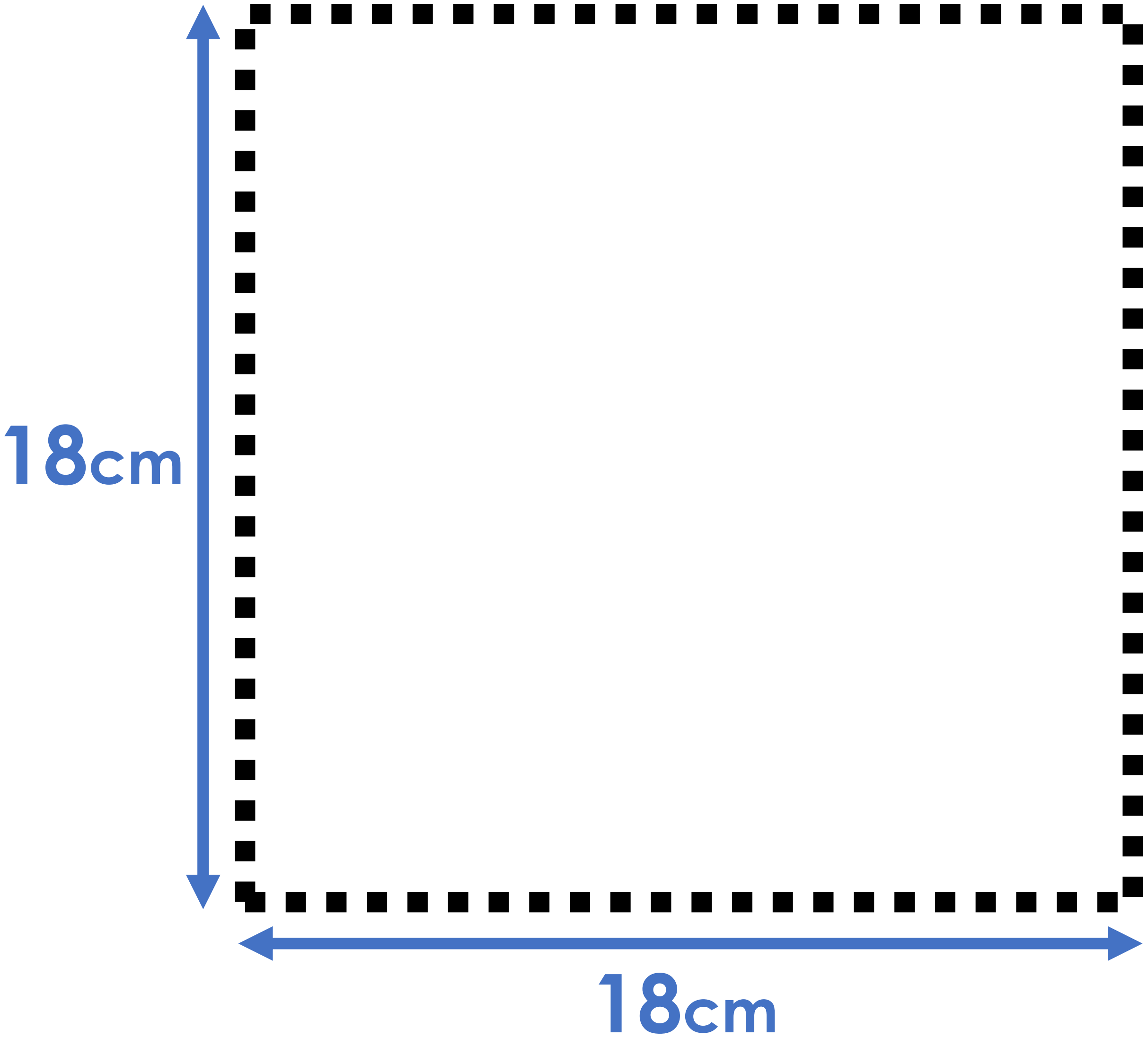
Area of triangle:

$17^2 \div 2 = 144.5\text{cm}^2$

Less than 150cm² ✓

Now try 18cm

Task 47: Triangle area

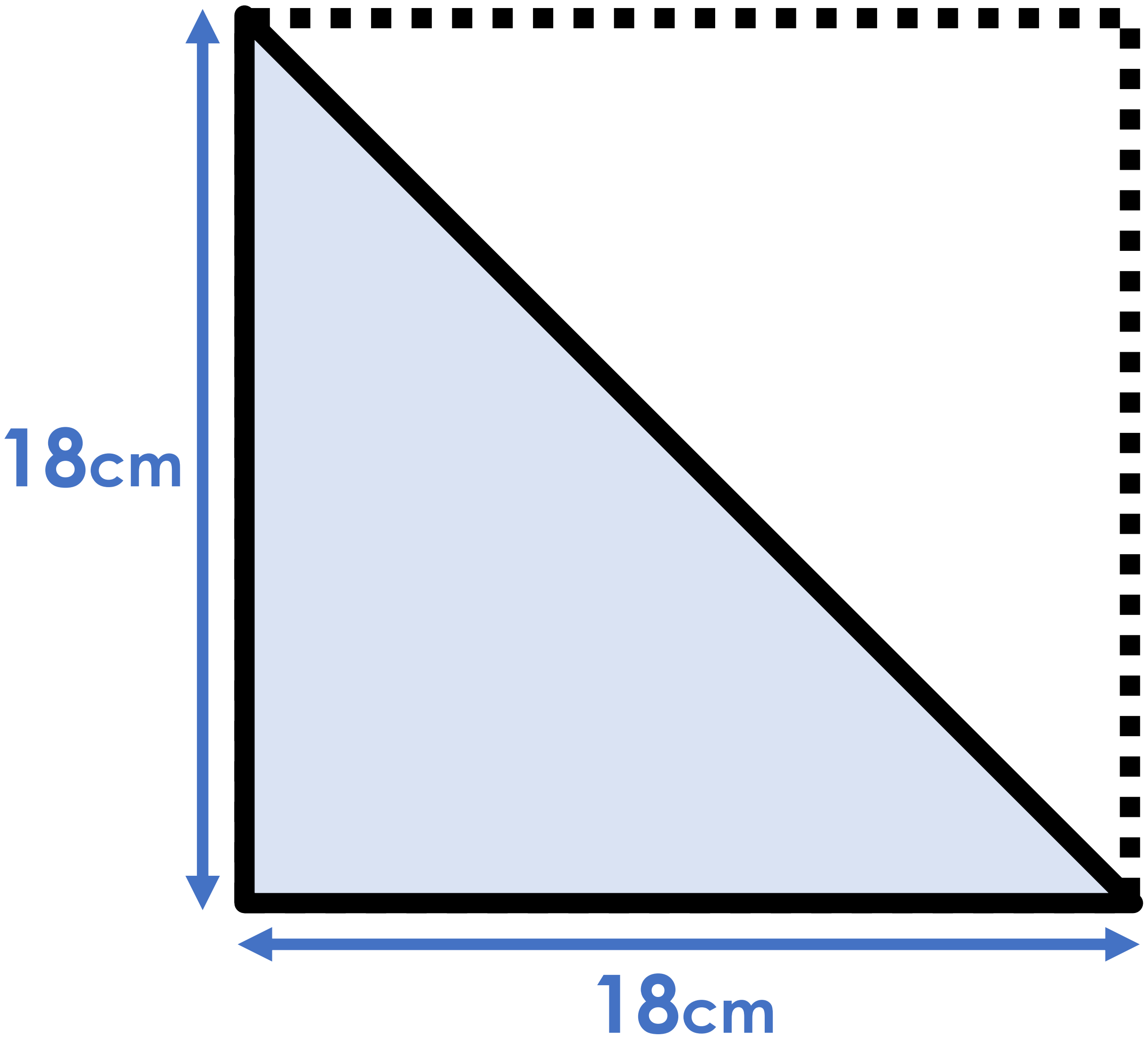


When length B = 18cm

Area of square:

$18^2 = 324cm^2$

Task 47: Triangle area

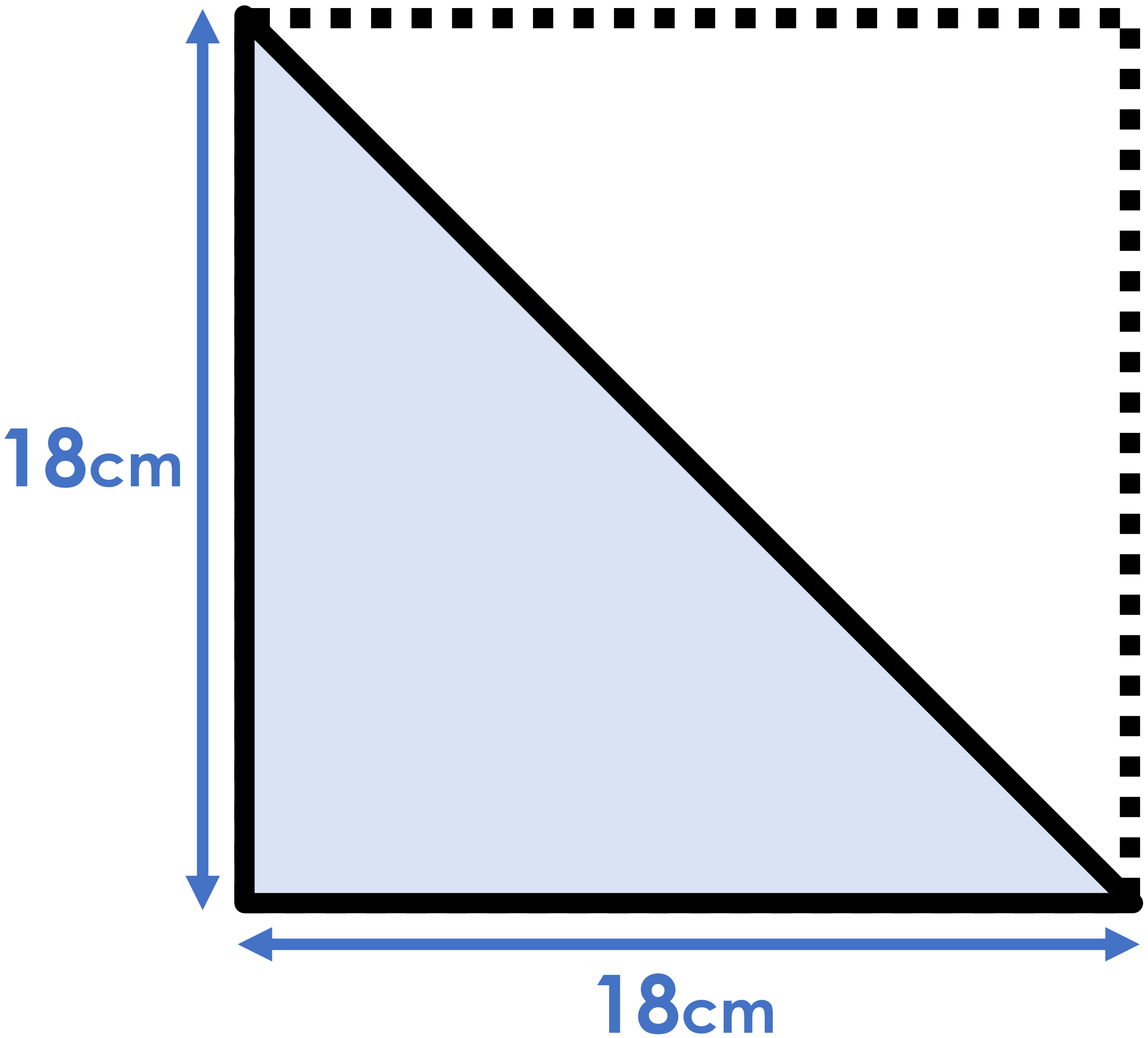


When length B = 18cm

Area of triangle:

$18^2 \div 2 = 162cm^2$

Task 47: Triangle area



When length B = 18cm

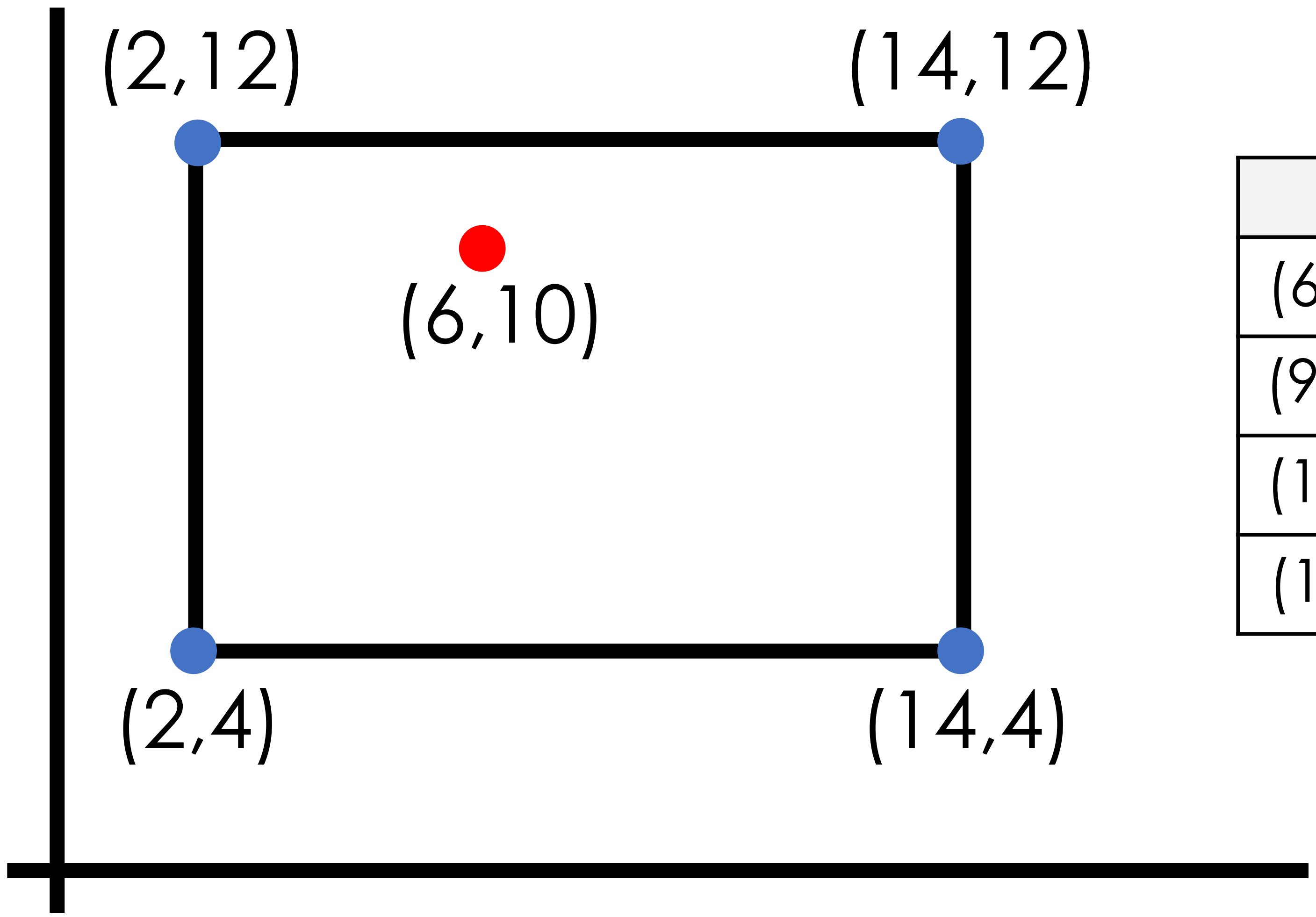
Area of triangle:

$18^2 \div 2 = 162cm^2$

More than 150cm² ✗

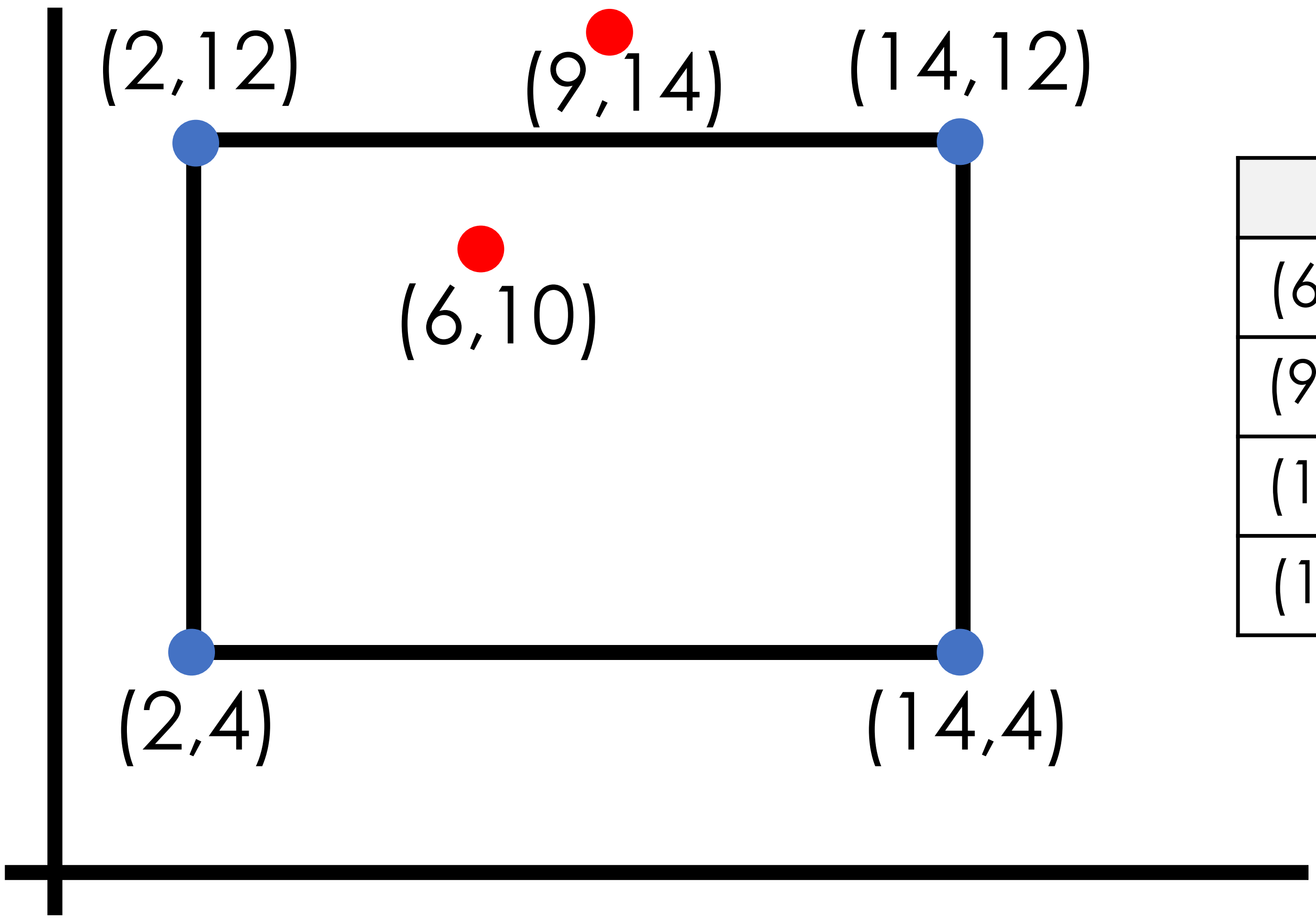
Largest length B = <u>17cm</u>

Task 48: Inside, edge or outside?



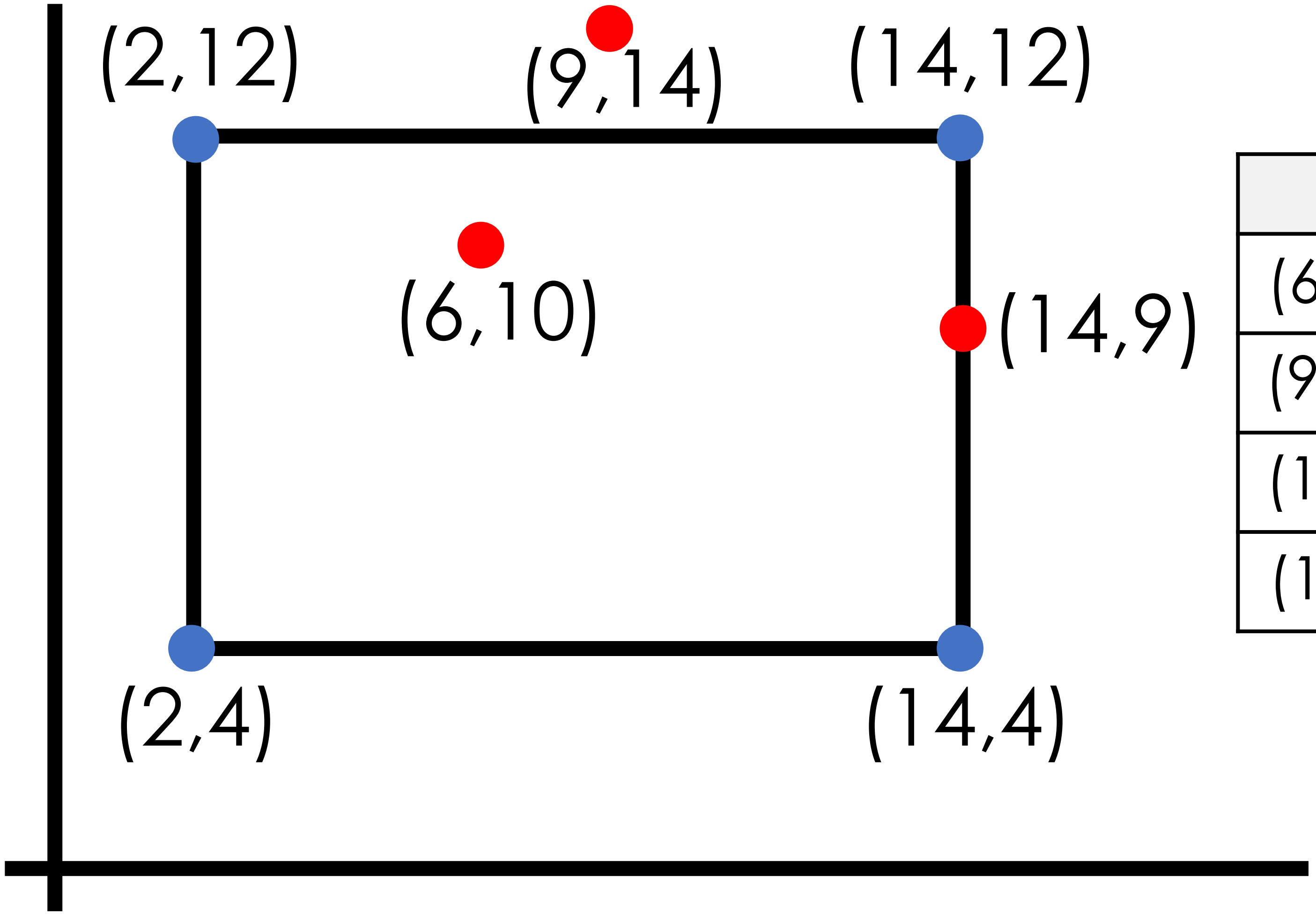
	Inside	Edge	Outside
(6,10)	✓		
(9,14)			
(14,9)			
(13,5)			

Task 48: Inside, edge or outside?



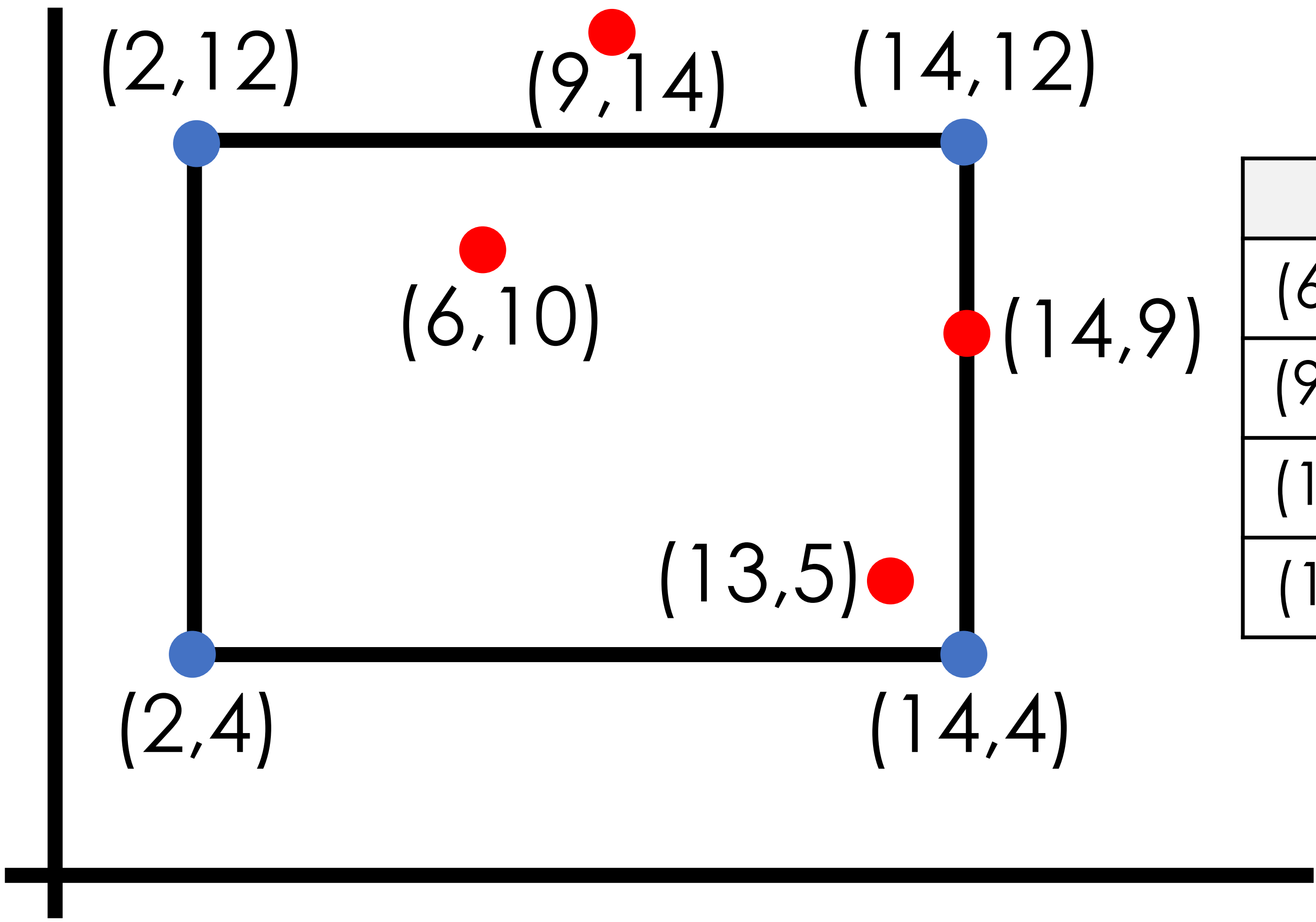
	Inside	Edge	Outside
(6,10)	✓		
(9,14)			✓
(14,9)			
(13,5)			

Task 48: Inside, edge or outside?



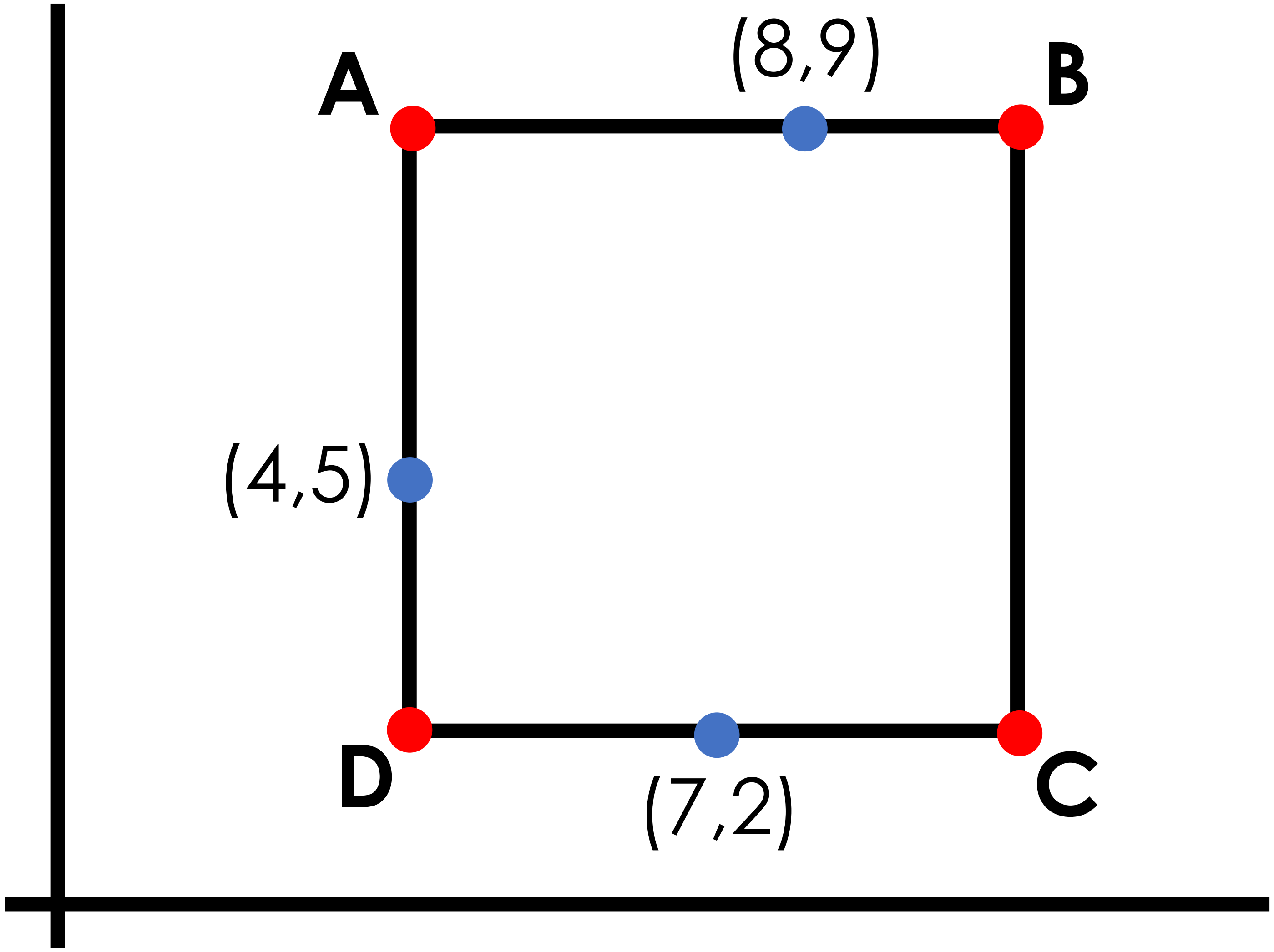
	Inside	Edge	Outside
(6,10)	✓		
(9,14)			✓
(14,9)		✓	
(13,5)			

Task 48: Inside, edge or outside?

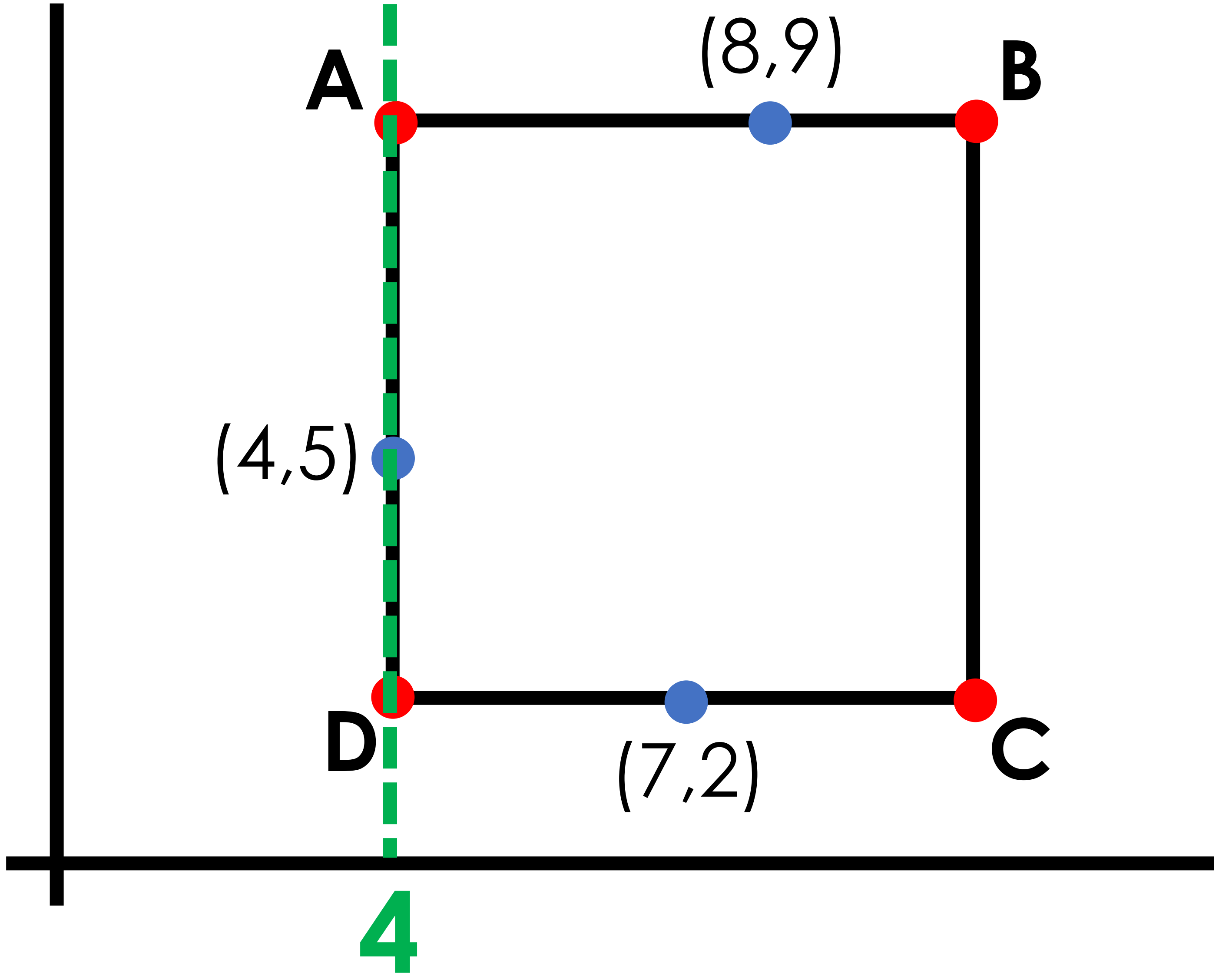


	Inside	Edge	Outside
(6,10)	✓		
(9,14)			✓
(14,9)		✓	
(13,5)	✓		

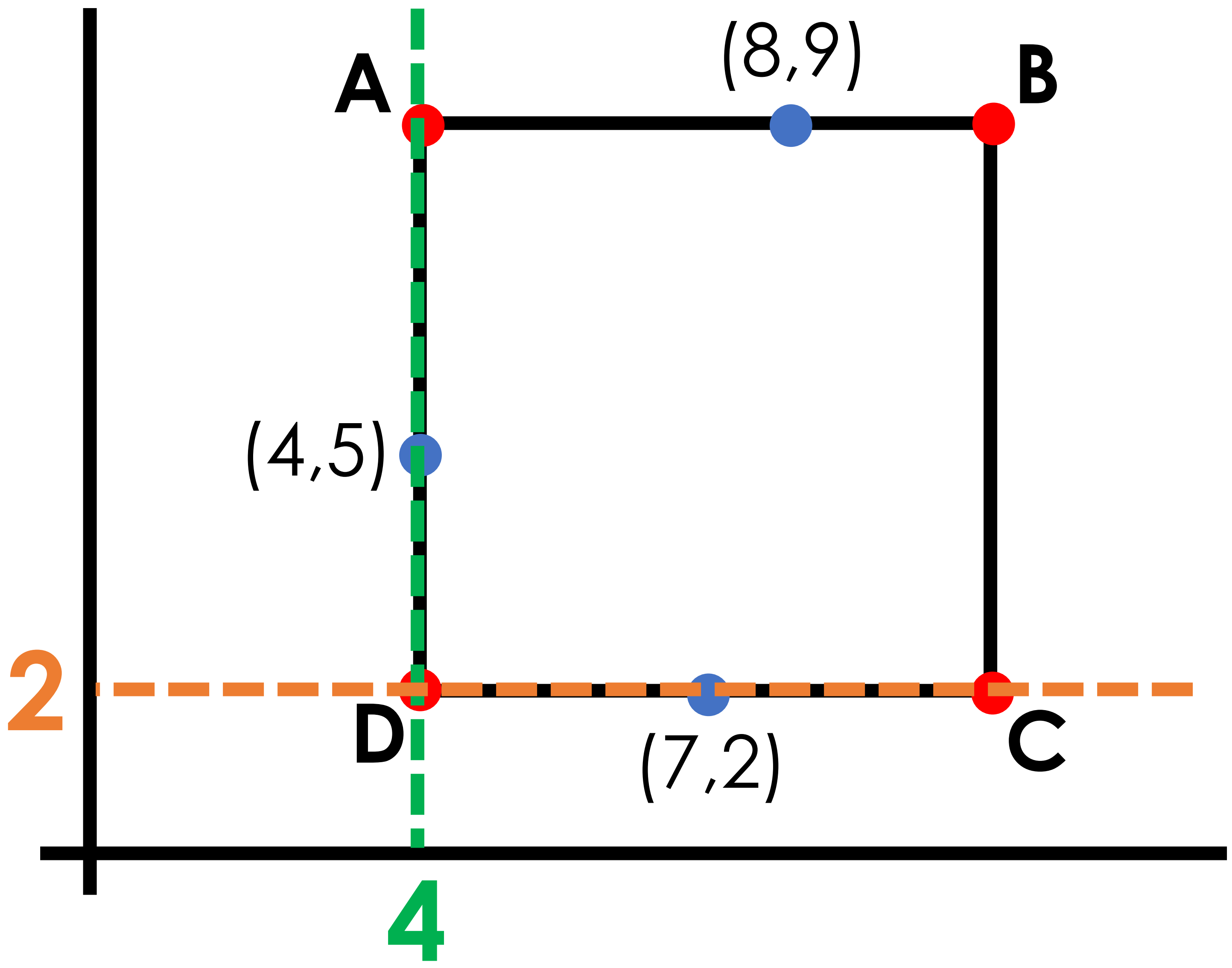
Task 49: Which vertices?



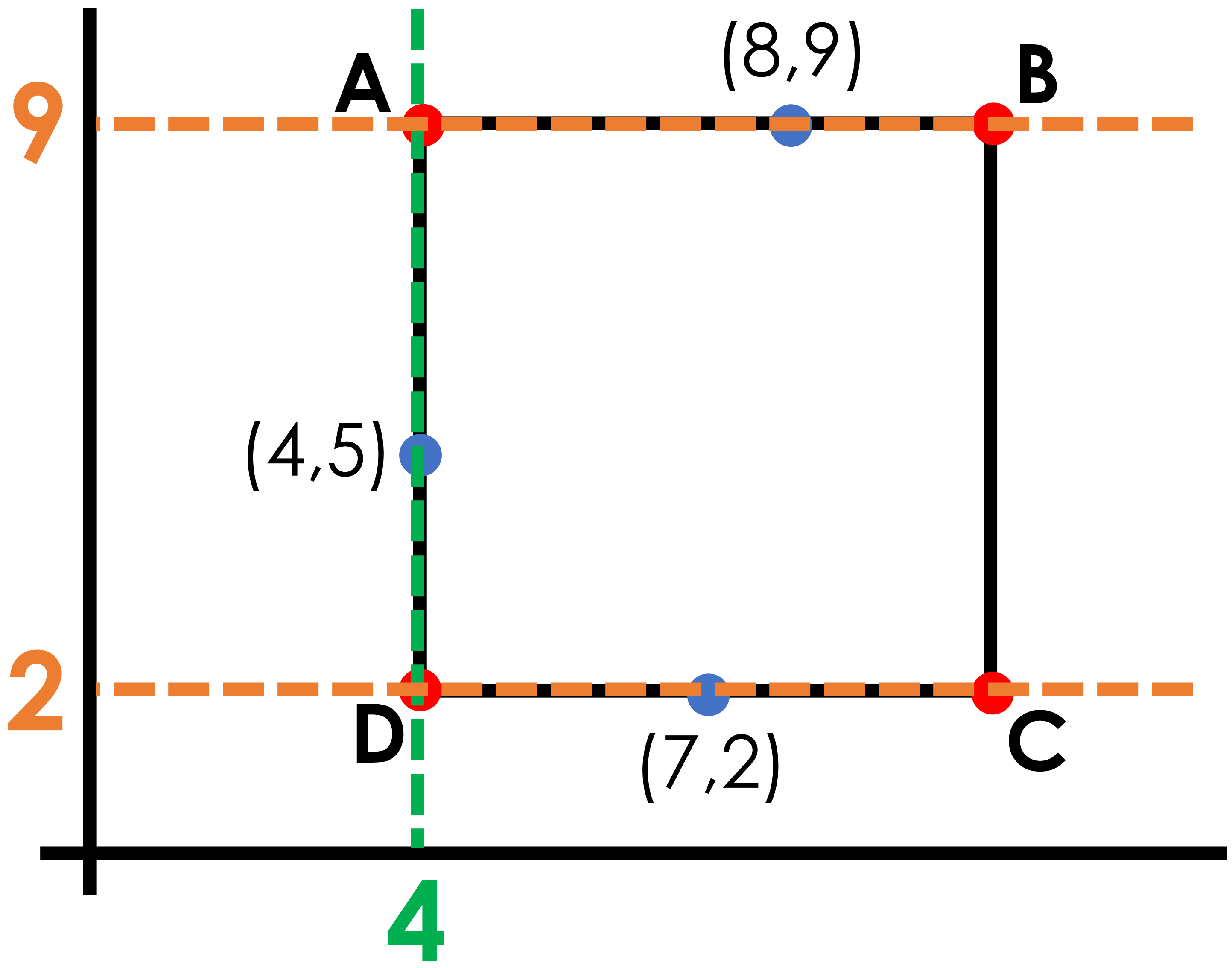
Task 49: Which vertices?



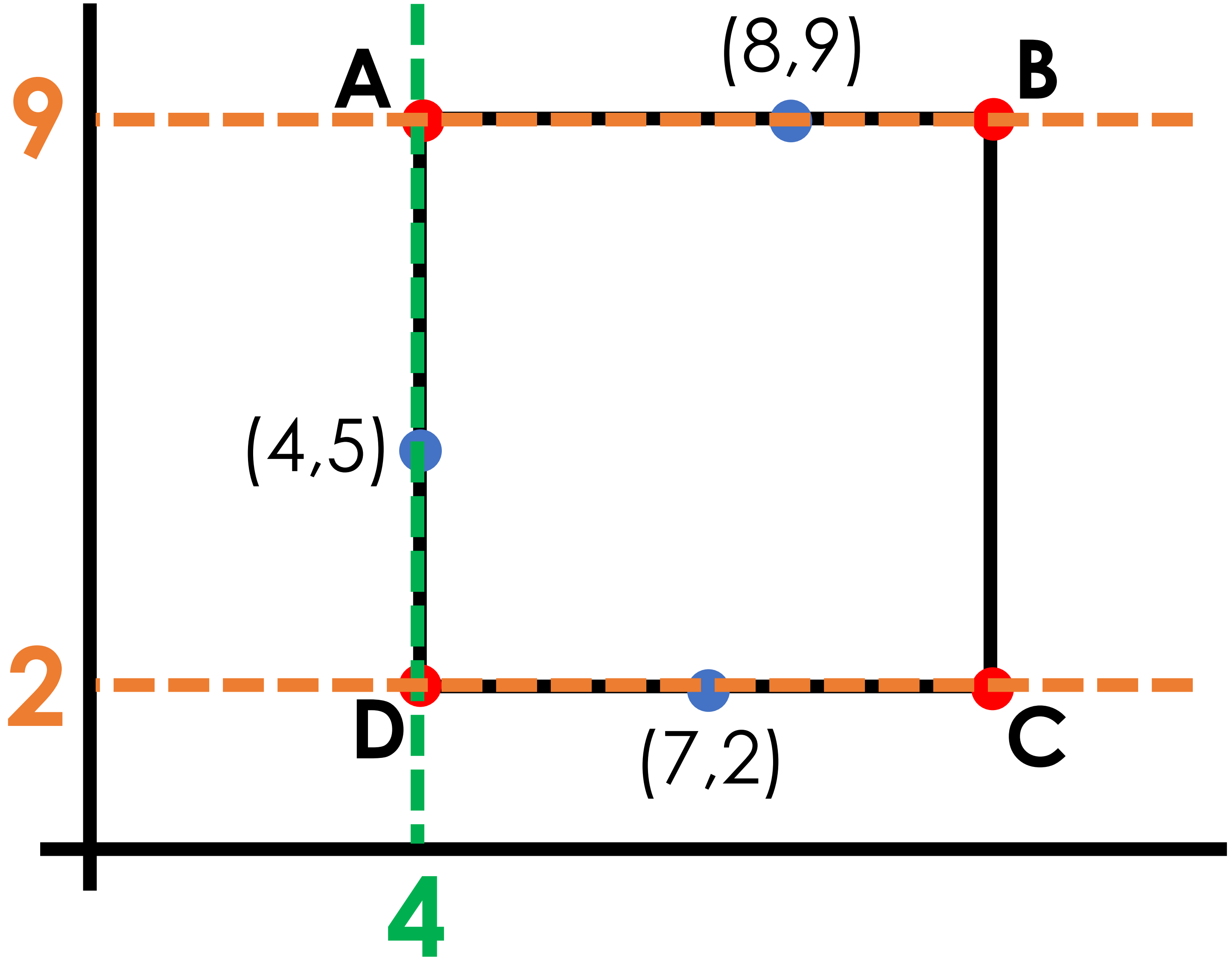
Task 49: Which vertices?



Task 49: Which vertices?

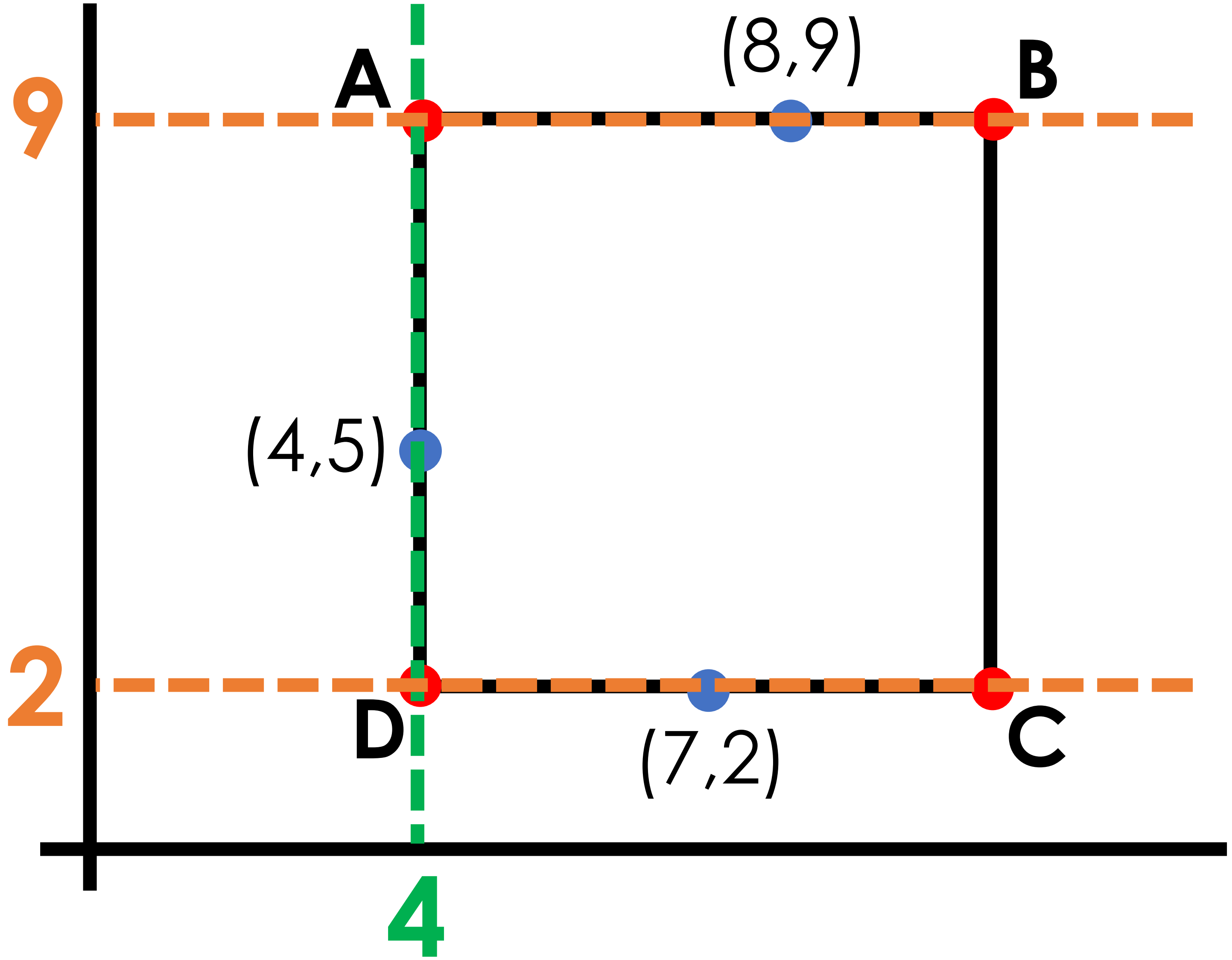


Task 49: Which vertices?



A = (4,9)

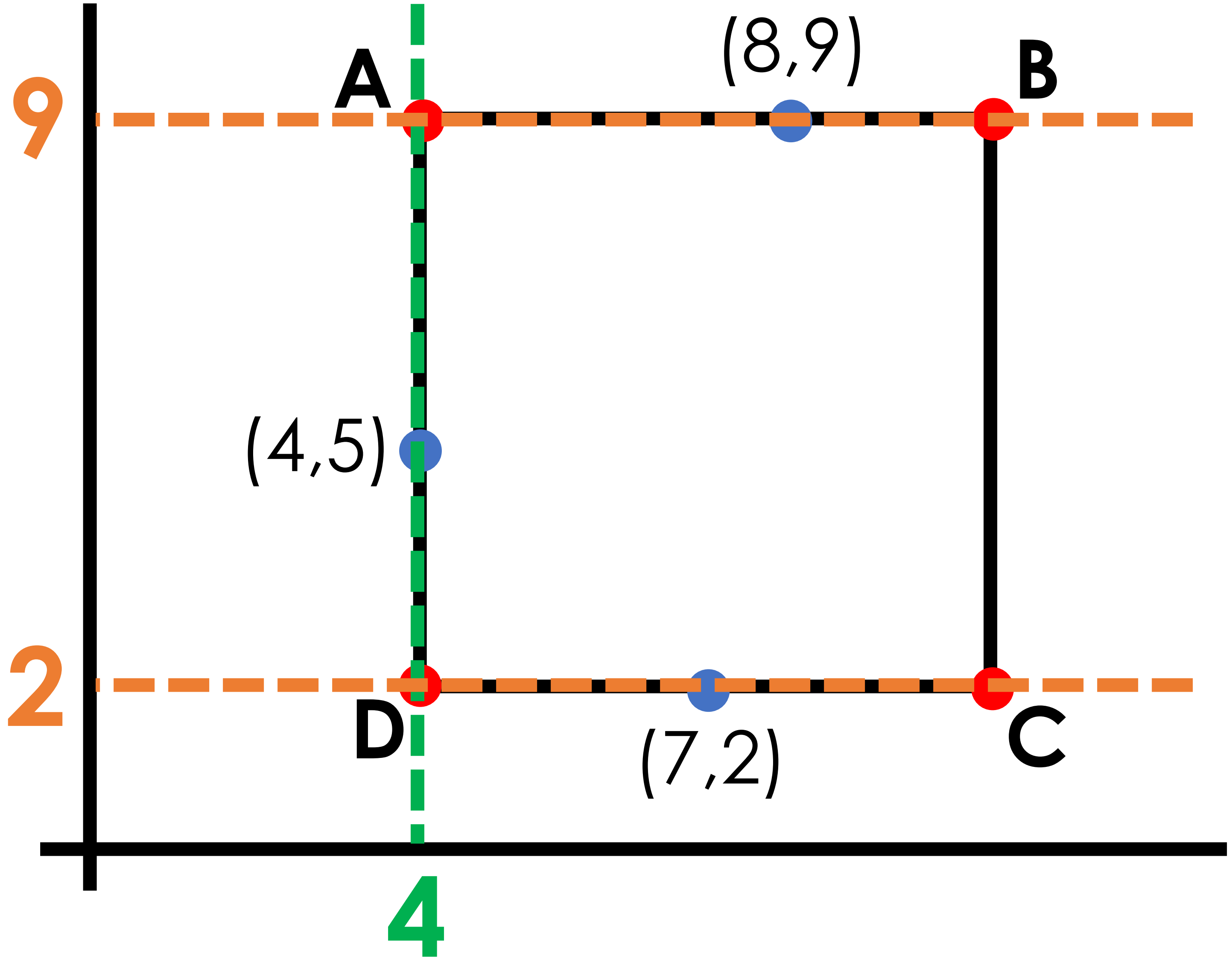
Task 49: Which vertices?



A = (4,9)

D = (4,2)

Task 49: Which vertices?



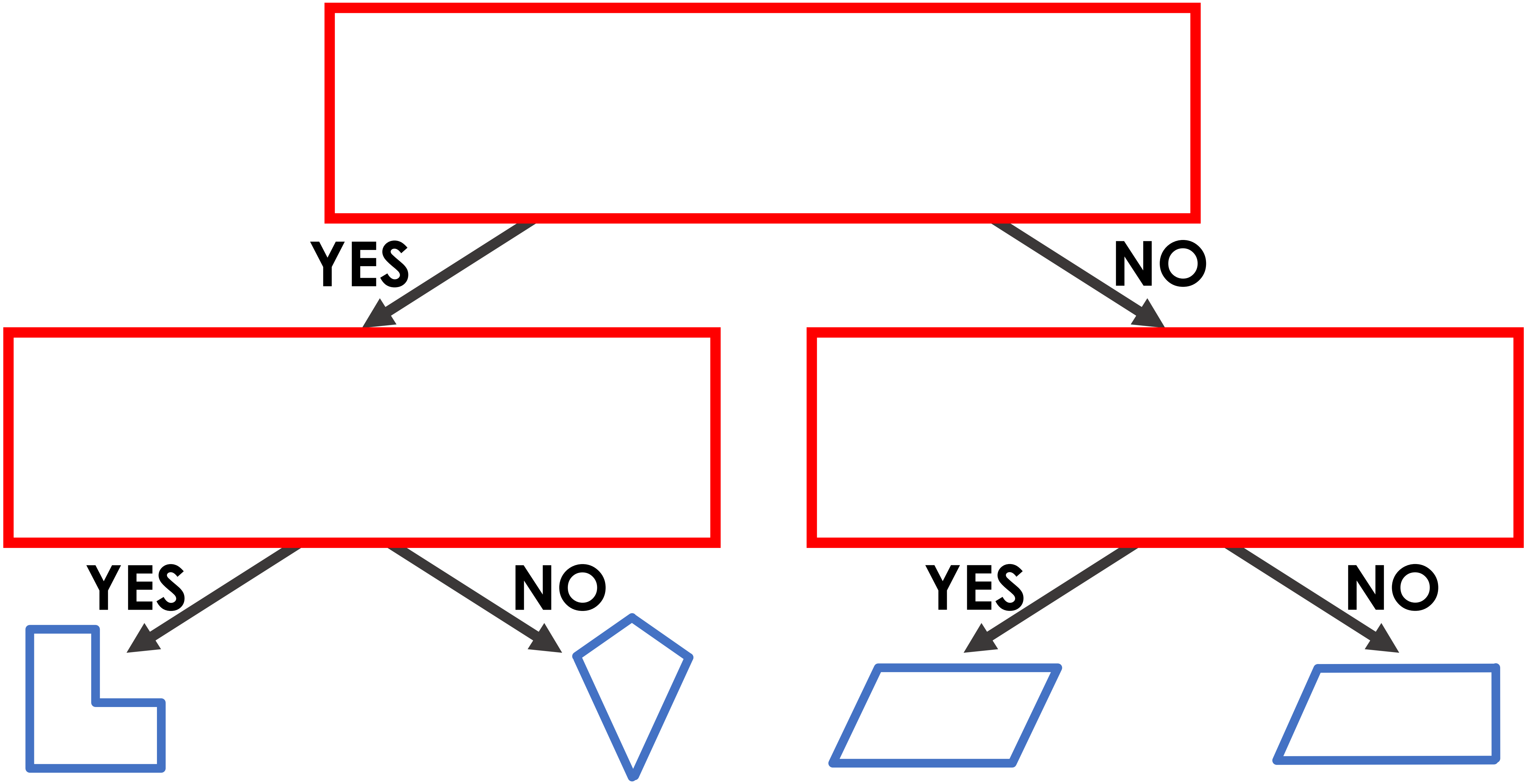
A = (4,9)

D = (4,2)

We don't know the **x coordinate** of points B and C

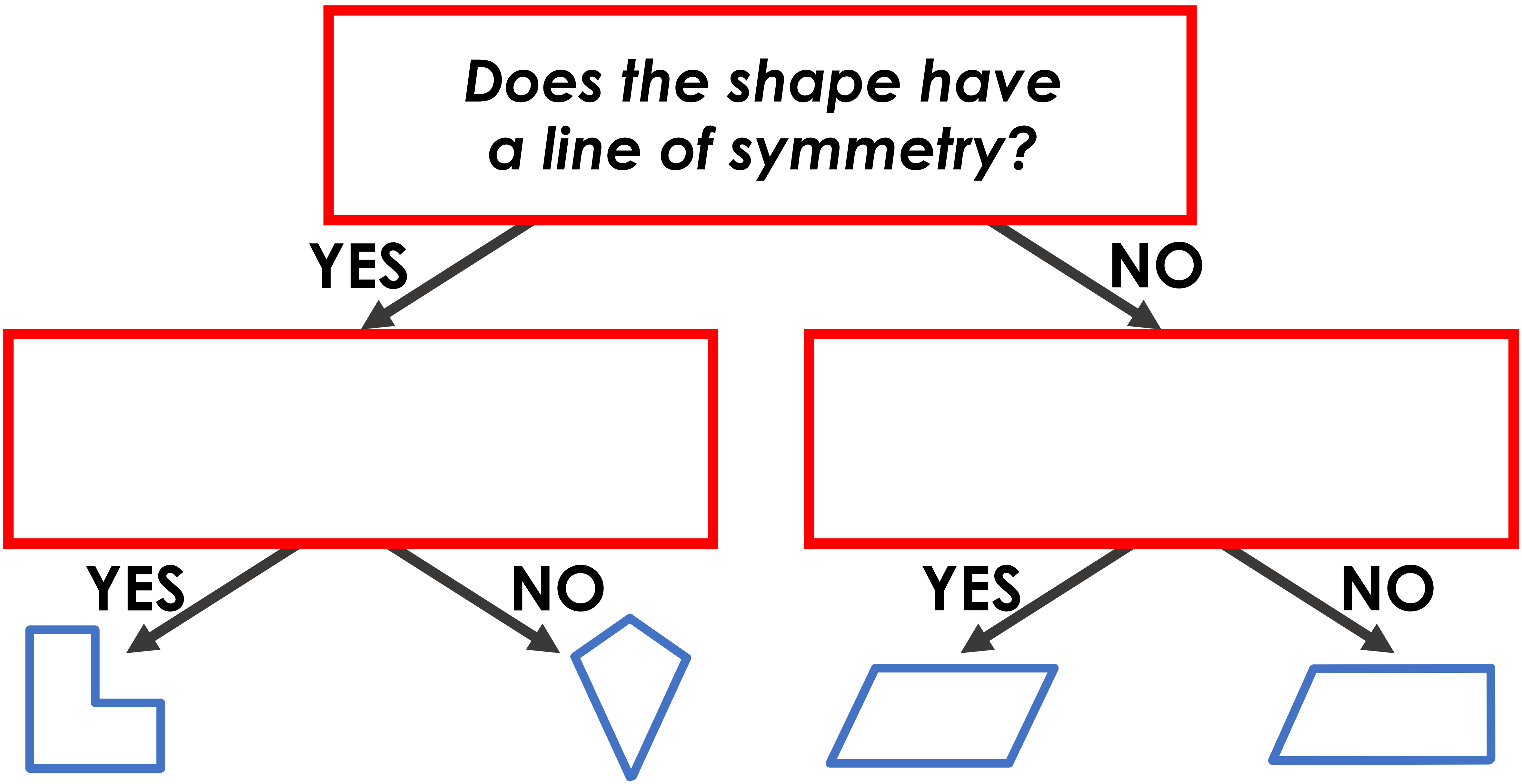
Task 50: Branching database

Example 1:



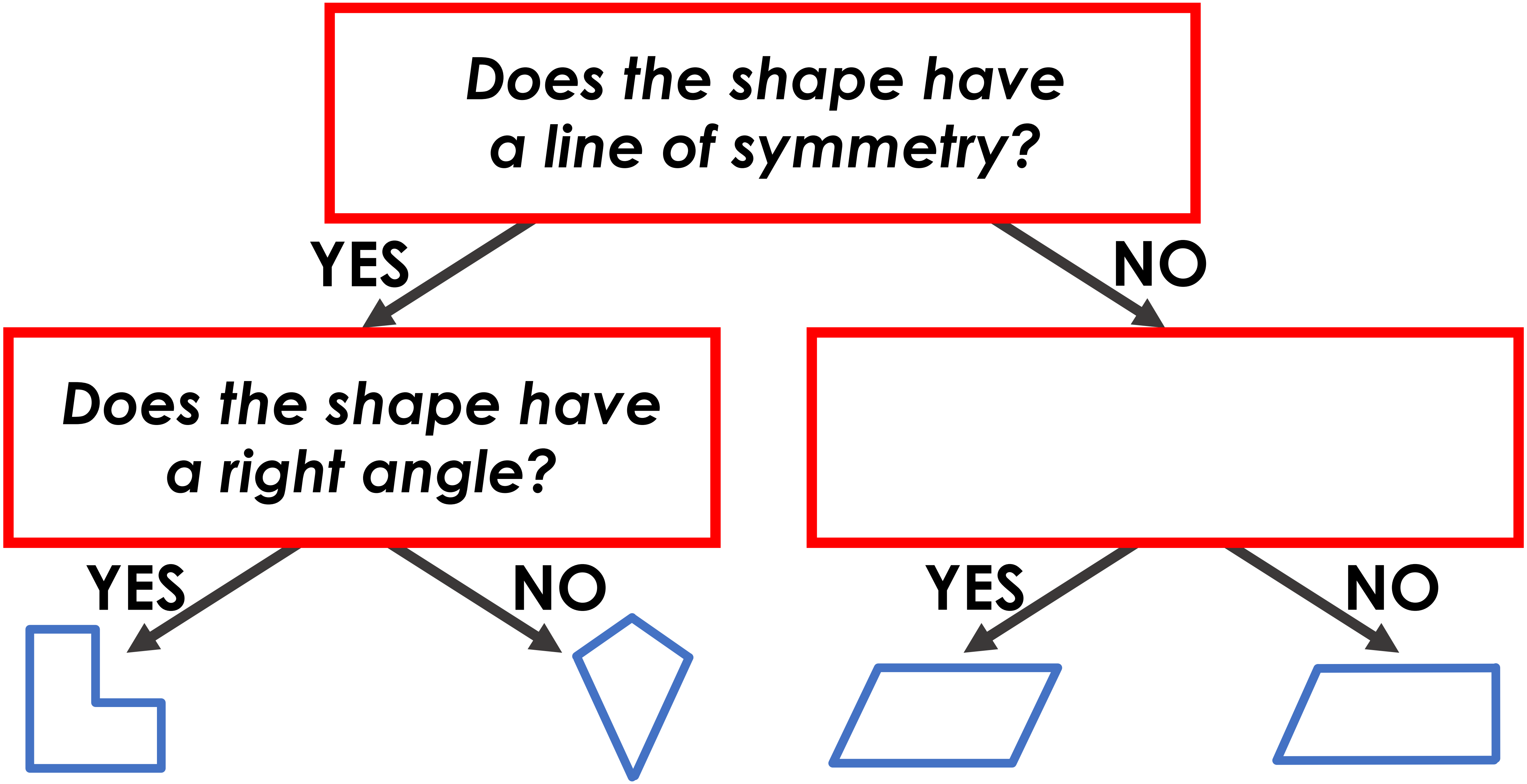
Task 50: Branching database

Example 1:



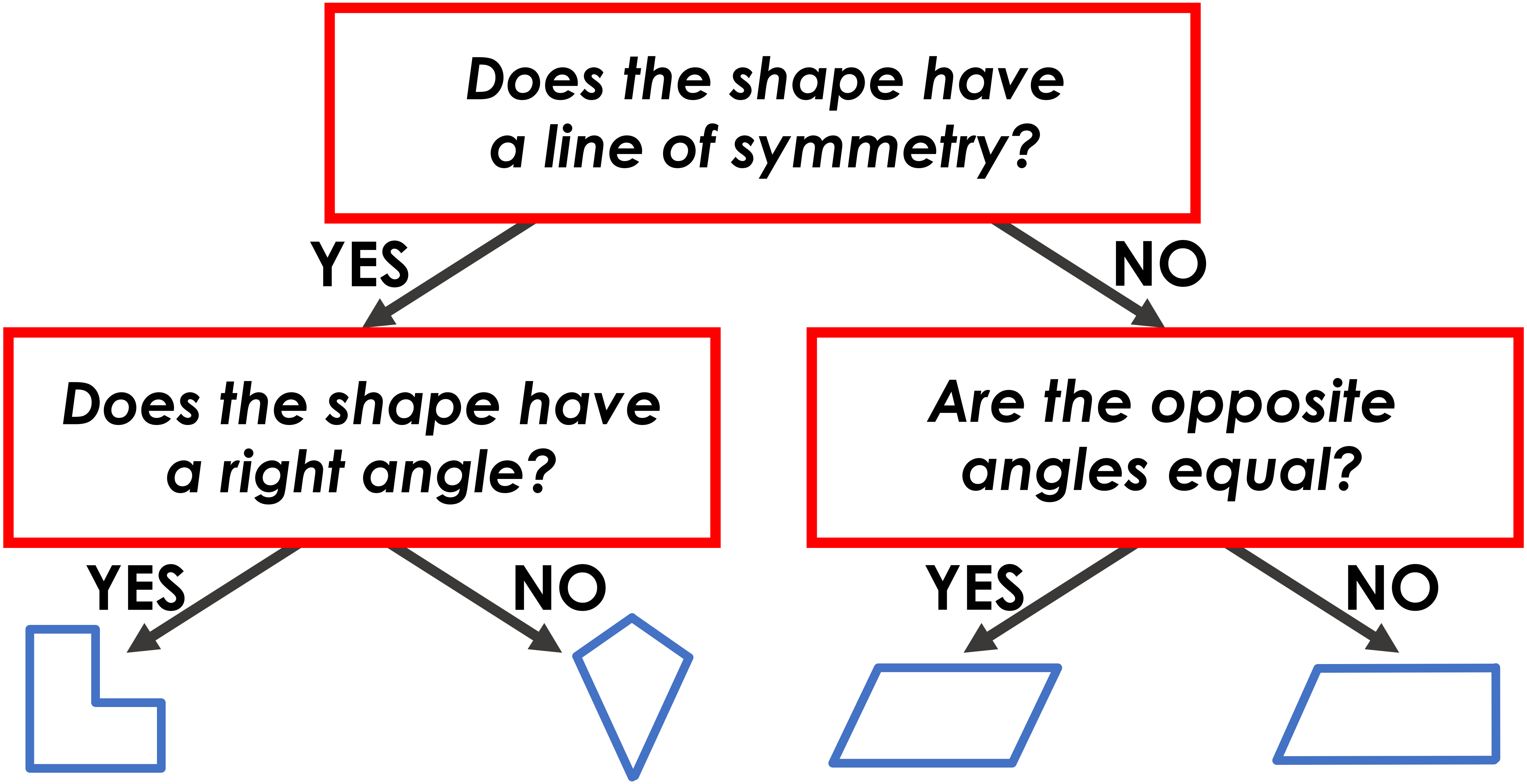
Task 50: Branching database

Example 1:



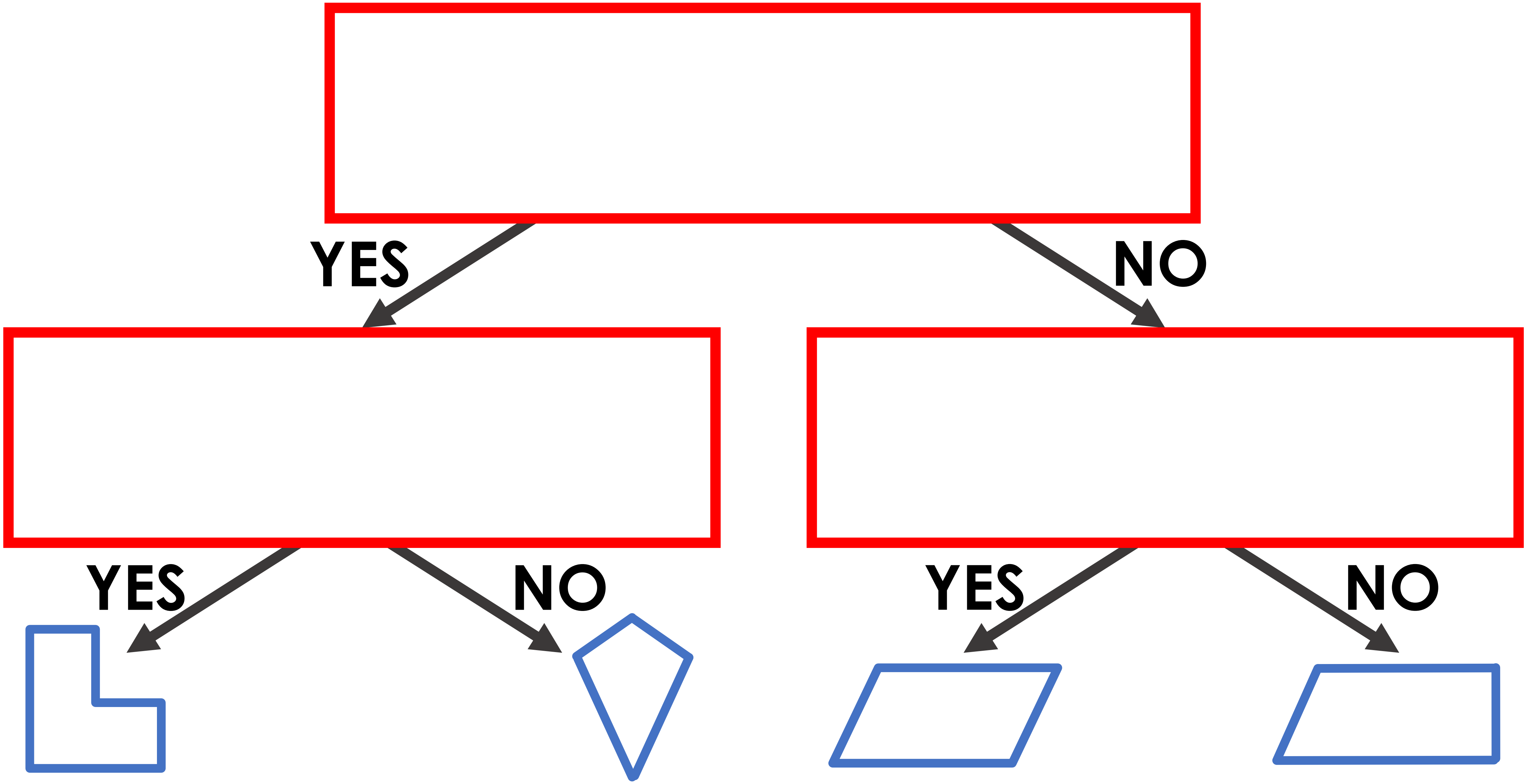
Task 50: Branching database

Example 1:



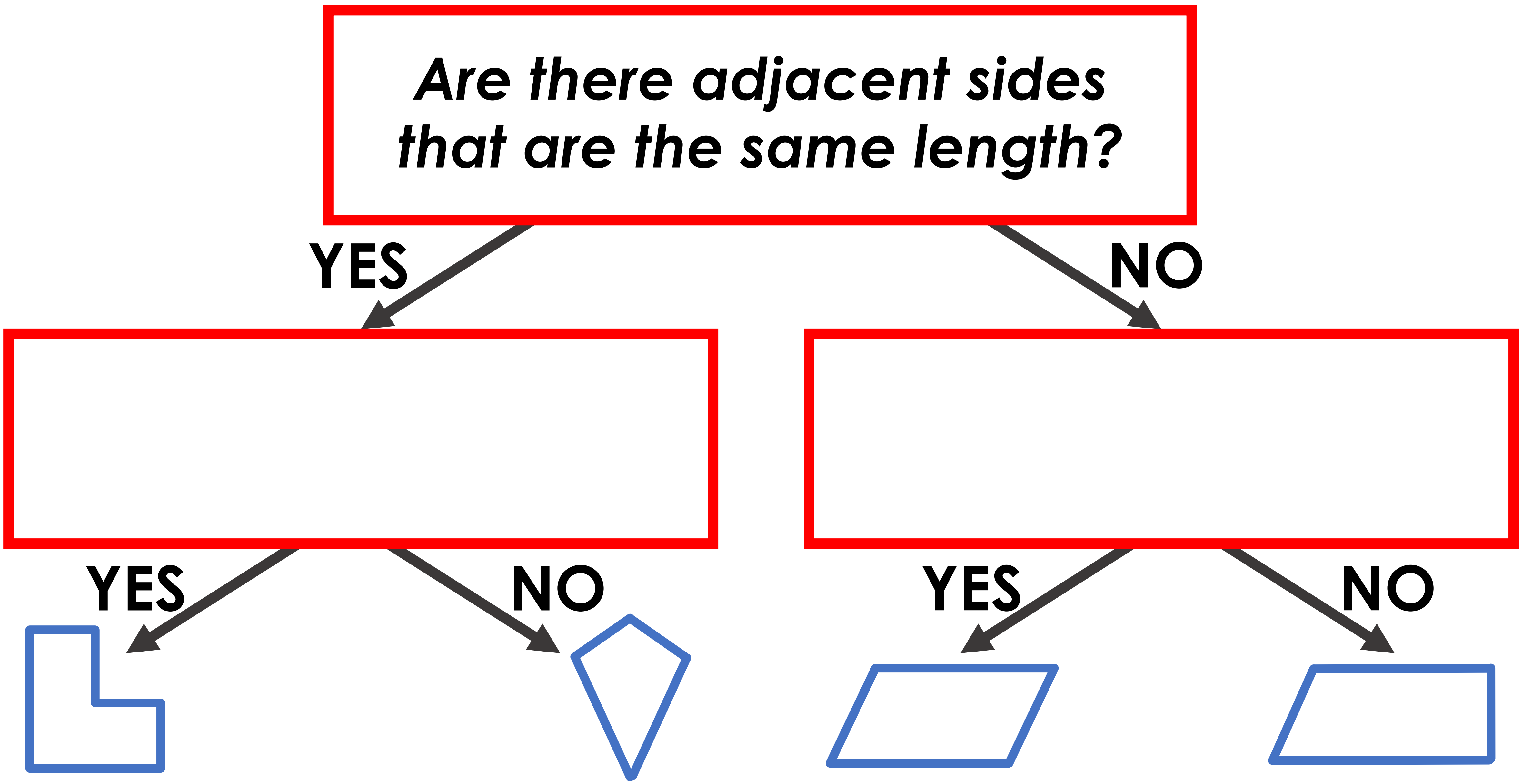
Task 50: Branching database

Example 2:



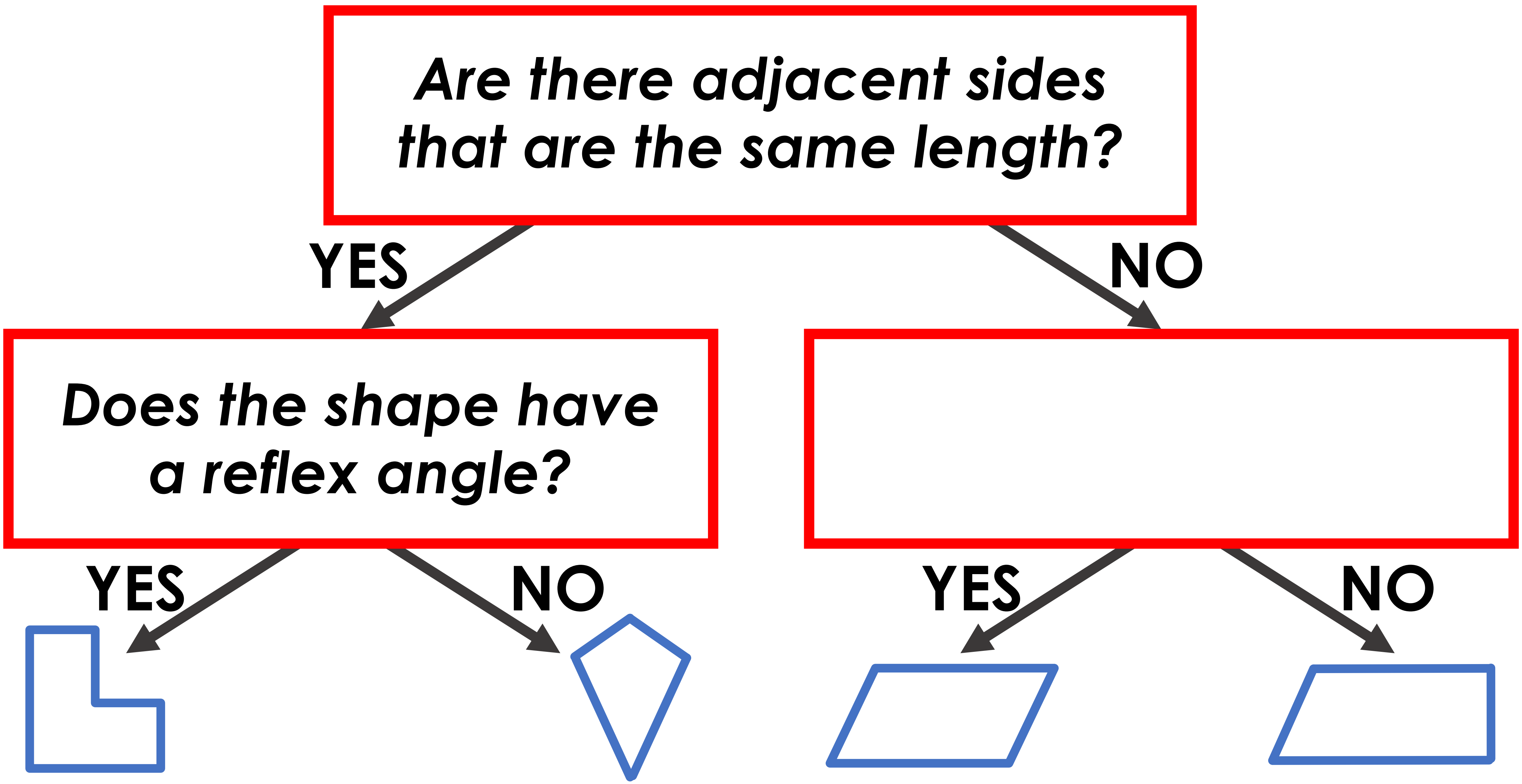
Task 50: Branching database

Example 2:



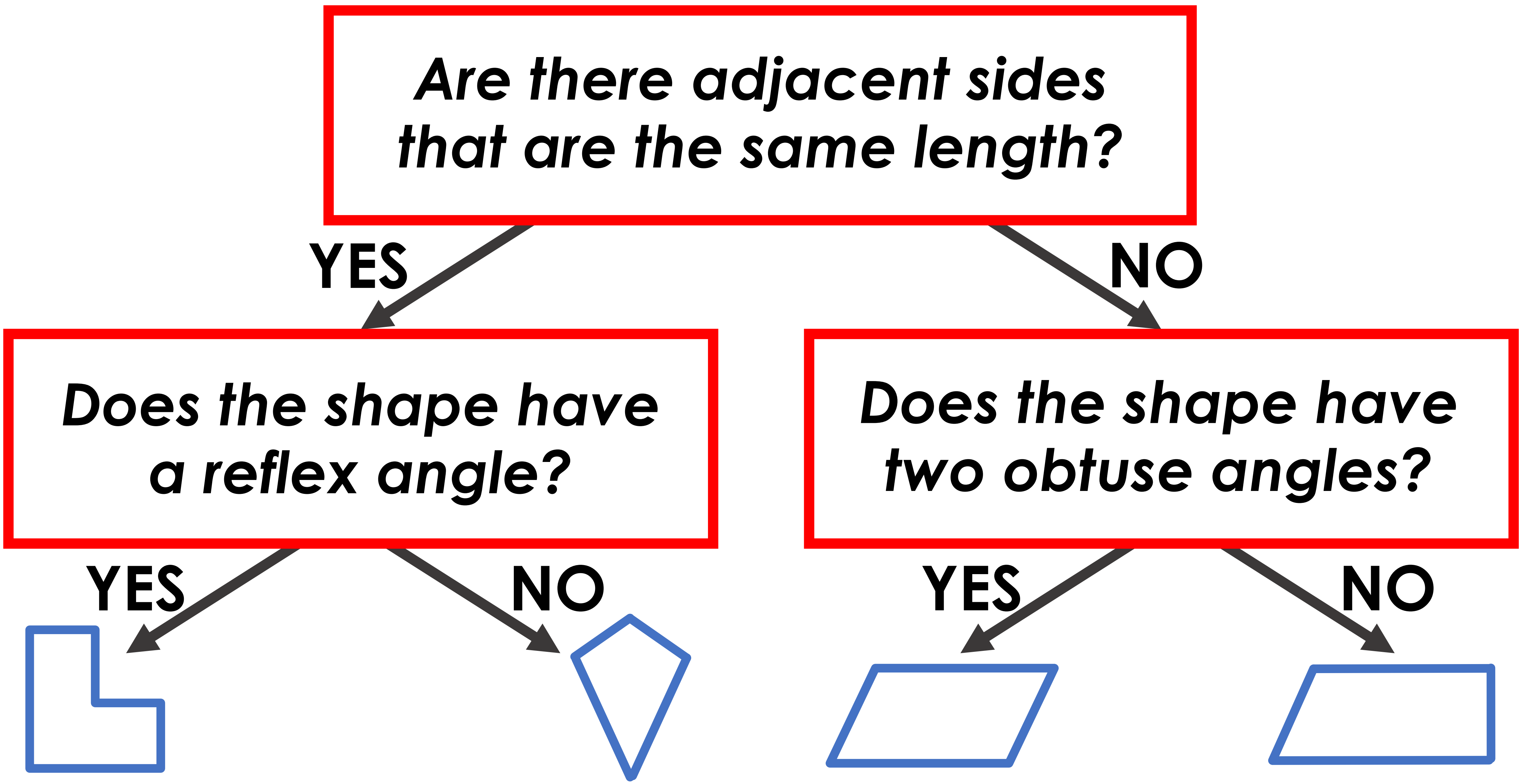
Task 50: Branching database

Example 2:



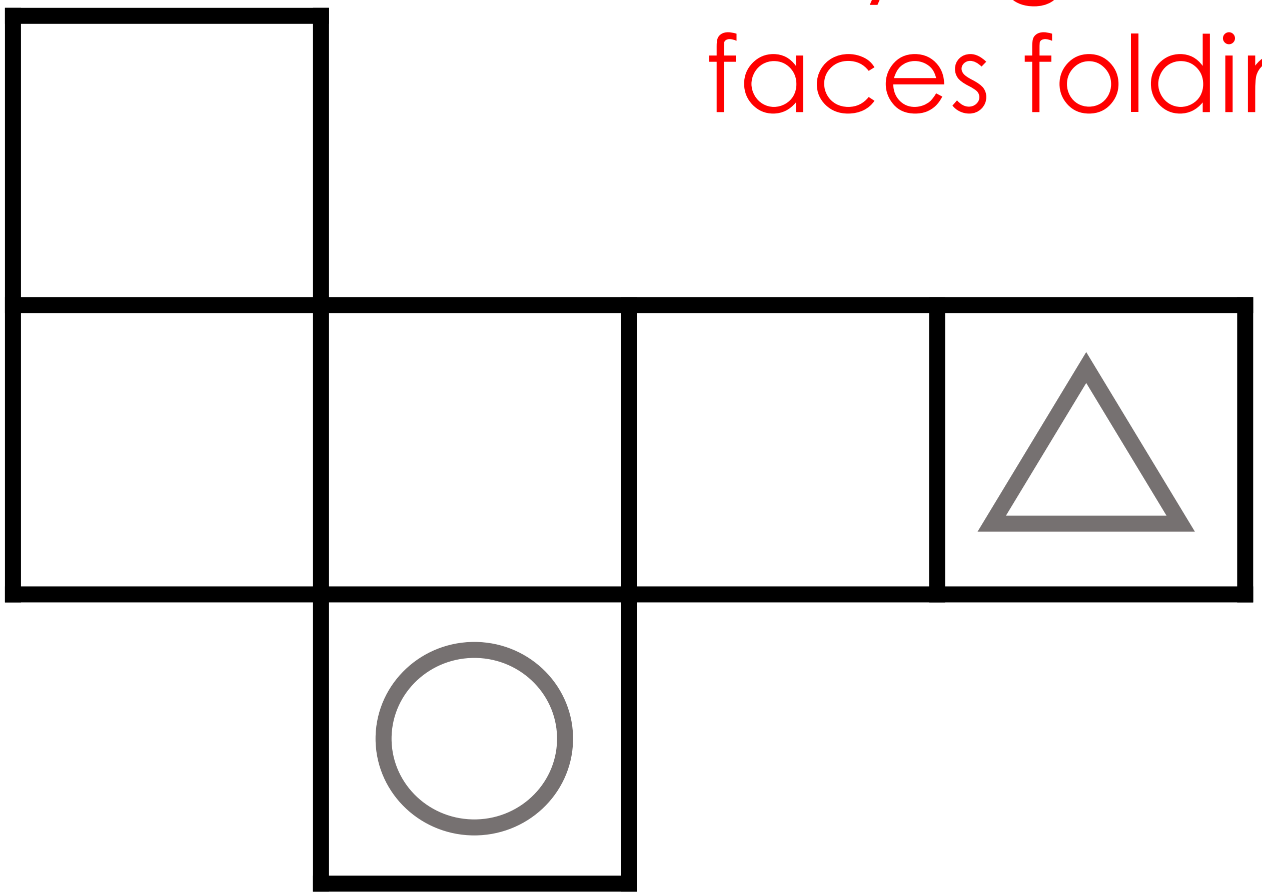
Task 50: Branching database

Example 2:

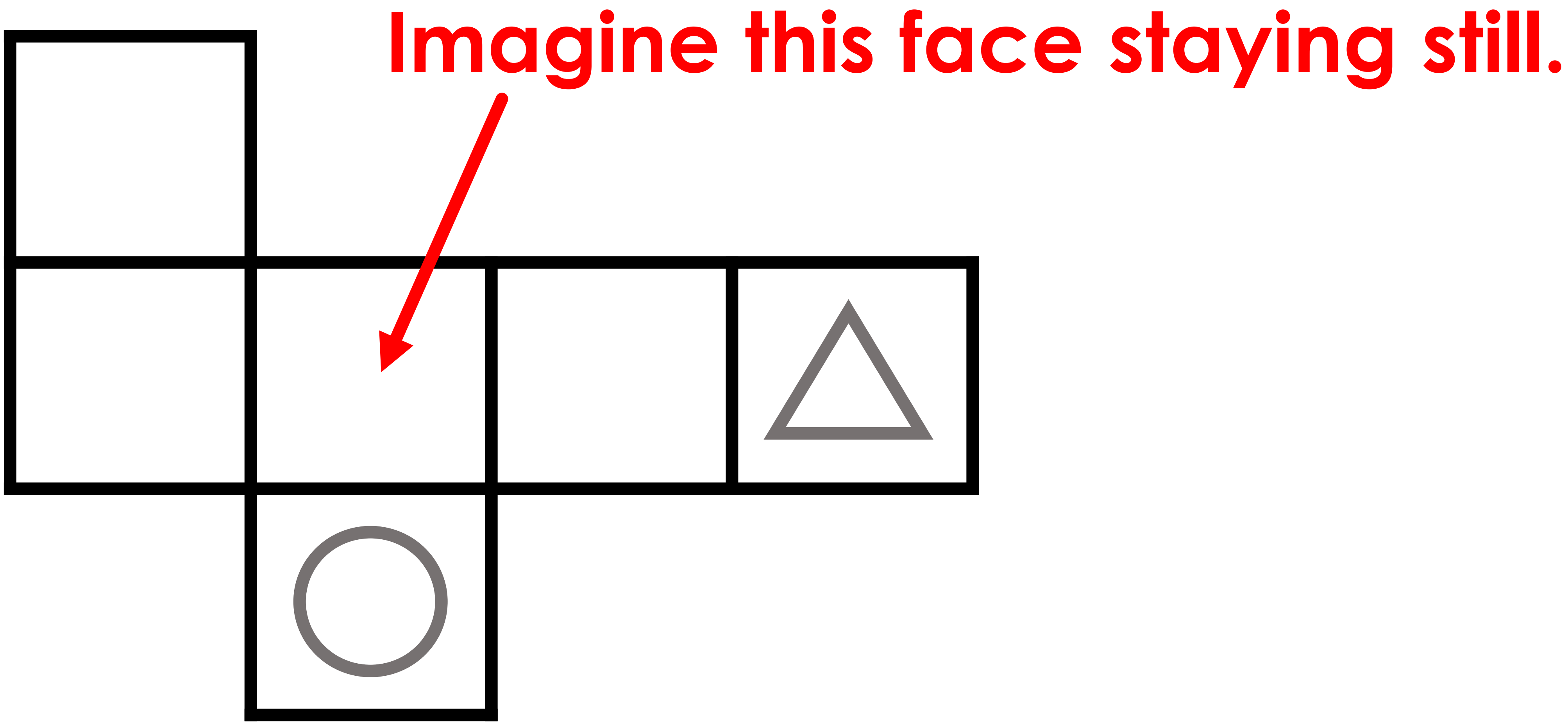


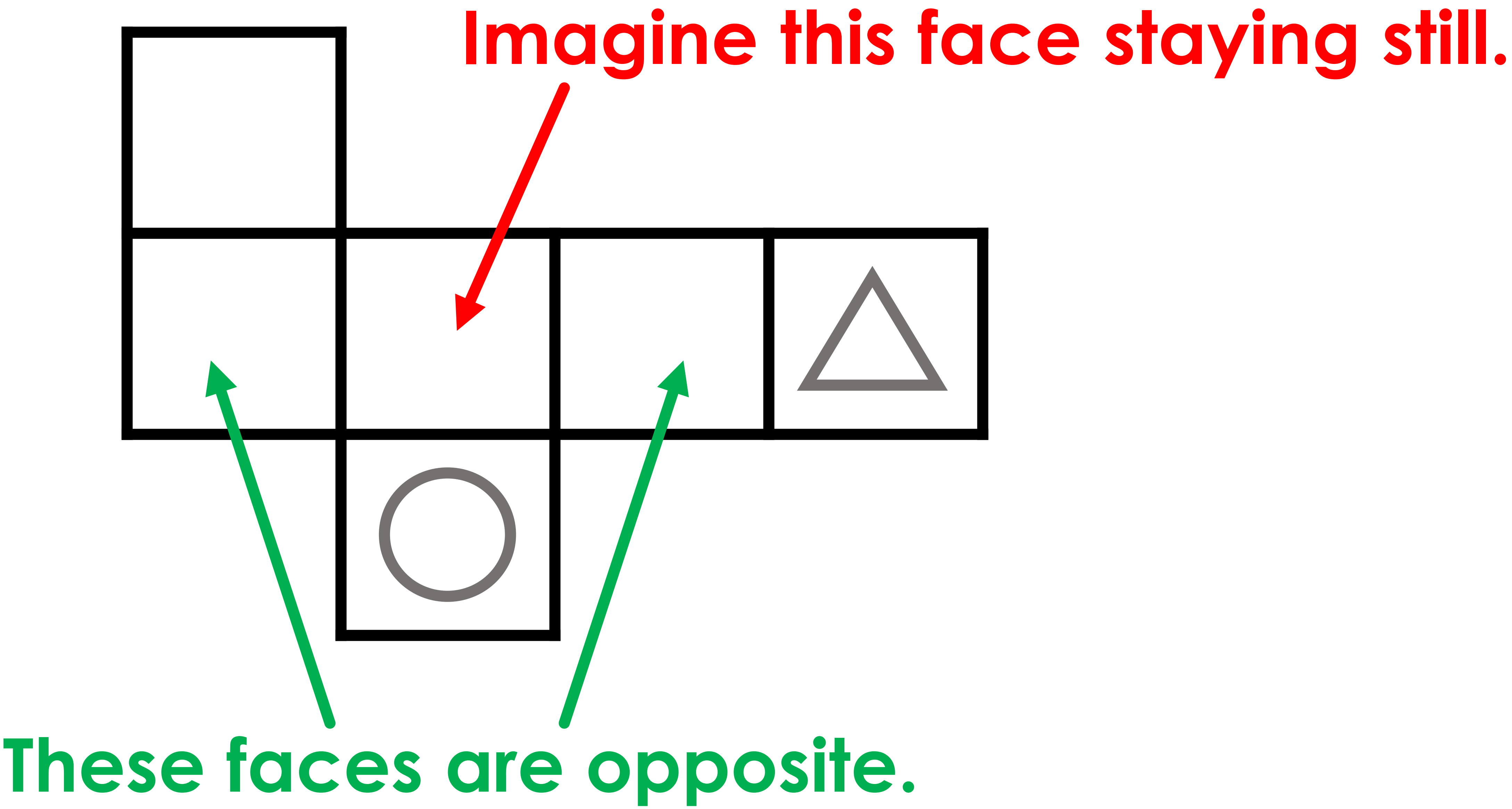
Task 51: Cube nets

Tip: Imagine one face staying still and the other faces folding around it.

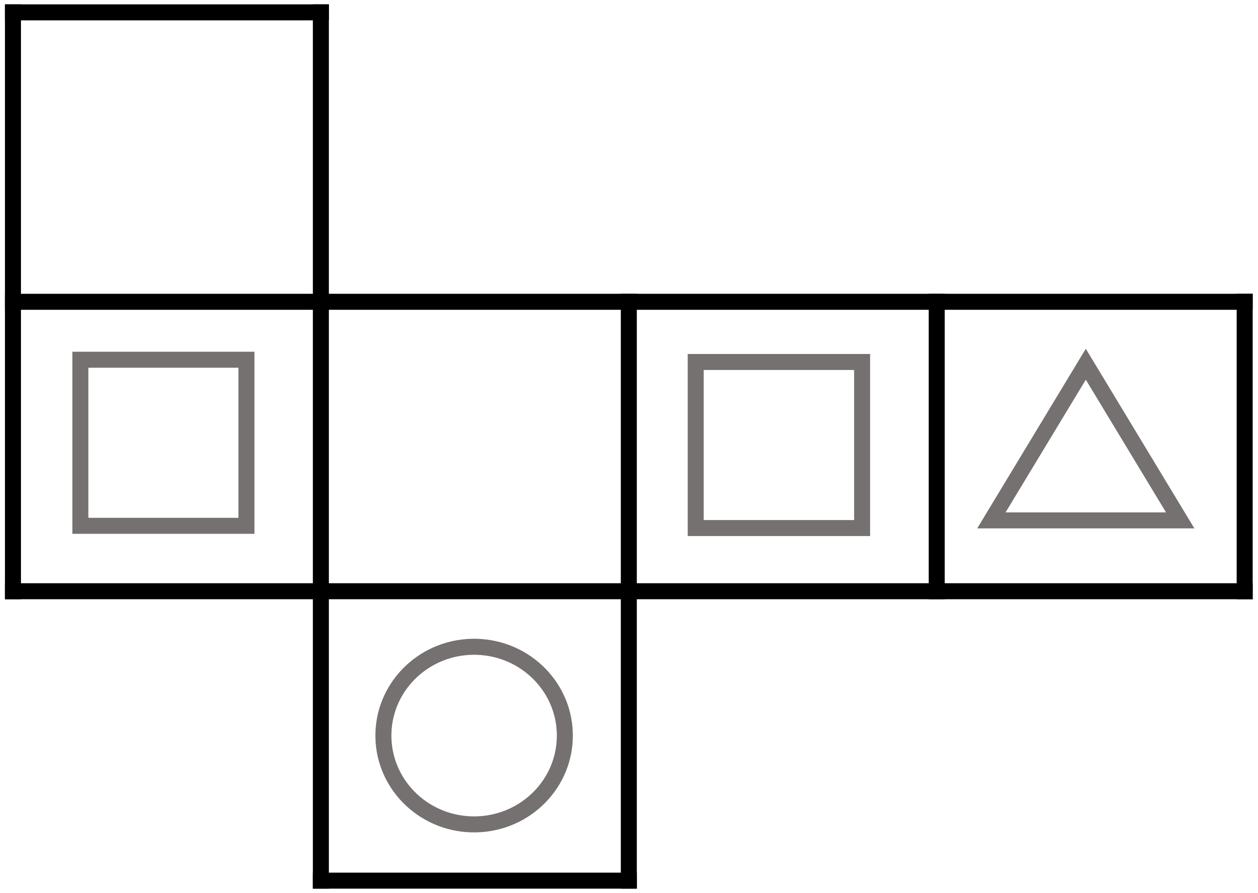


Task 51: Cube nets



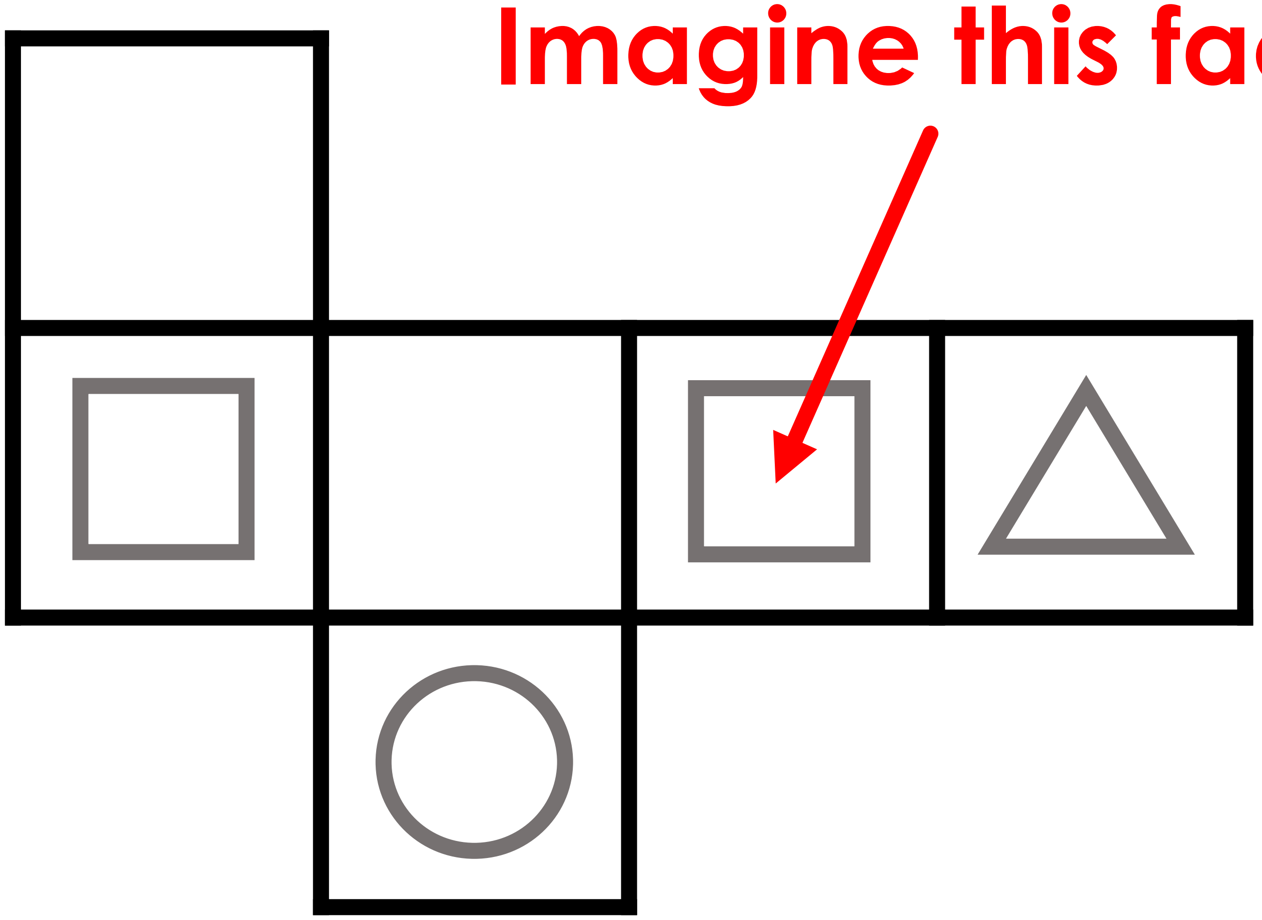

Imagine this face staying still.
These faces are opposite.

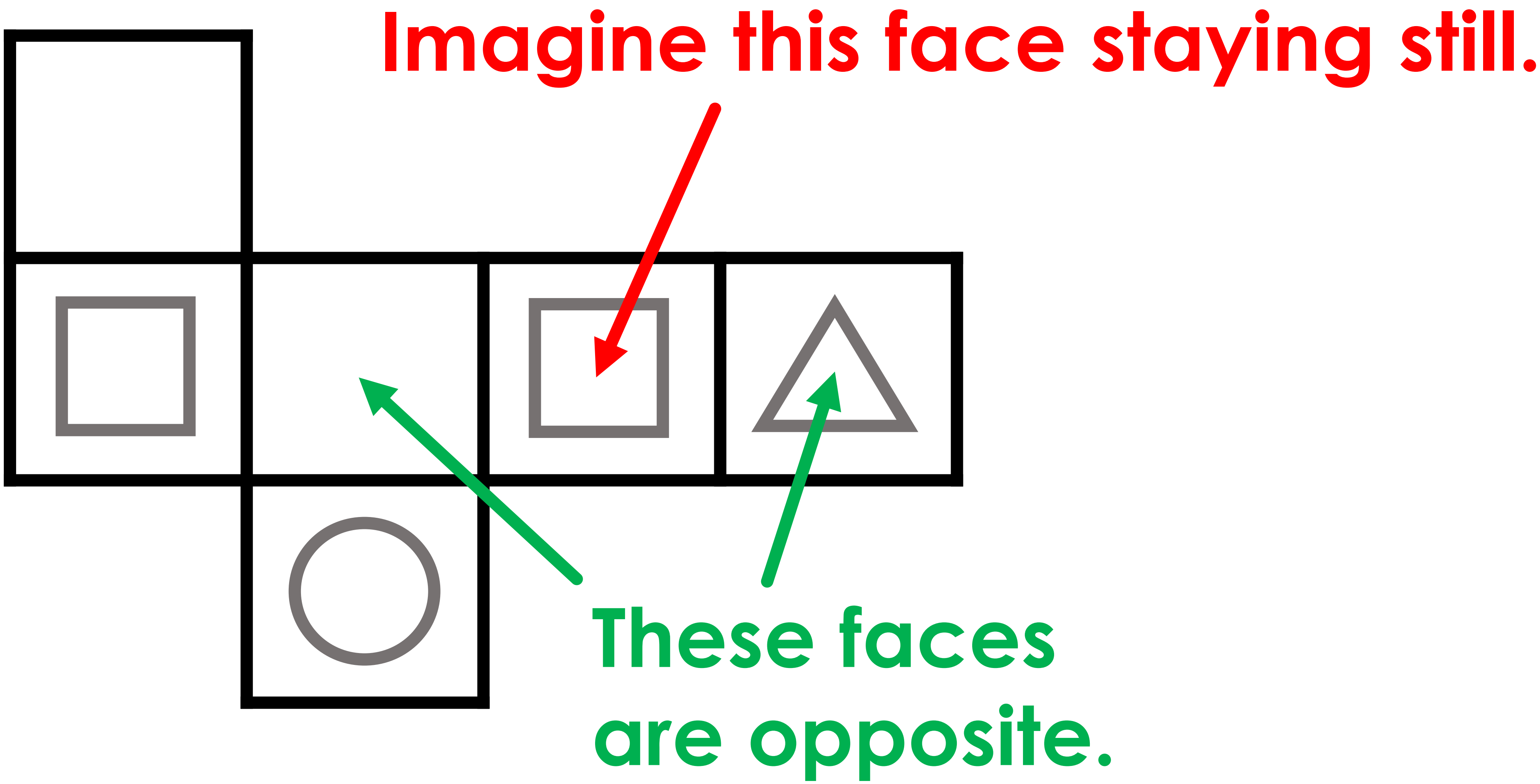
Task 51: Cube nets



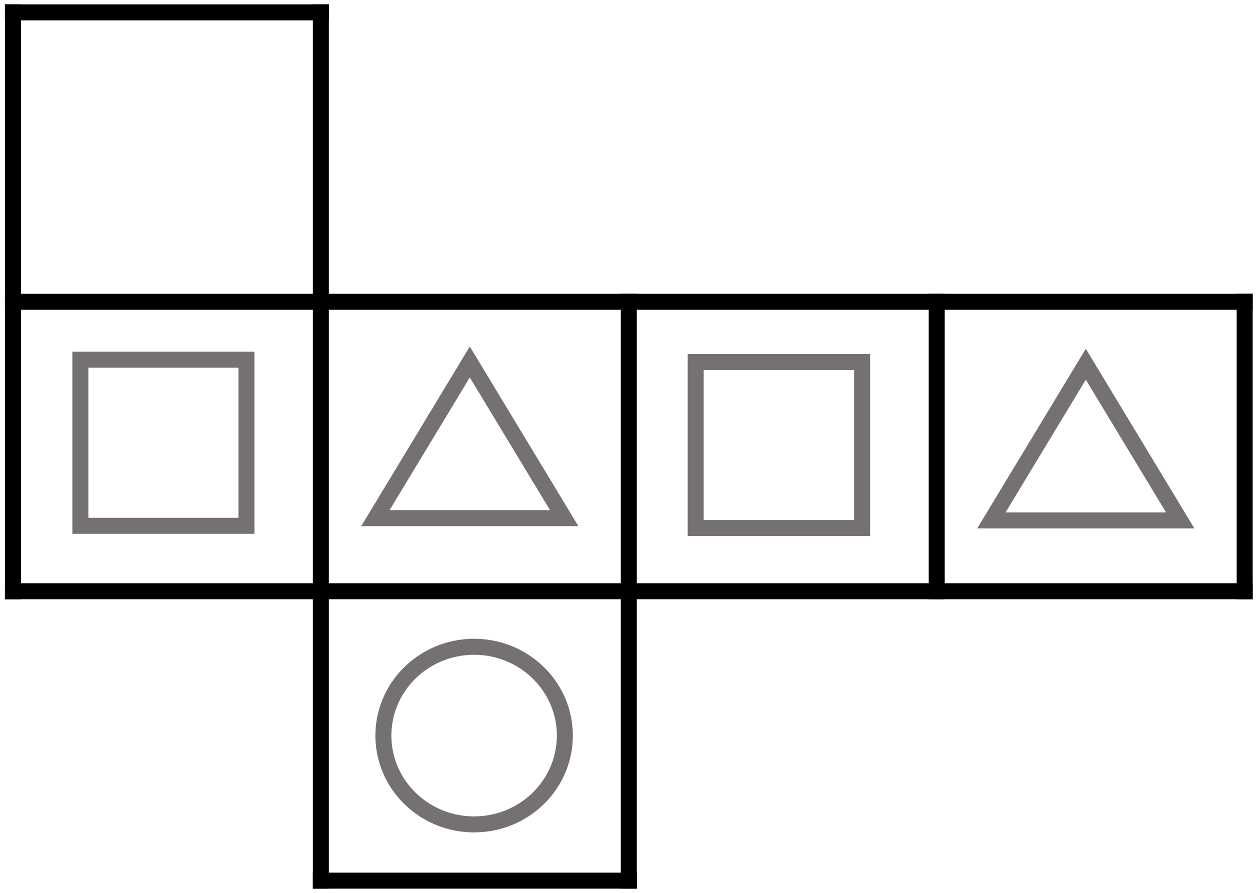
Task 51: Cube nets

Imagine this face staying still.

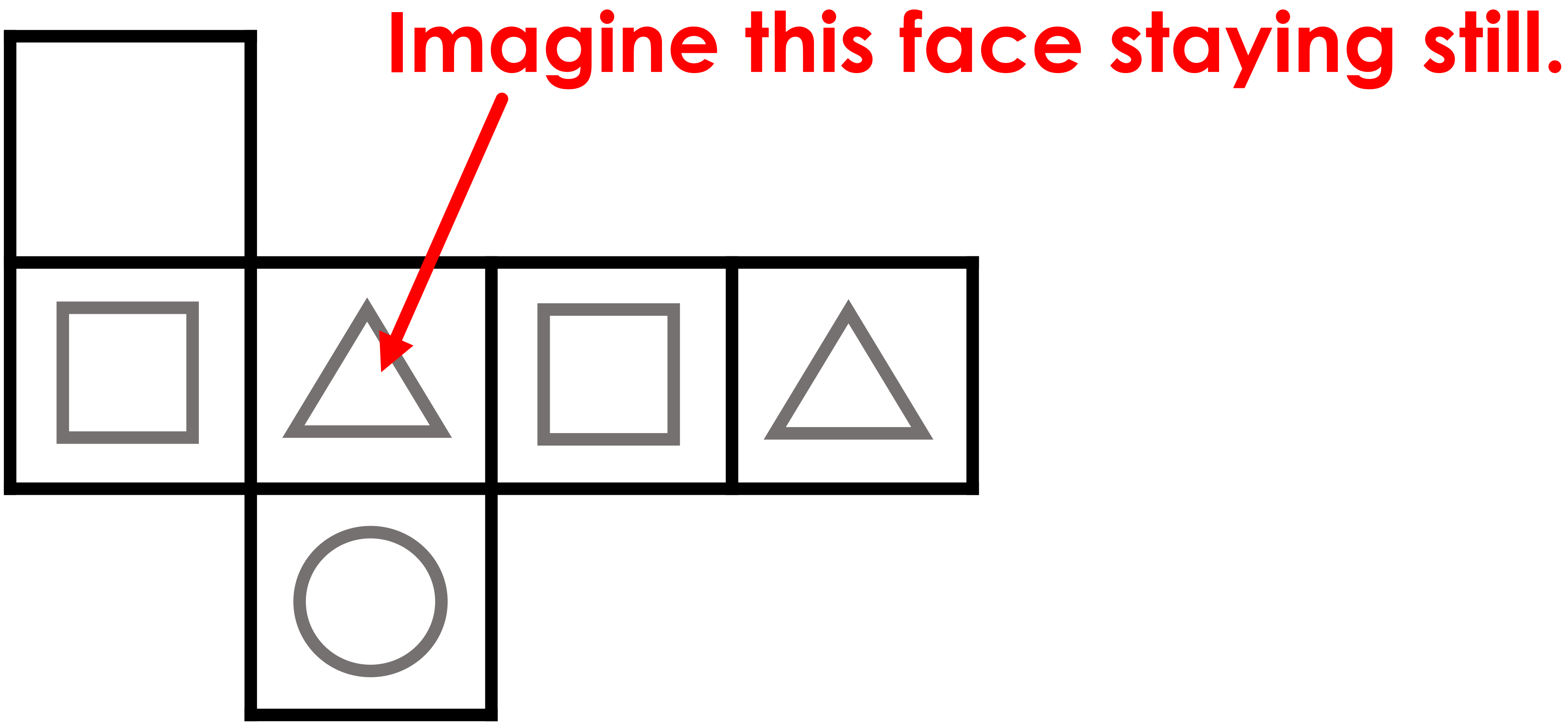



Imagine this face staying still.
These faces
are opposite.

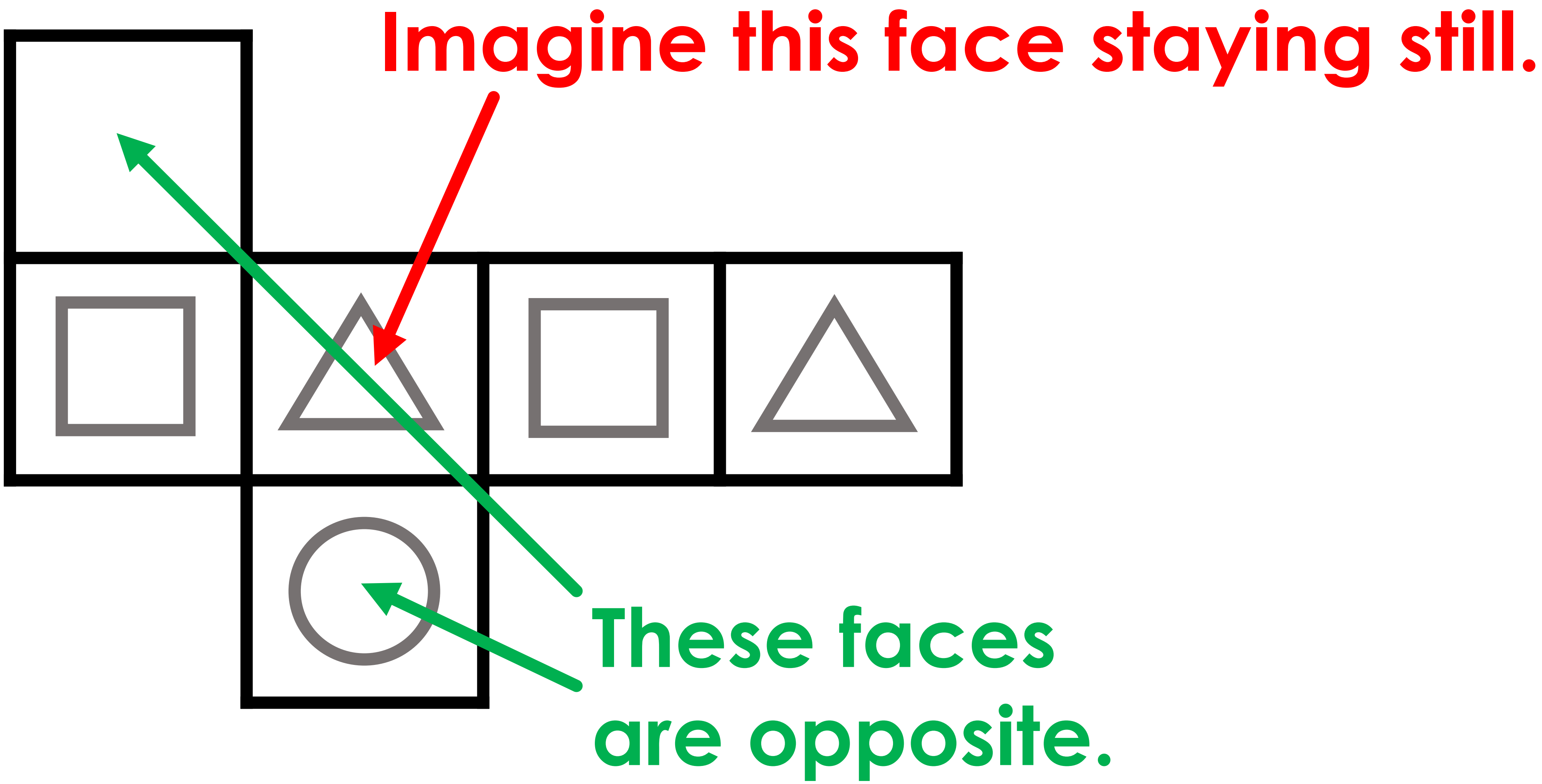
Task 51: Cube nets



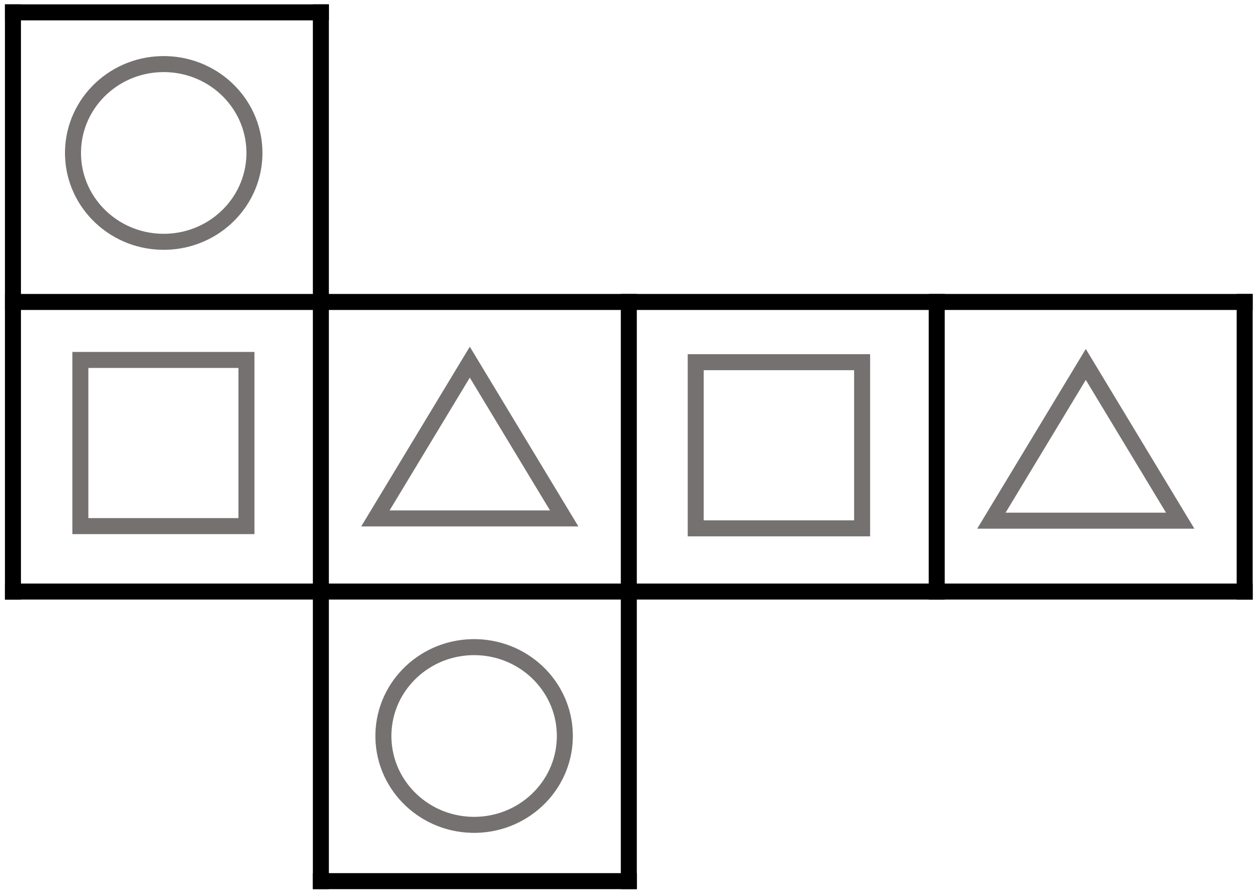
Task 51: Cube nets



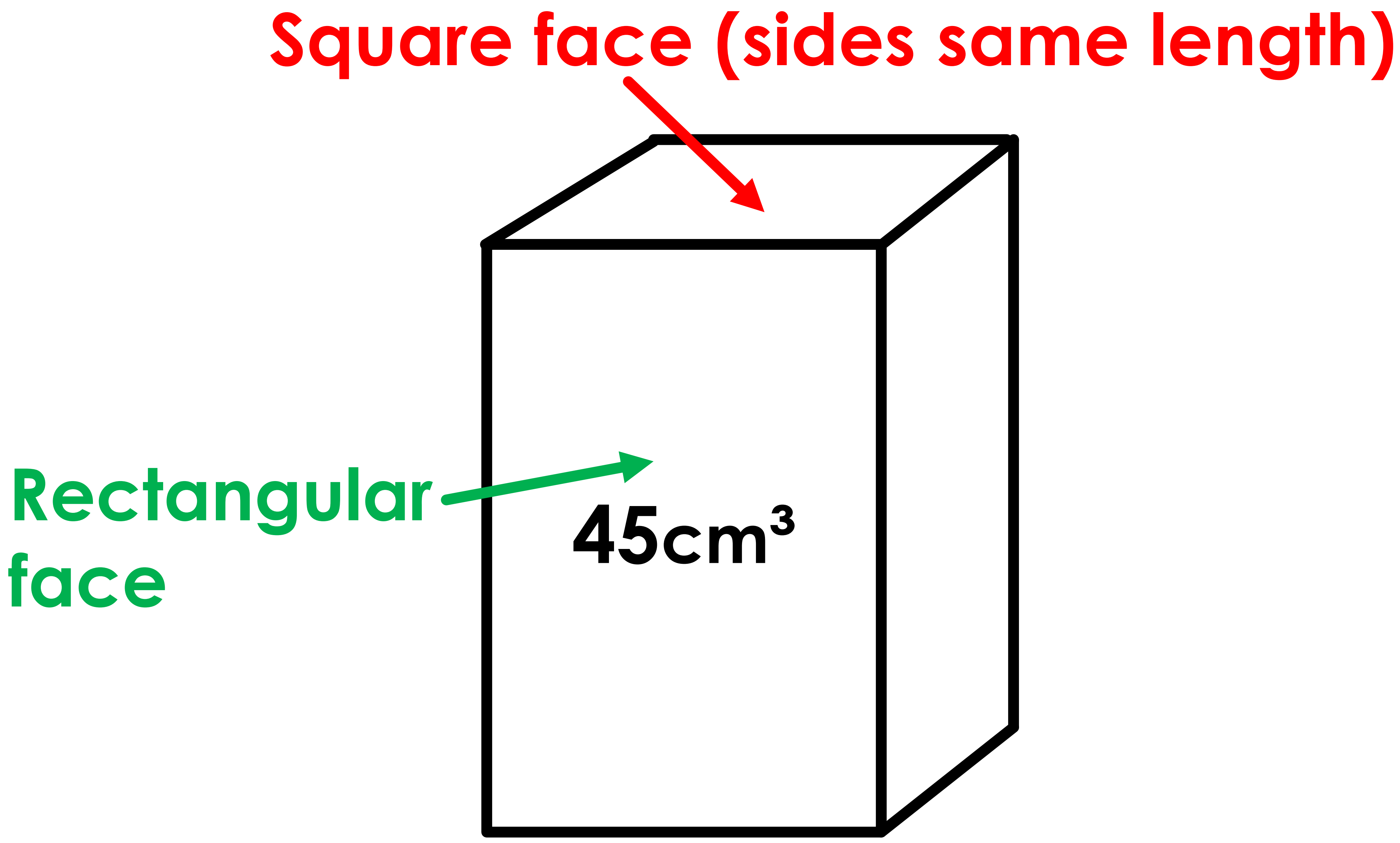
Task 51: Cube nets



Task 51: Cube nets

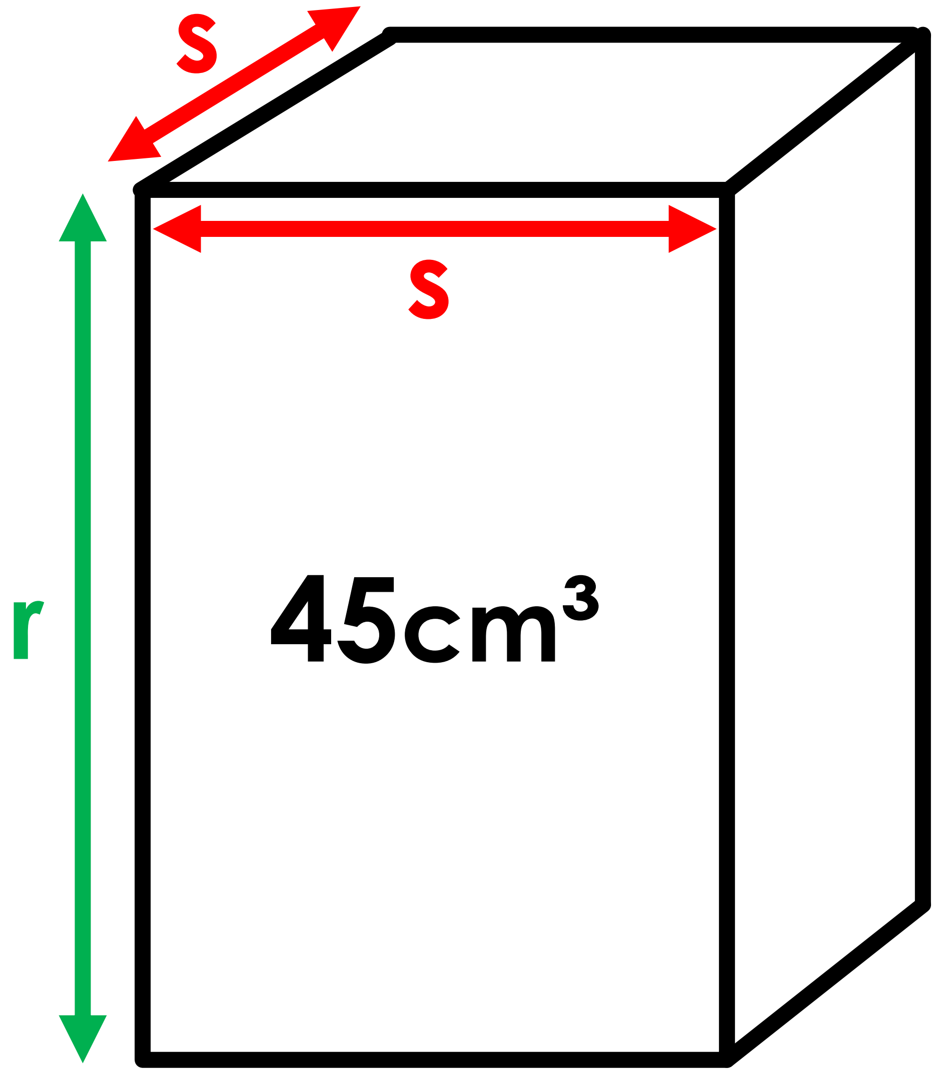


Task 52: Cuboid dimensions



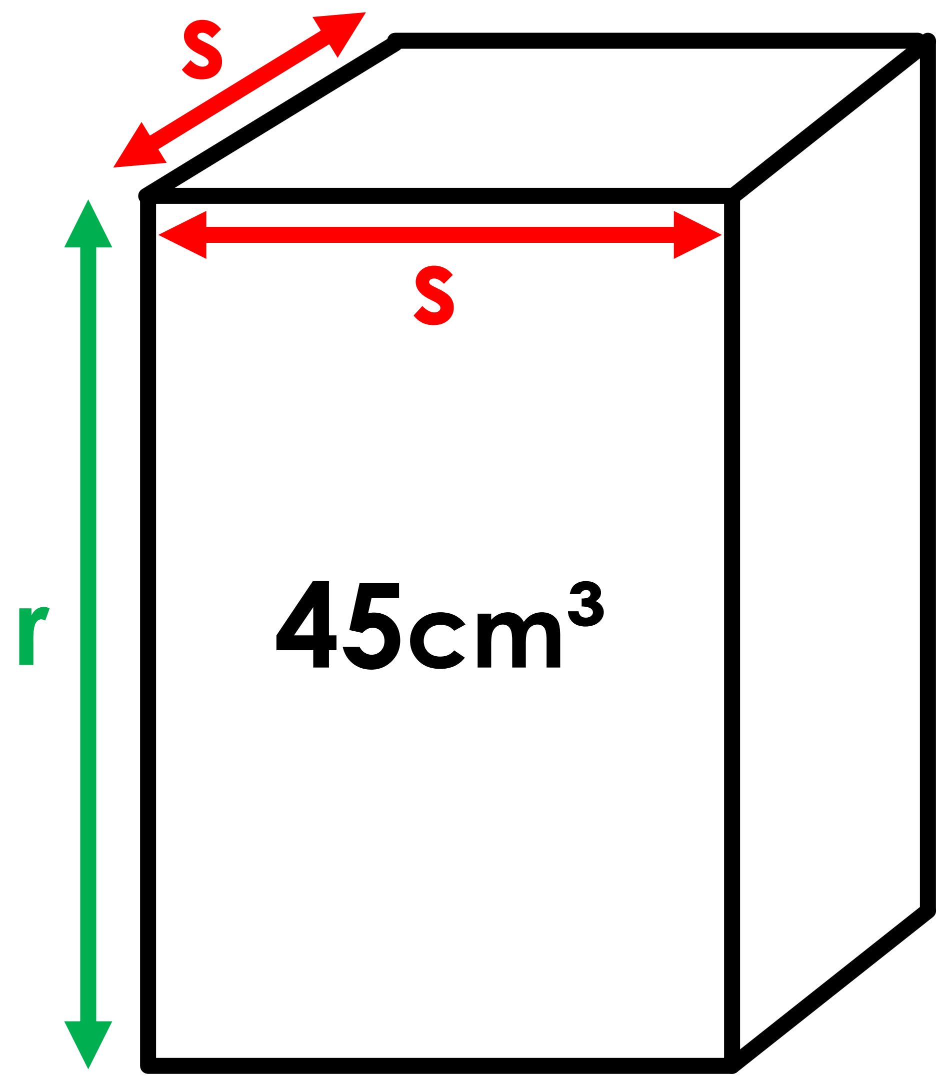
Task 52: Cuboid dimensions

$$s \times s \times r = 45cm^3$$



Task 52: Cuboid dimensions

$s \times s \times r = 45\text{cm}^3$

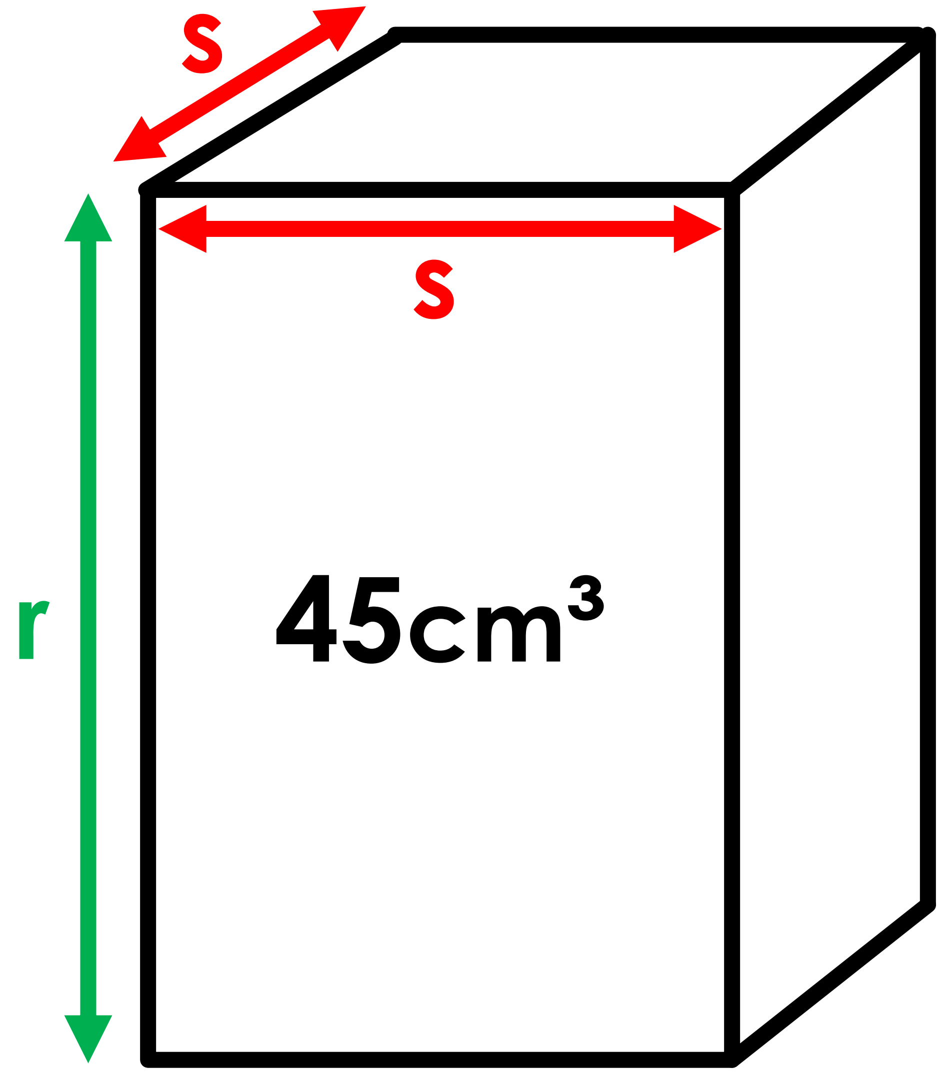


$s \times s$ is a factor of 45

What could the length of s be?

Task 52: Cuboid dimensions

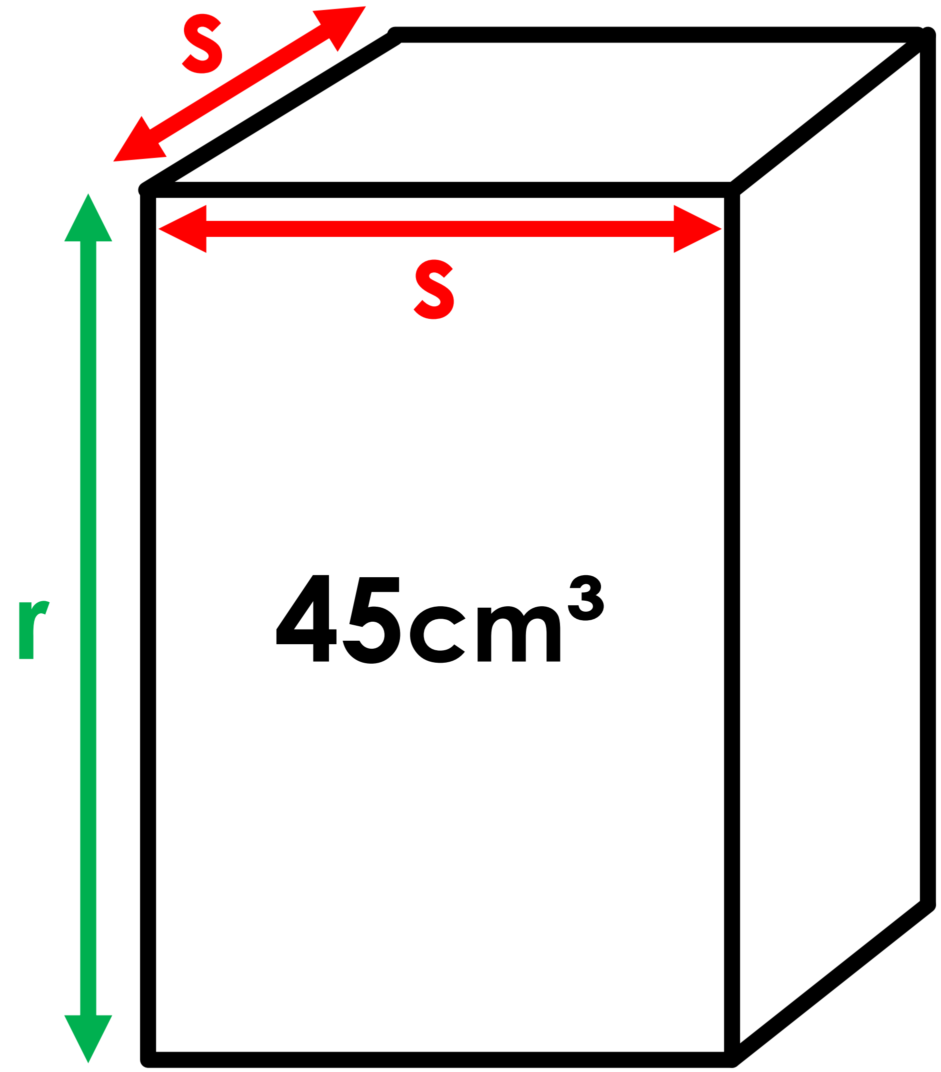
$s \times s \times r = 45cm^3$



$s = 3cm$

Task 52: Cuboid dimensions

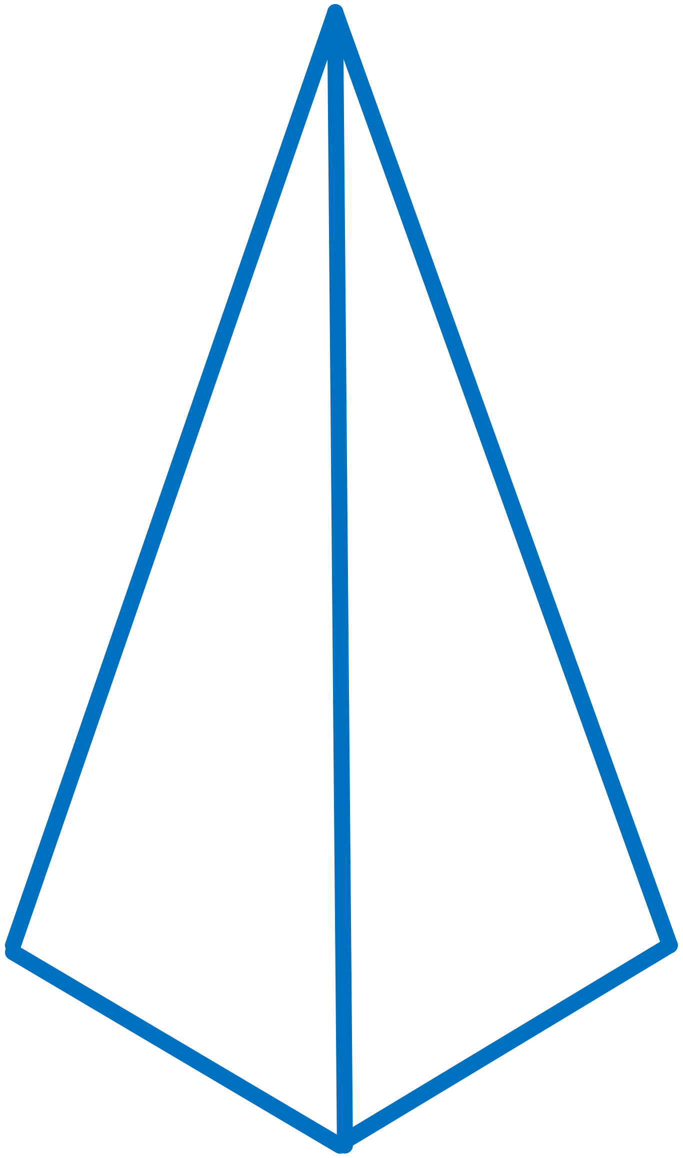
$s \times s \times r = 45cm^3$



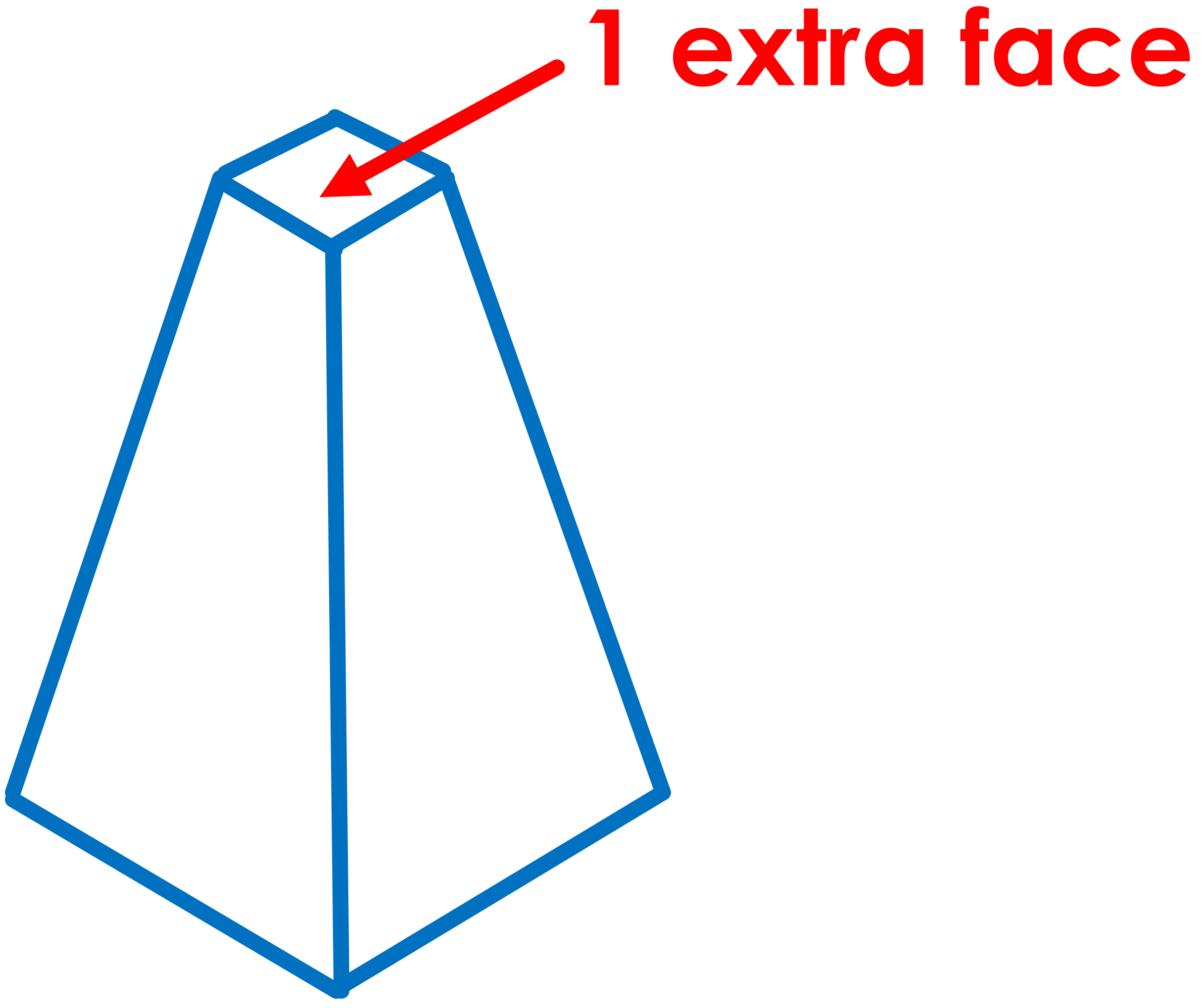
$s = 3cm$

$r = 5cm$

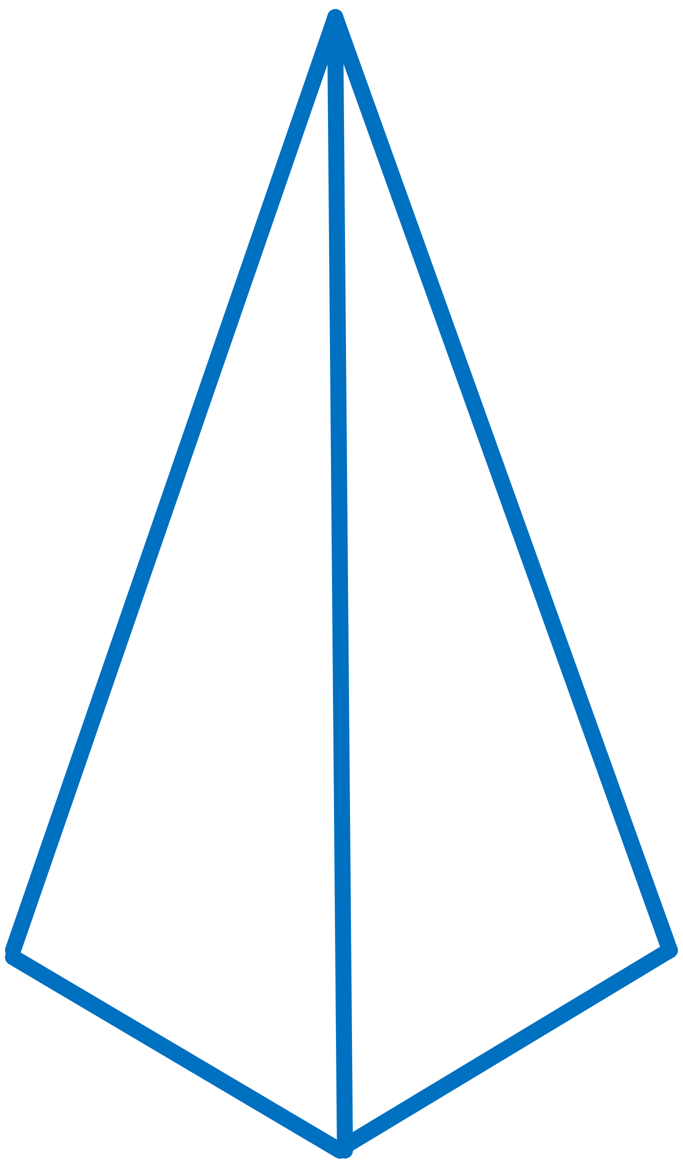
Task 53: Faces, edges, vertices



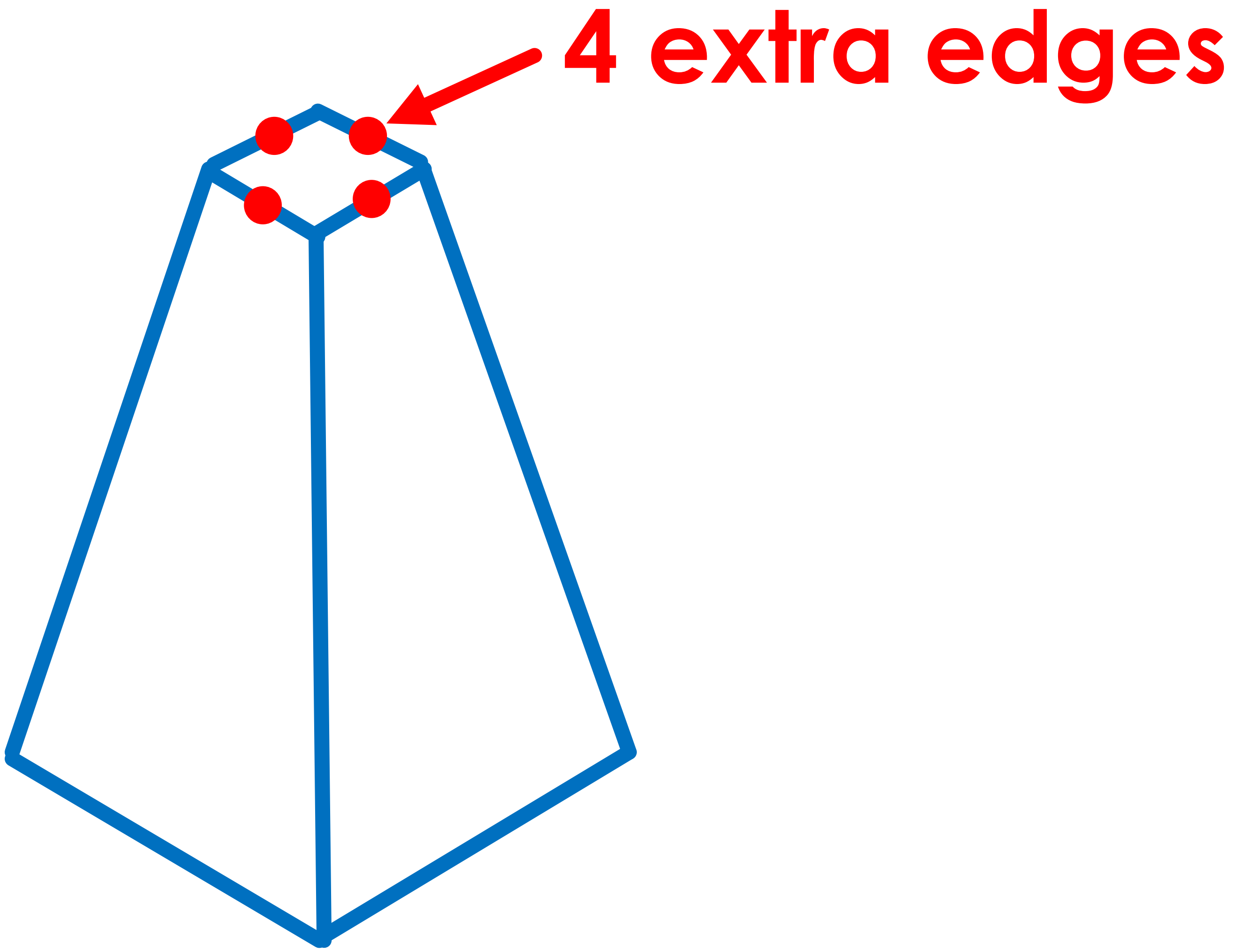
Task 53: Faces, edges, vertices



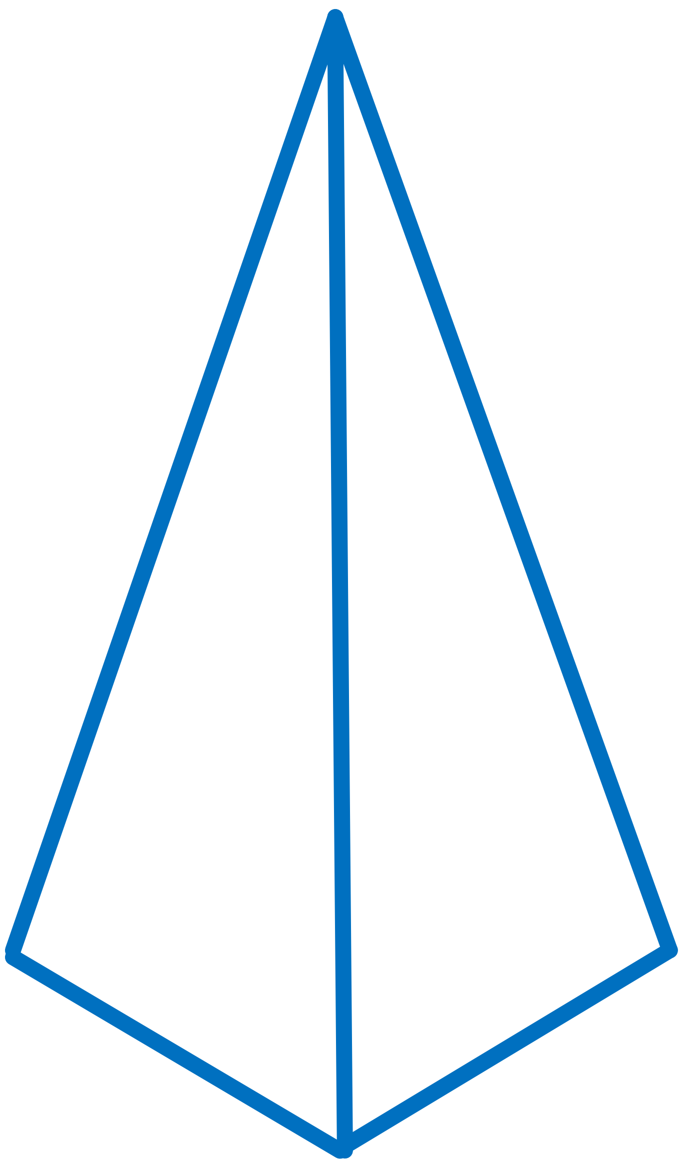
Task 53: Faces, edges, vertices



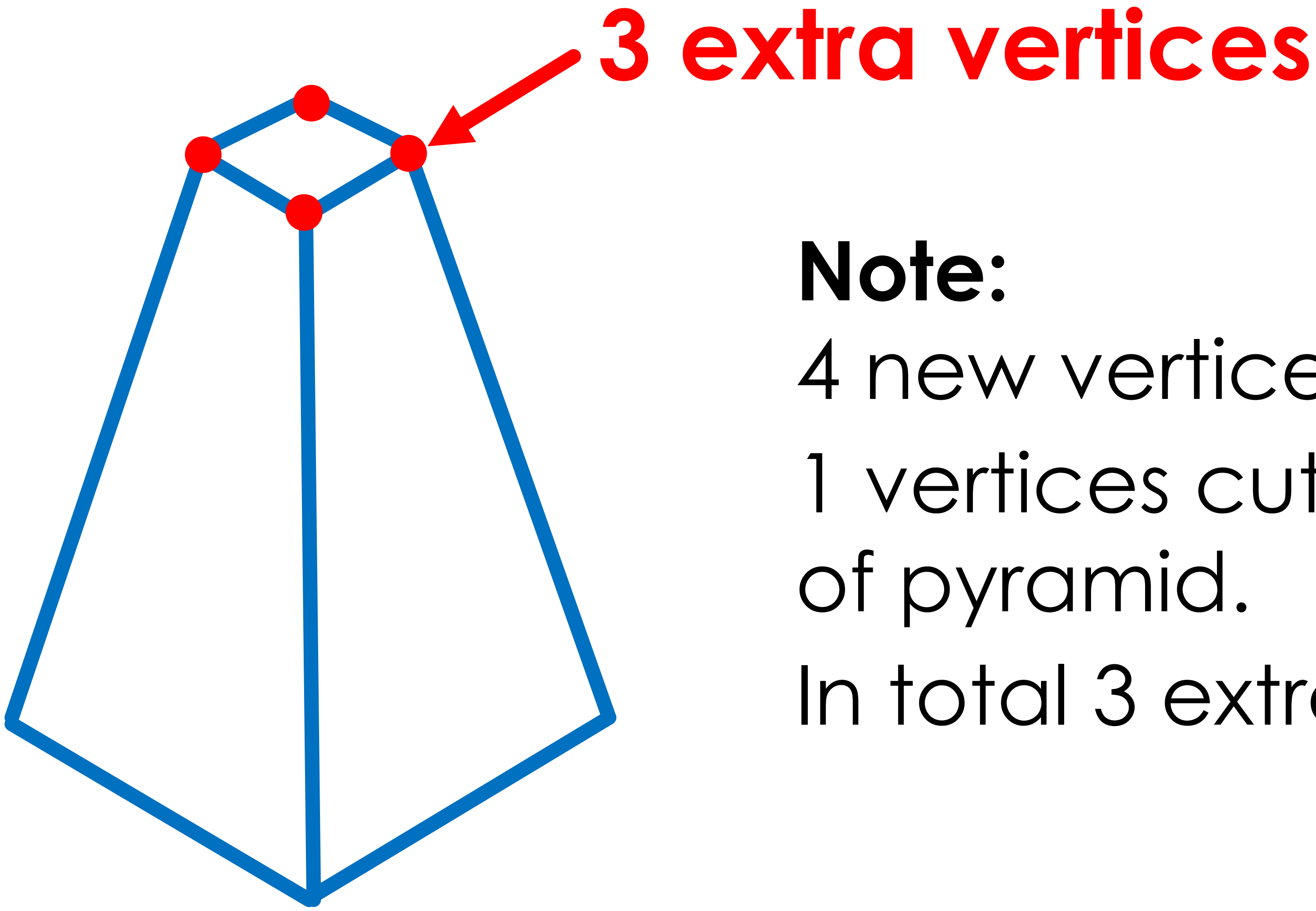
Task 53: Faces, edges, vertices



Task 53: Faces, edges, vertices



Task 53: Faces, edges, vertices



Note:

4 new vertices at the top.

1 vertices cut off from top of pyramid.

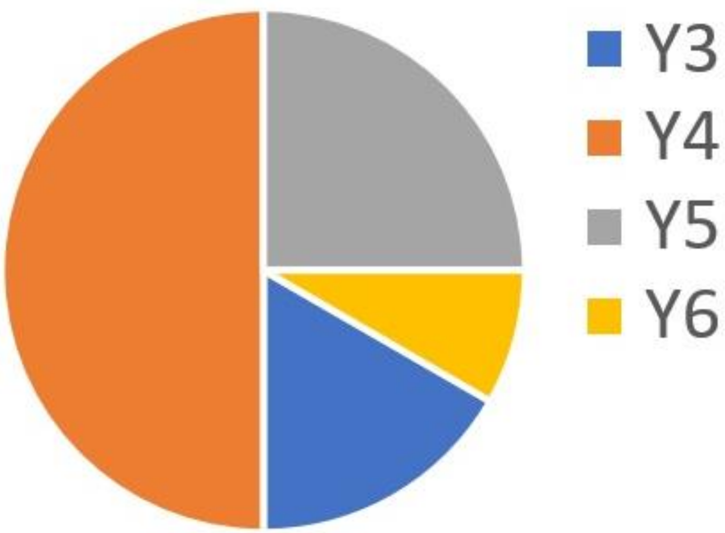
In total 3 extra vertices.

Task 54: Before/now pie charts

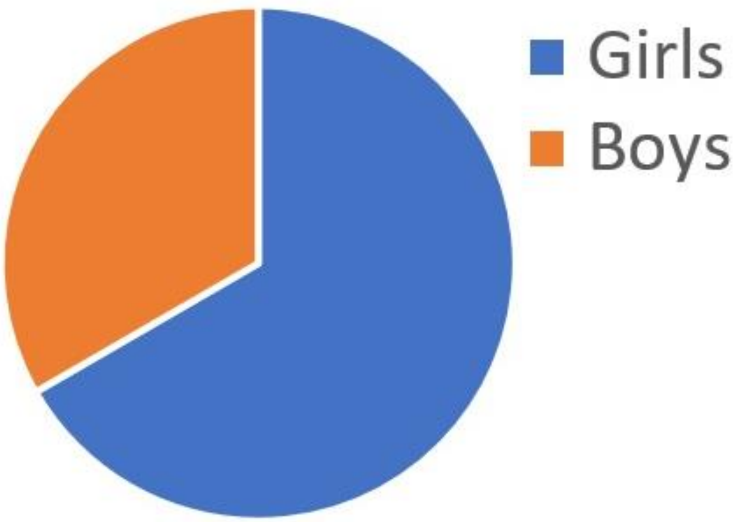
Running club (start of term)

12 children

Year Group



Gender

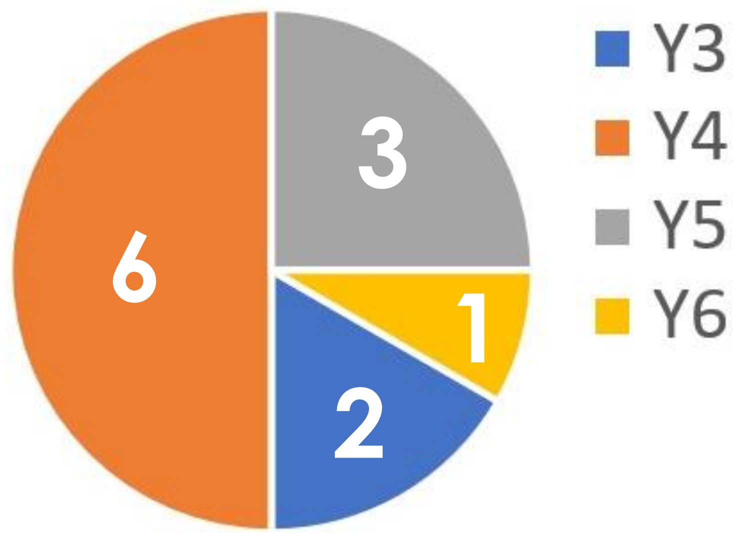


Task 54: Before/now pie charts

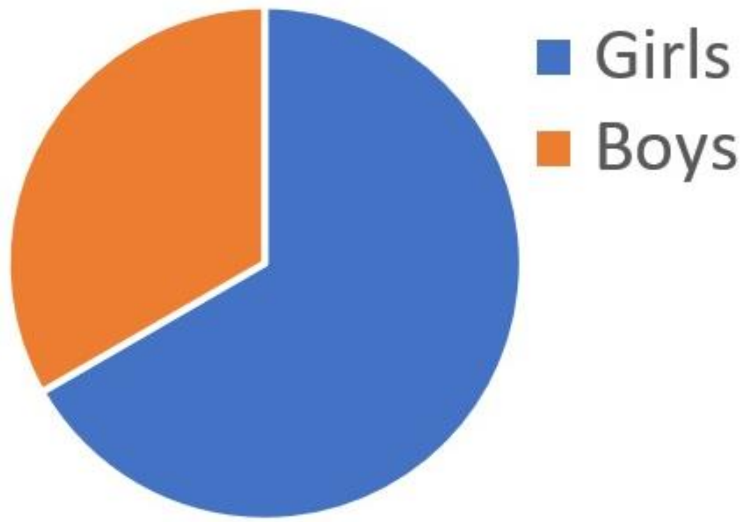
Running club (start of term)

12 children

Year Group



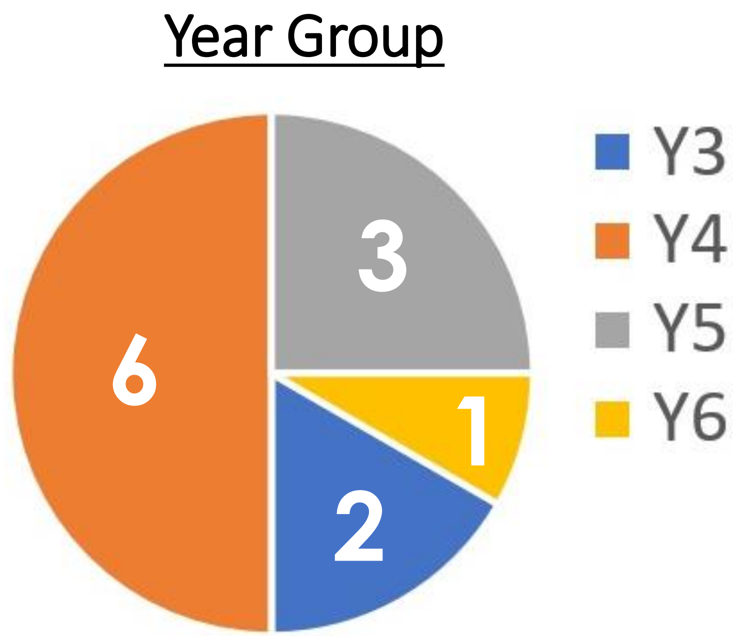
Gender

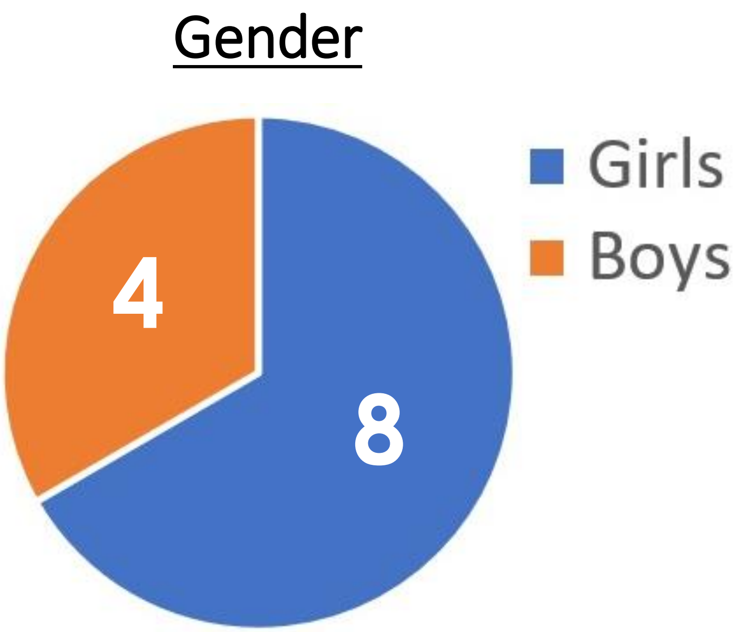


Task 54: Before/now pie charts

Running club (start of term)

12 children



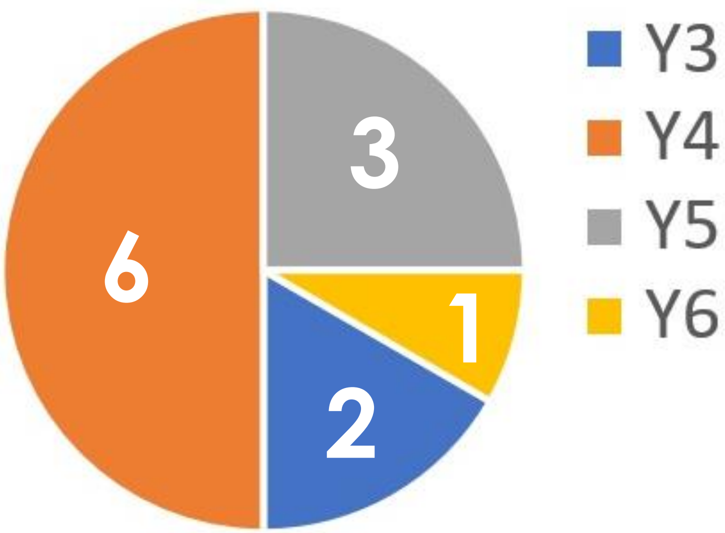


Task 54: Before/now pie charts

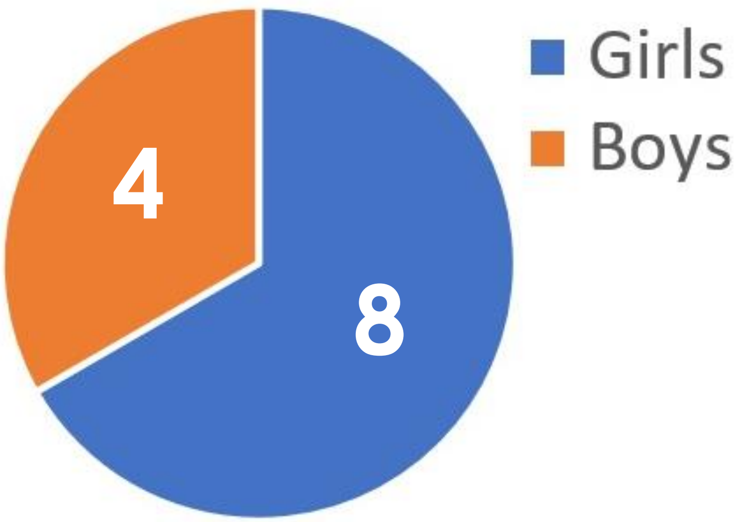
Running club (start of term)

12 children

Year Group



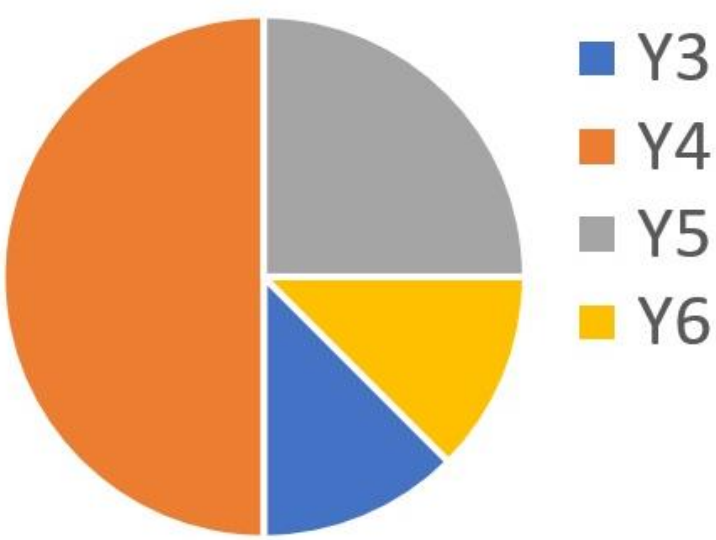
Gender



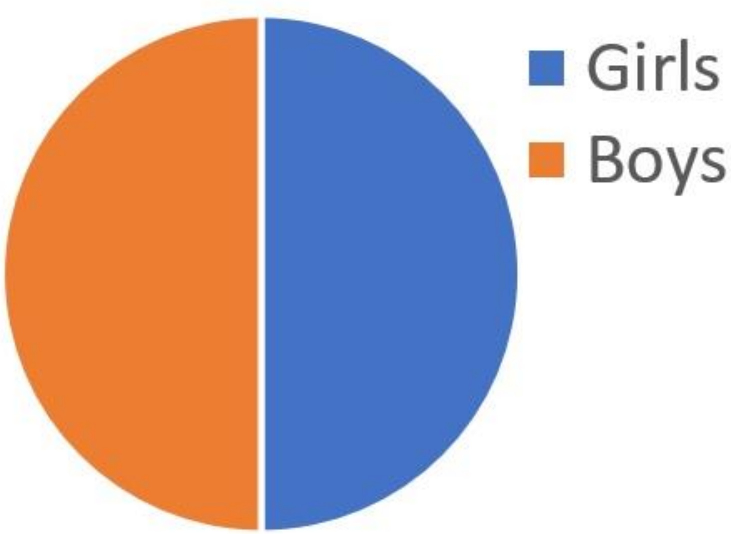
Running club (end of term)

16 children

Year Group



Gender

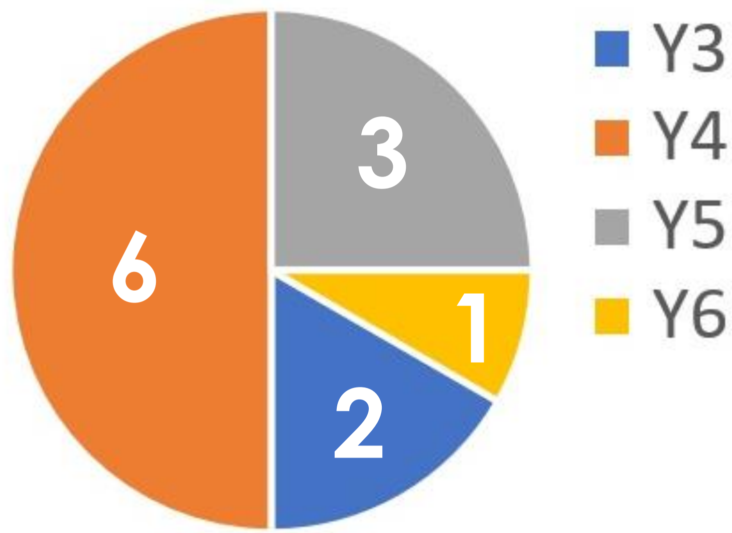


Task 54: Before/now pie charts

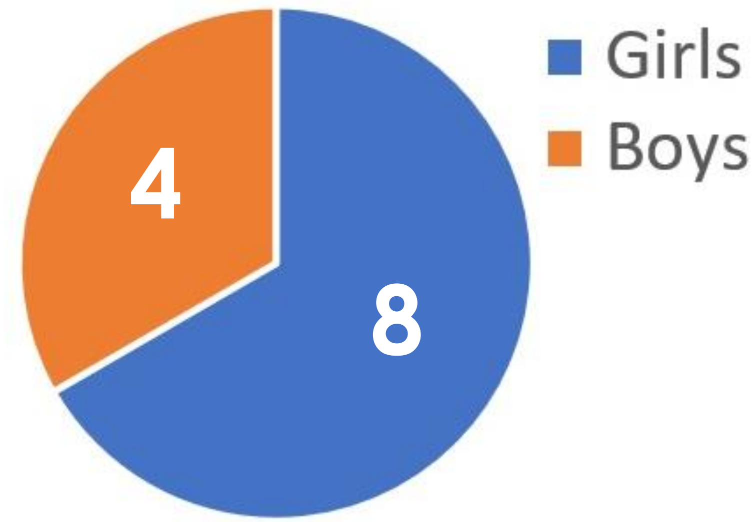
Running club (start of term)

12 children

Year Group



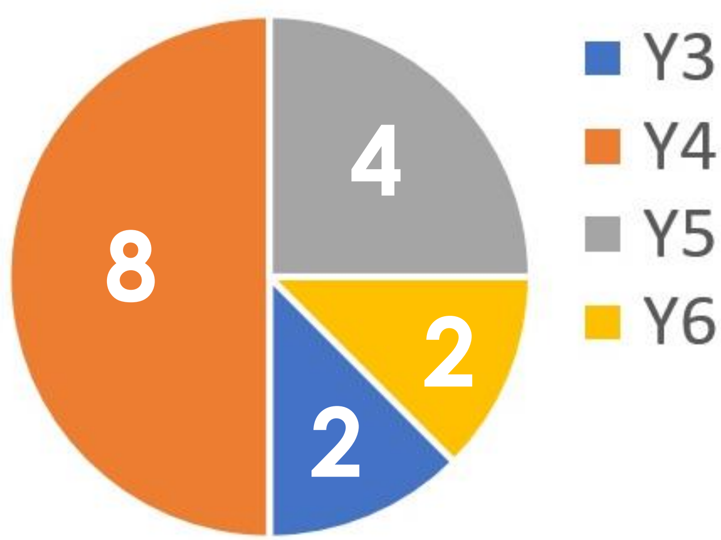
Gender



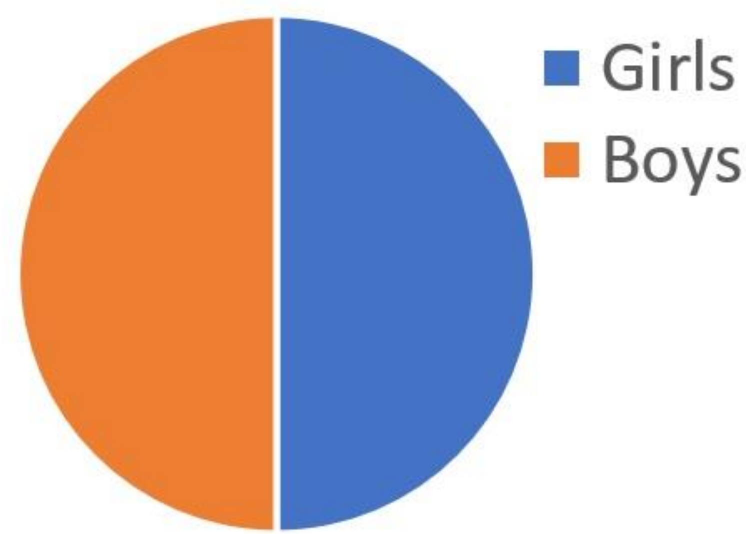
Running club (end of term)

16 children

Year Group



Gender

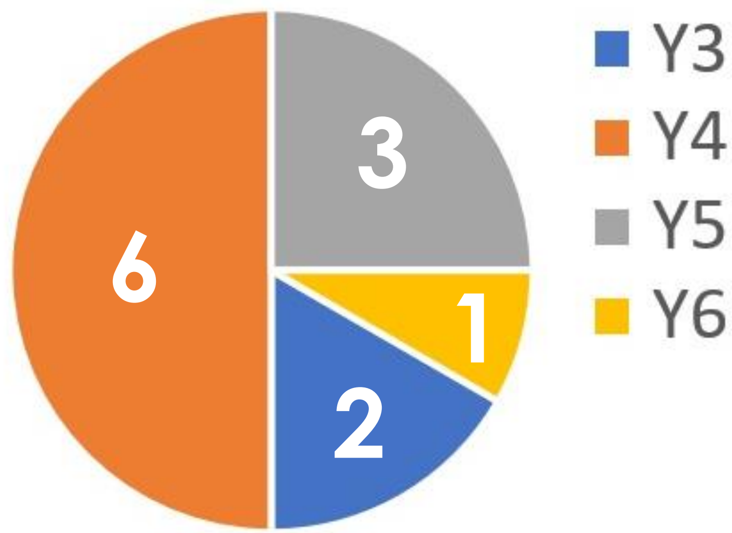


Task 54: Before/now pie charts

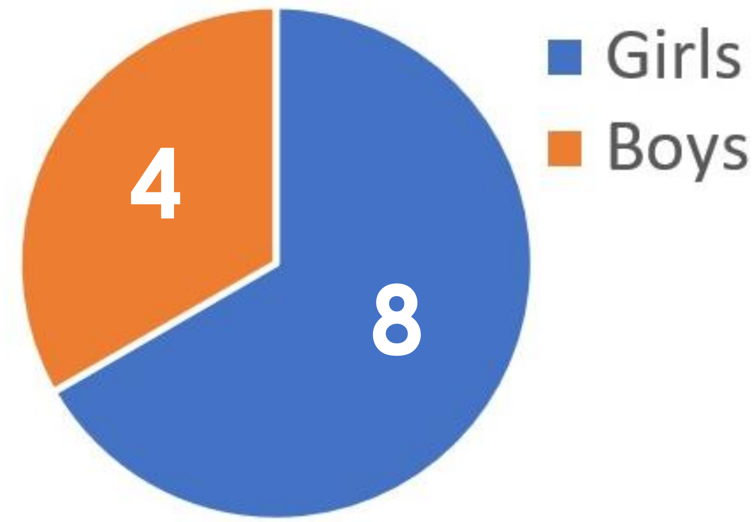
Running club (start of term)

12 children

Year Group



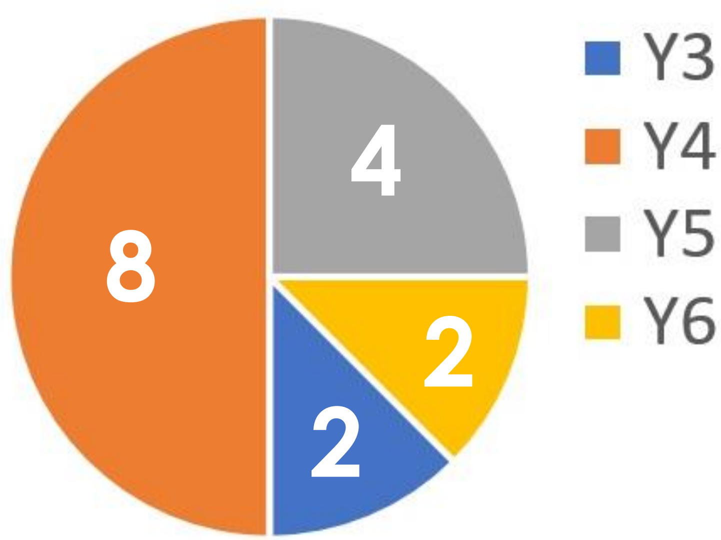
Gender



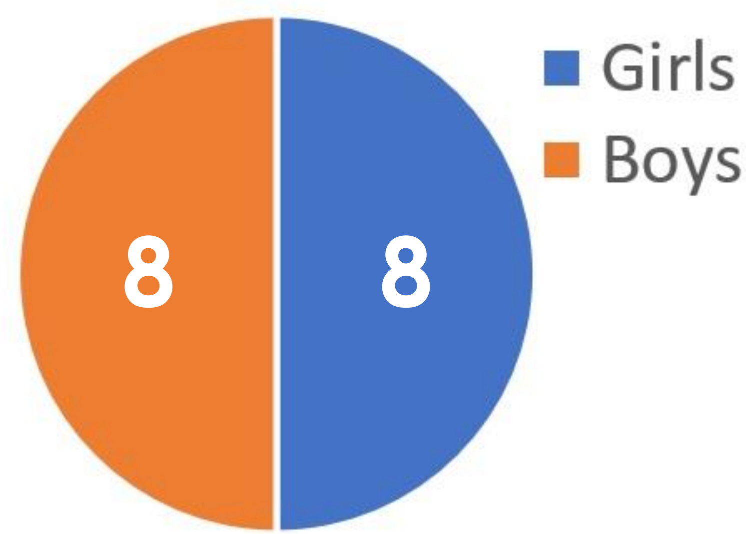
Running club (end of term)

16 children

Year Group



Gender

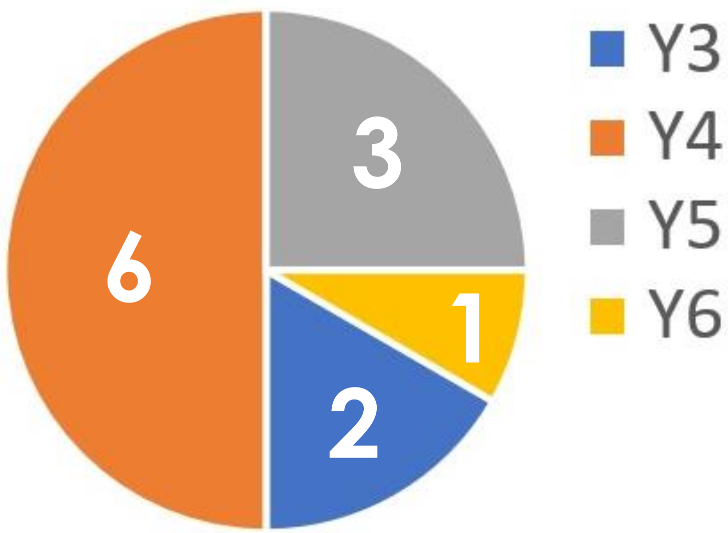


Task 54: Before/now pie charts

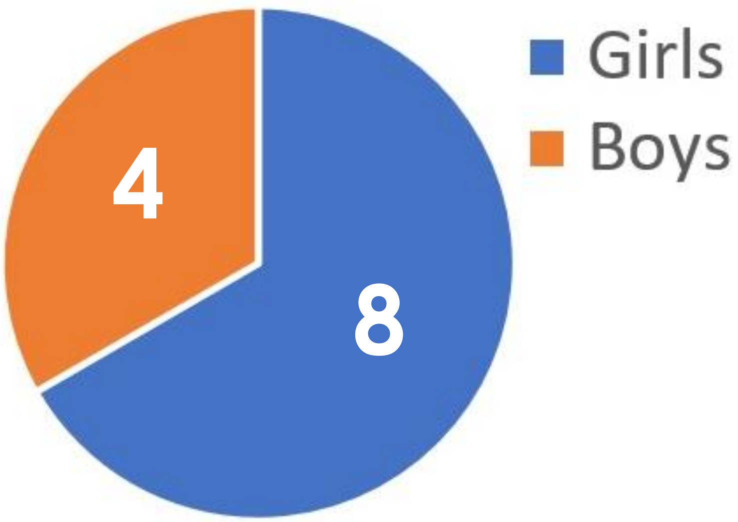
Running club (start of term)

12 children

Year Group



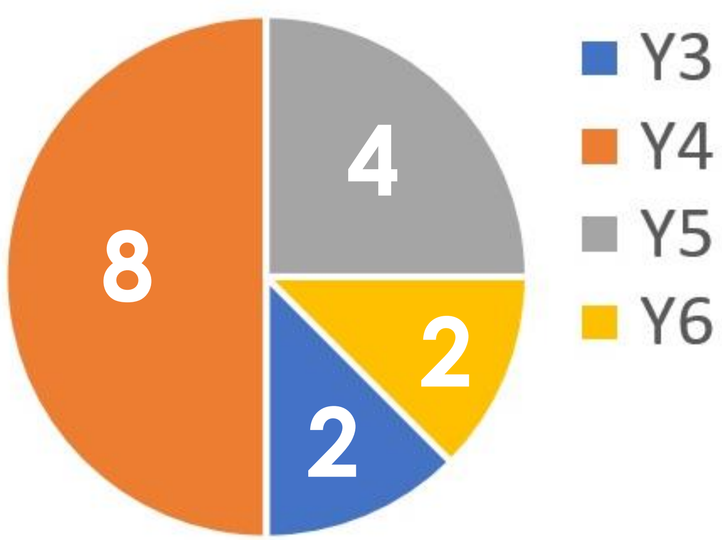
Gender



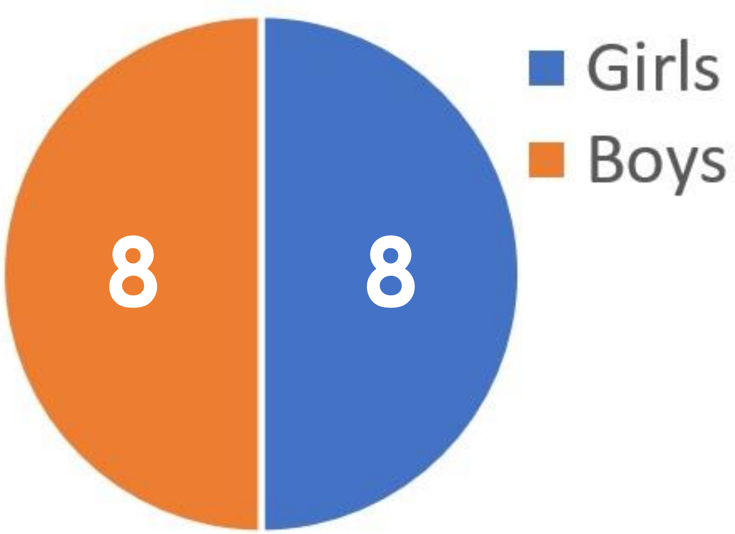
Running club (end of term)

16 children

Year Group



Gender

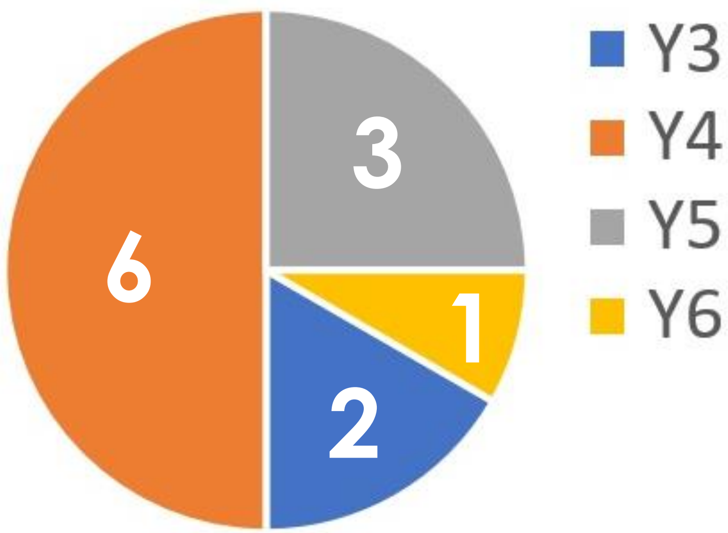


Task 54: Before/now pie charts

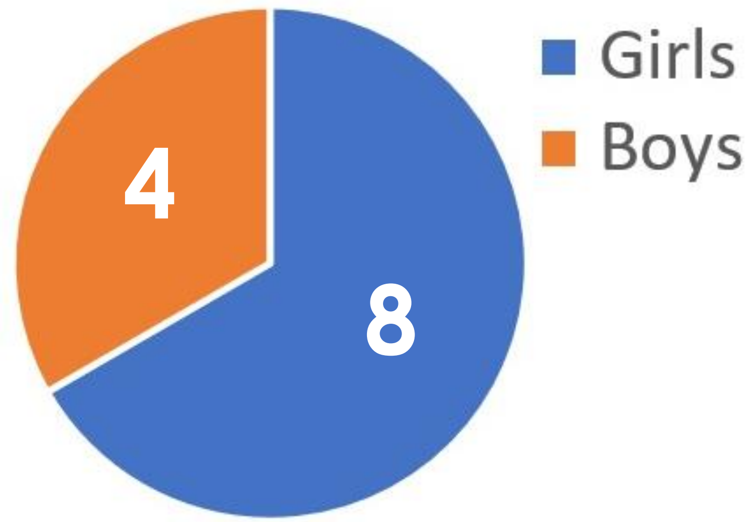
Running club (start of term)

12 children

Year Group



Gender



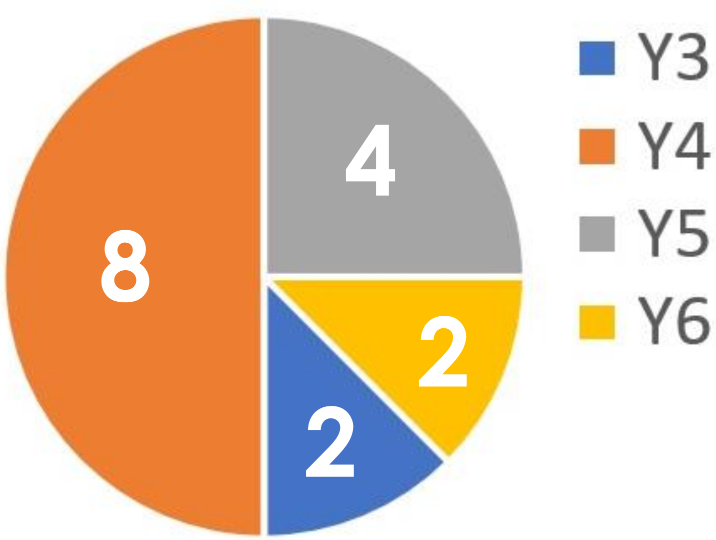
4 more boys

2 boys from Y4

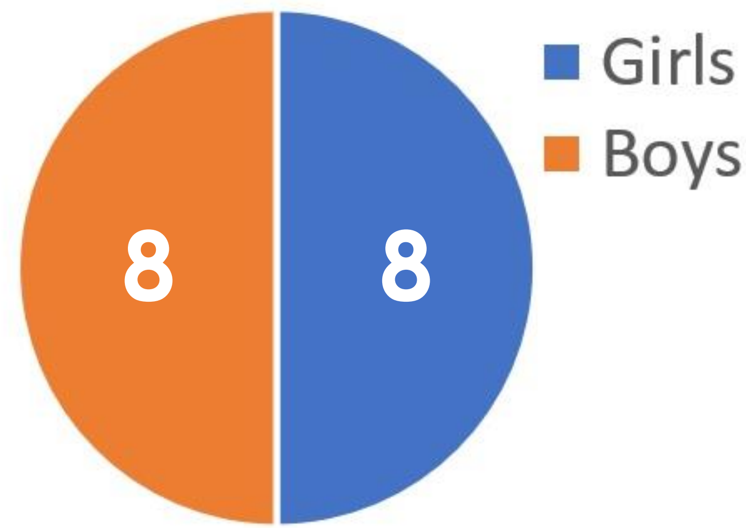
1 boy from Y5

1 boy from Y6

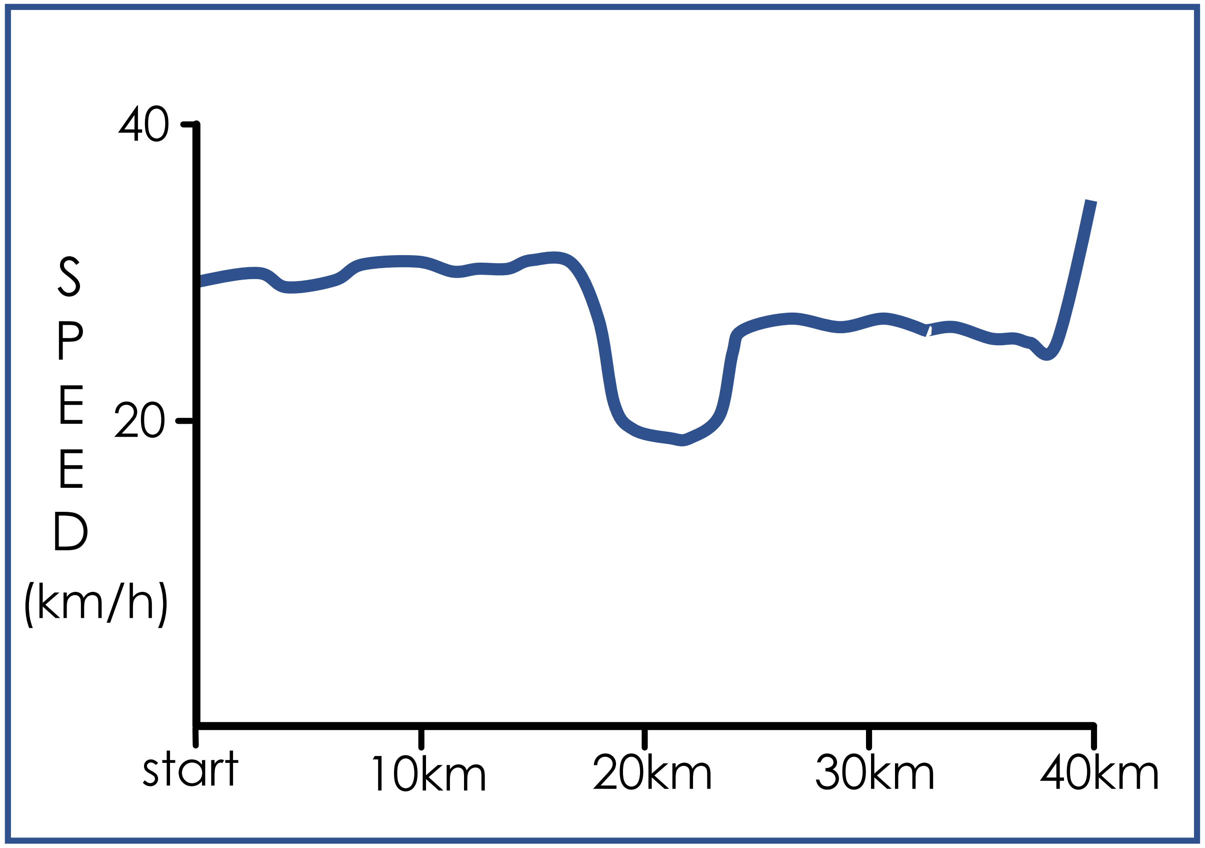
Year Group

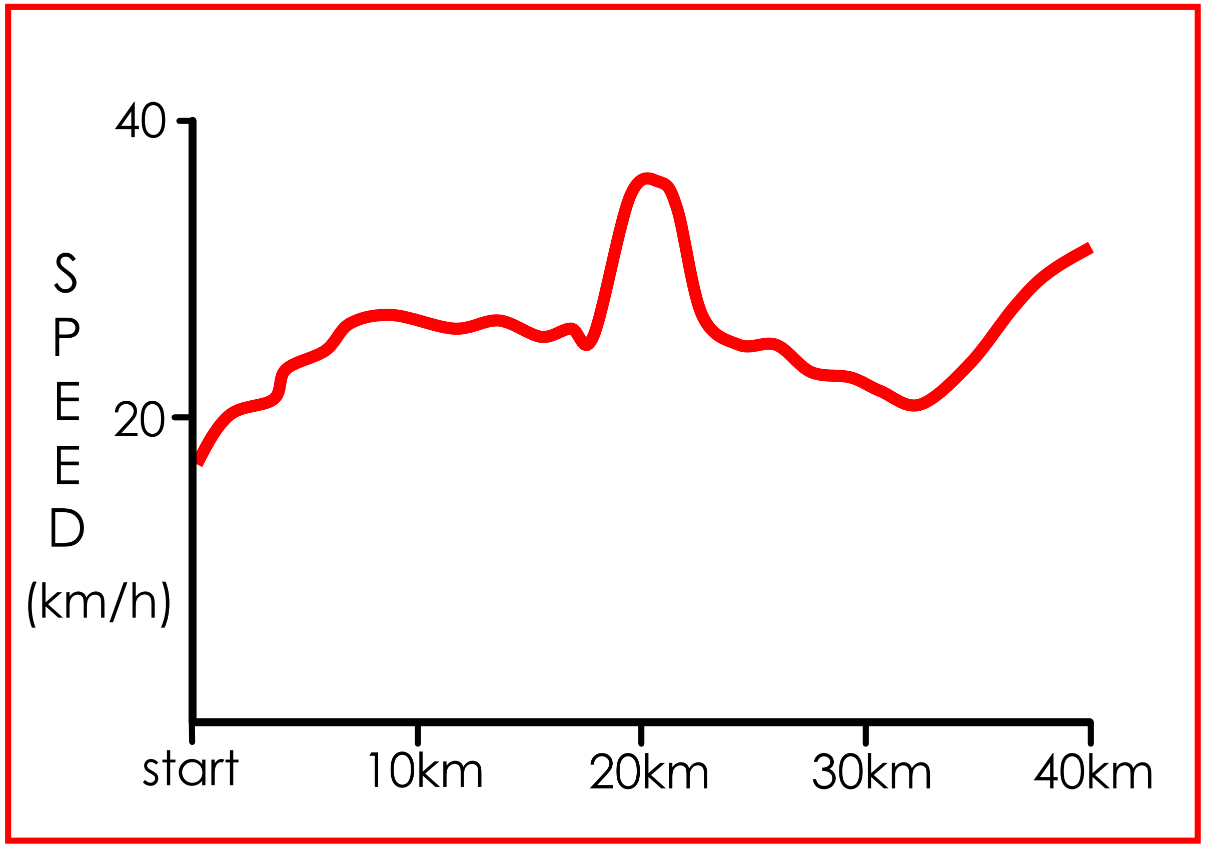


Gender



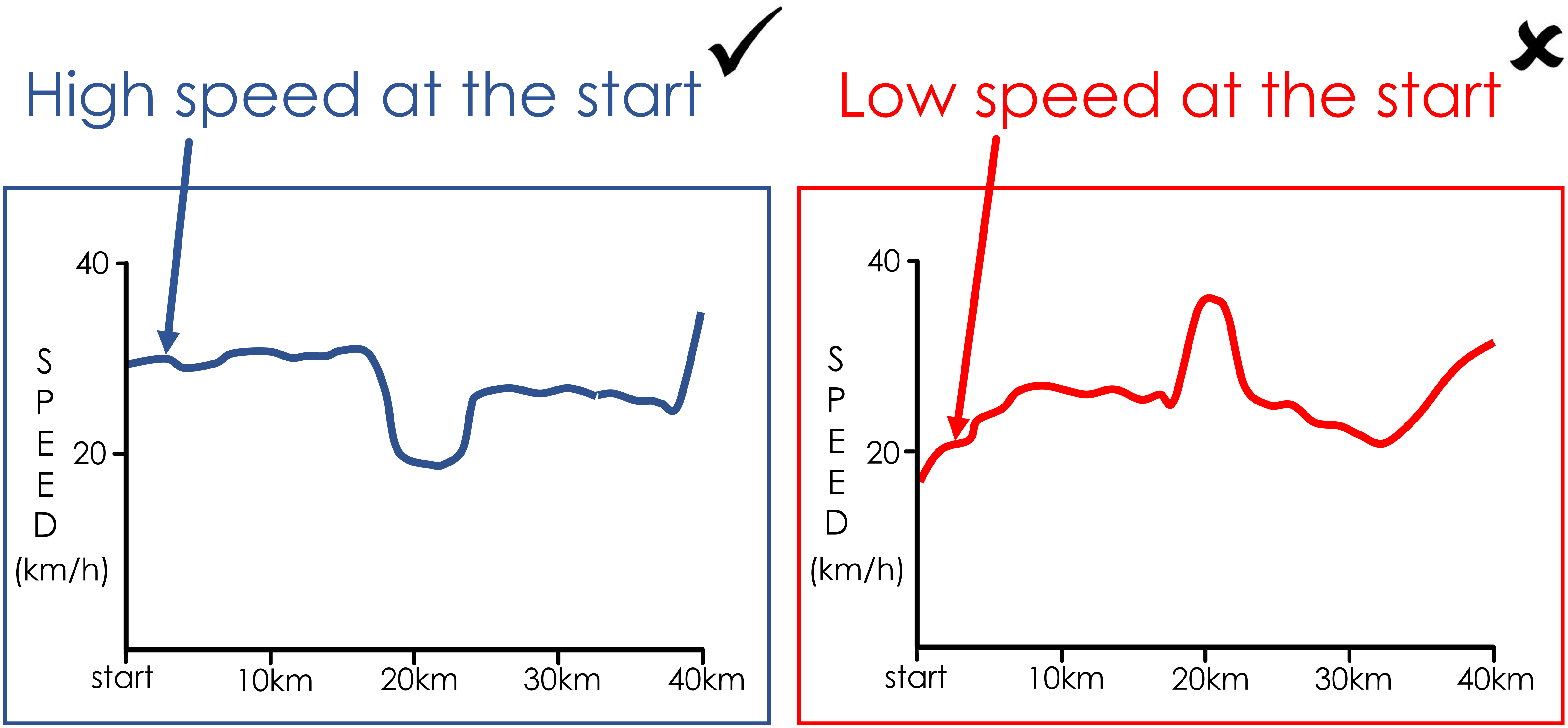
Task 55: Bike race line graphs (question 1)





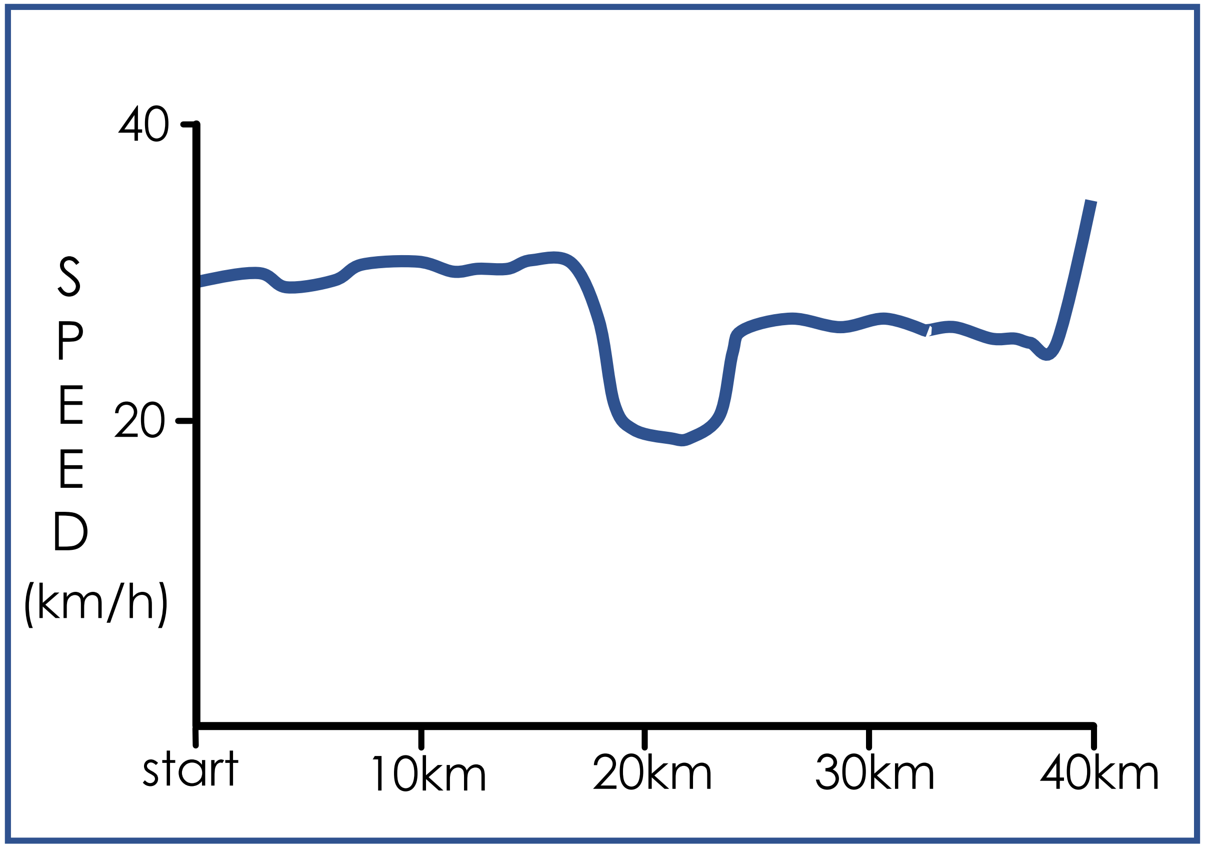
'I started the race quickly.'

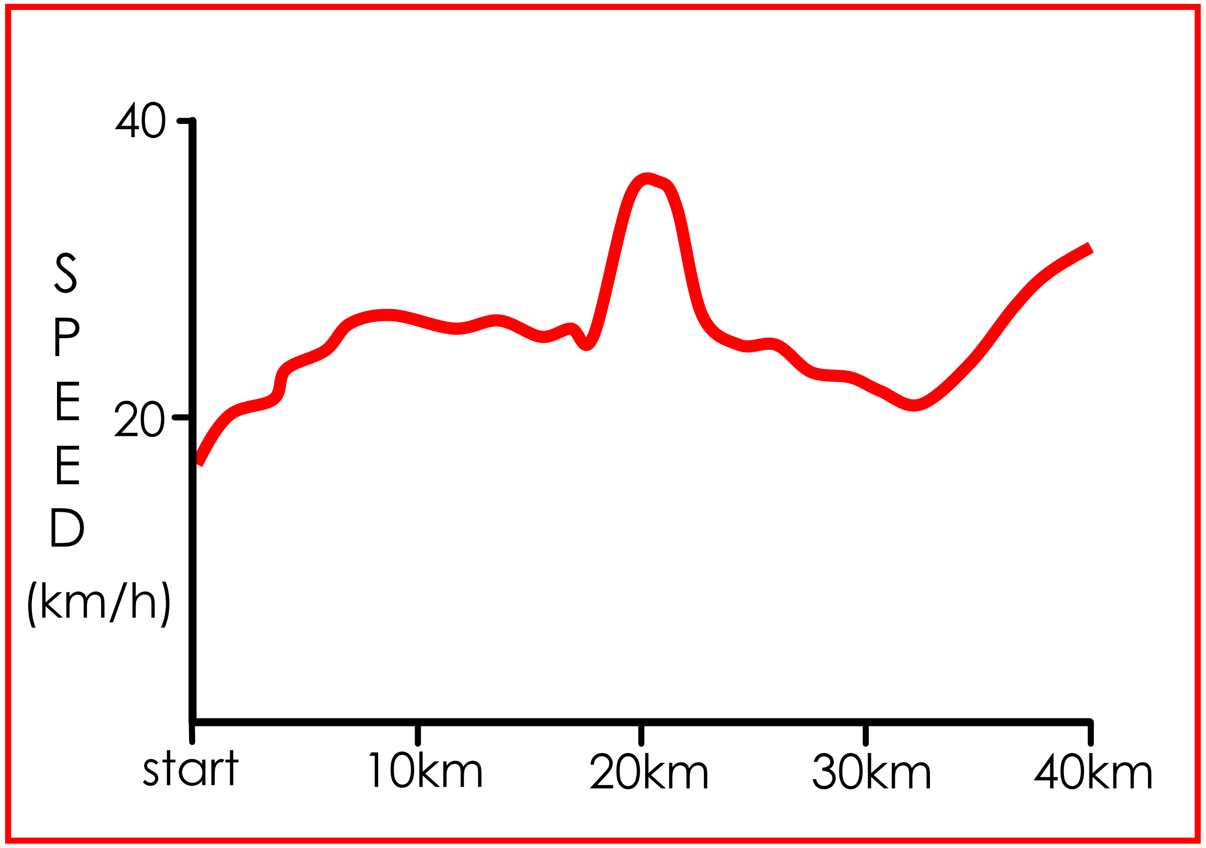
Task 55: Bike race line graphs (question 1)



'I started the race quickly.'

Task 55: Bike race line graphs (question 1)



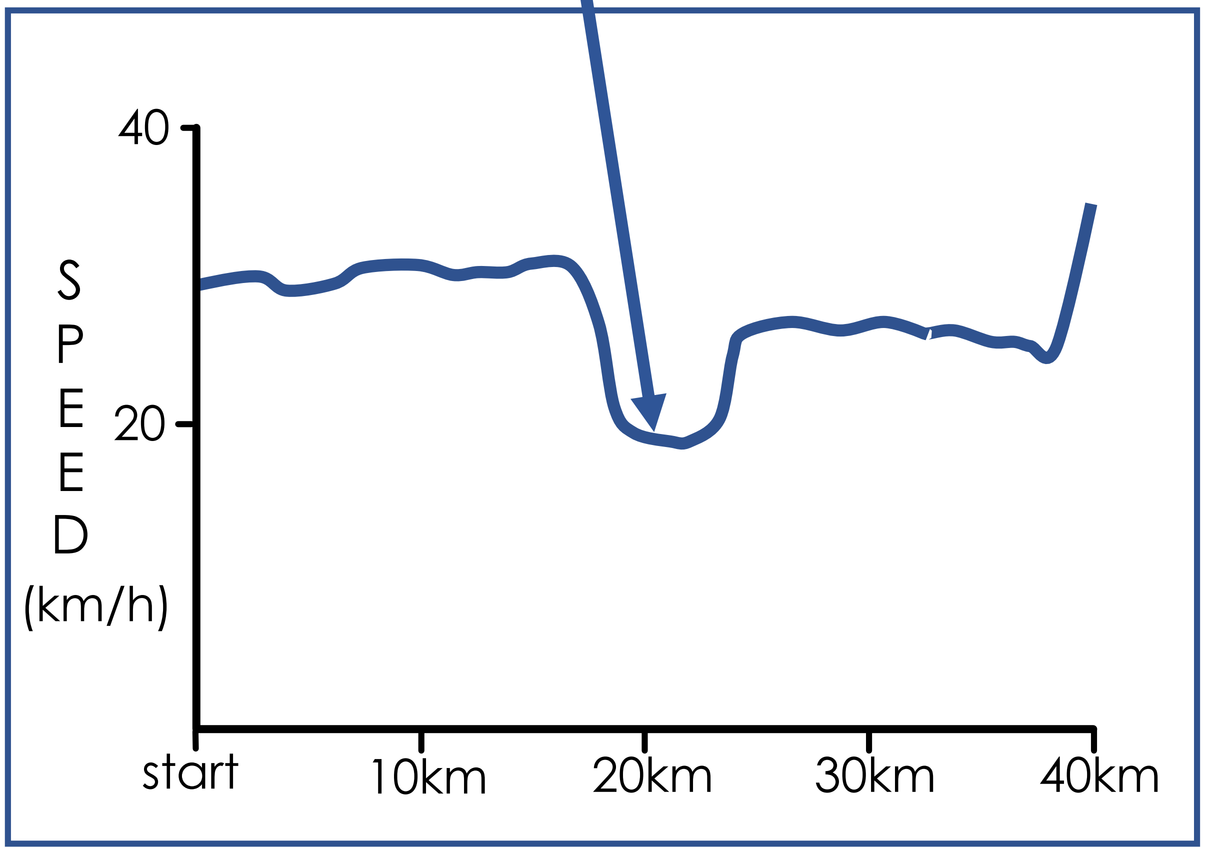


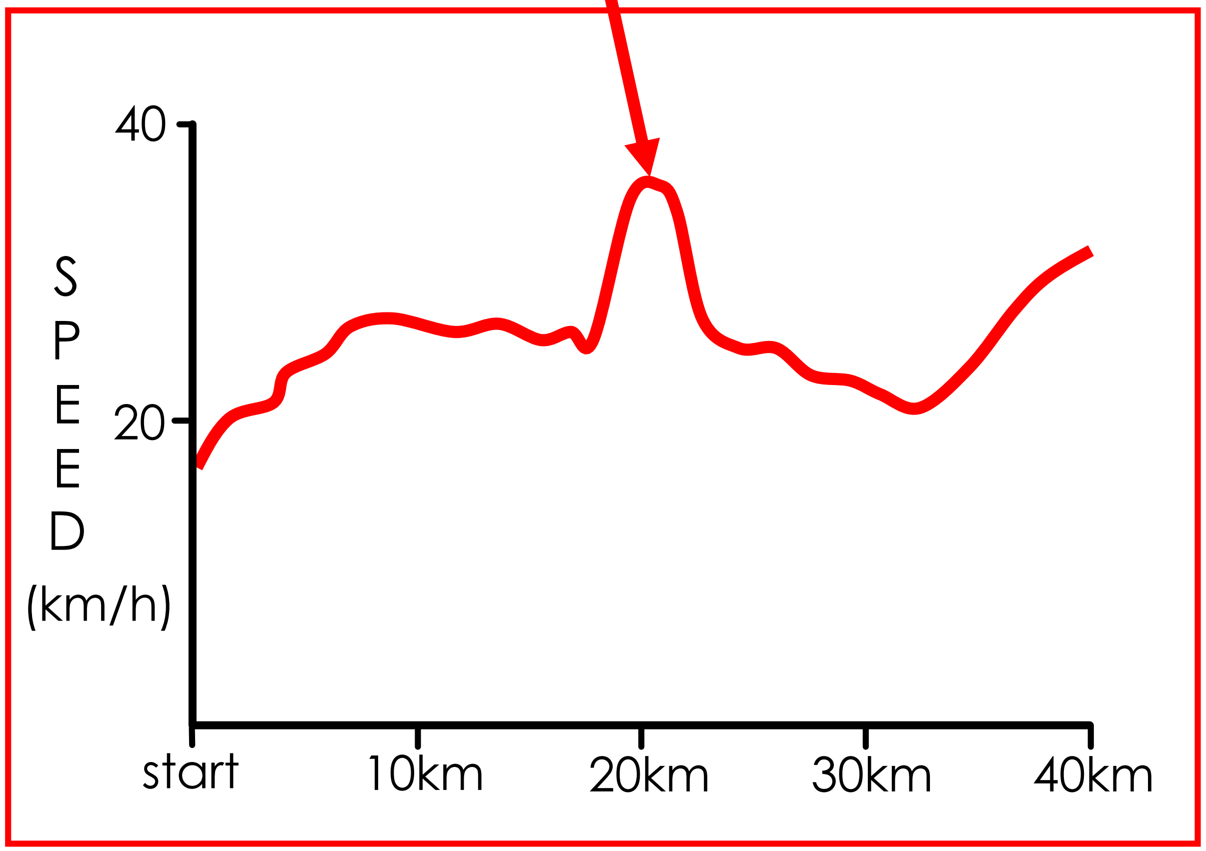
'There was a big uphill climb half-way through the race.'

Task 55: Bike race line graphs (question 1)

Slower here due to the hill ✓

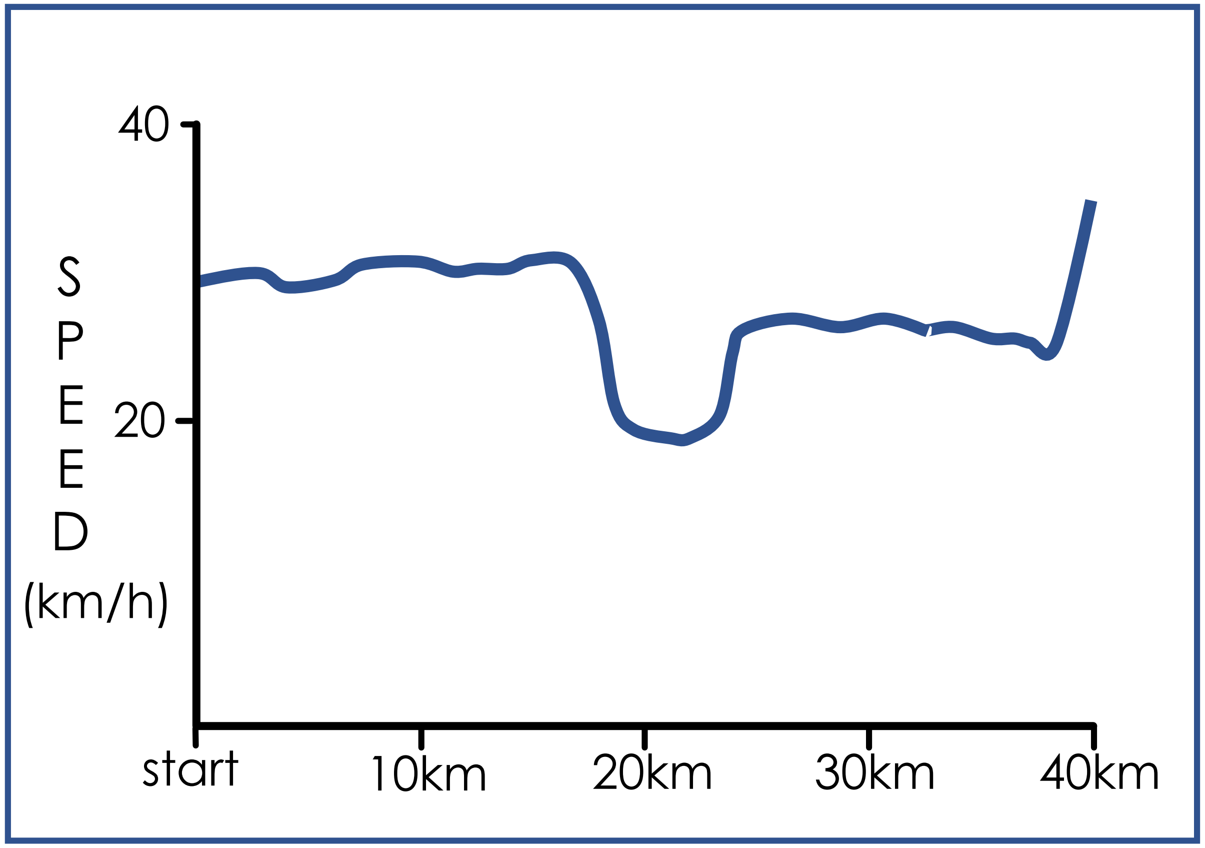
Not likely to have a higher speed when cycling uphill ✗

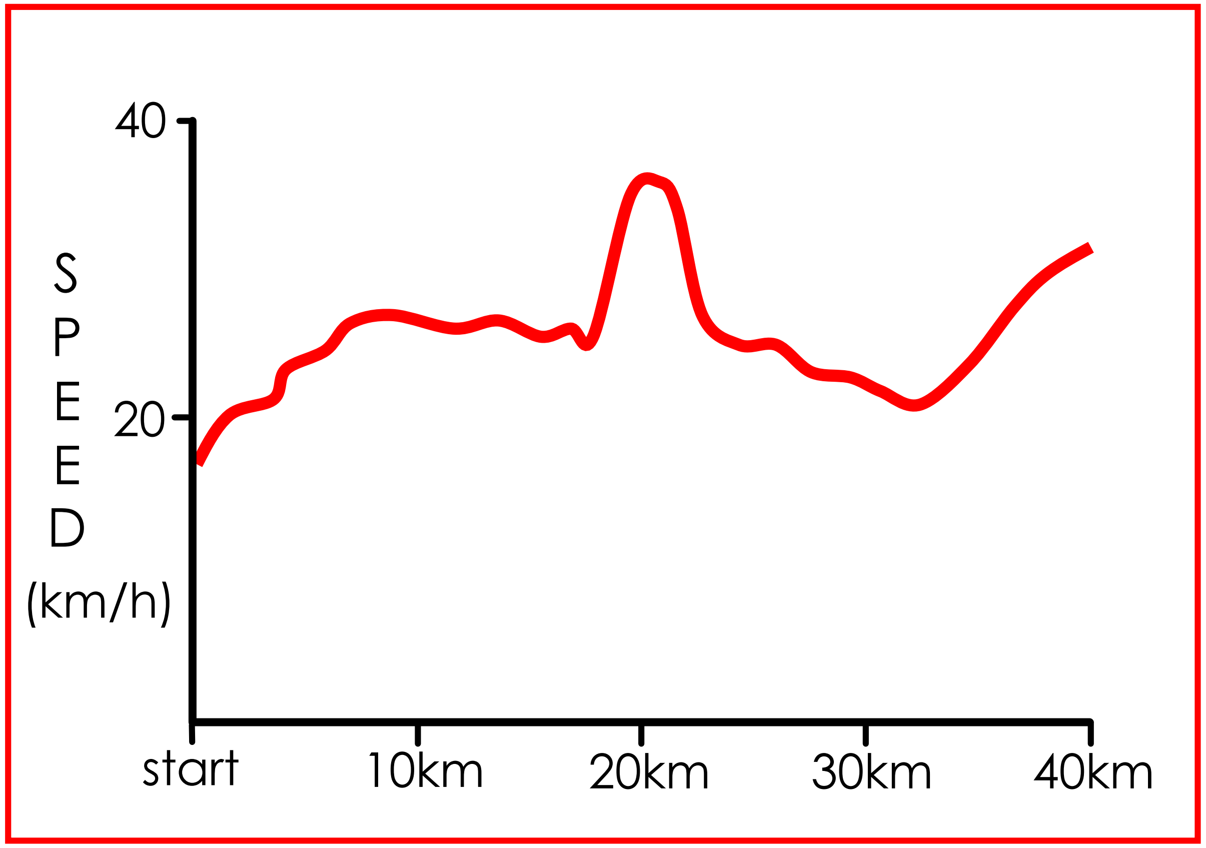




'There was a big uphill climb half-way through the race.'

Task 55: Bike race line graphs (question 1)



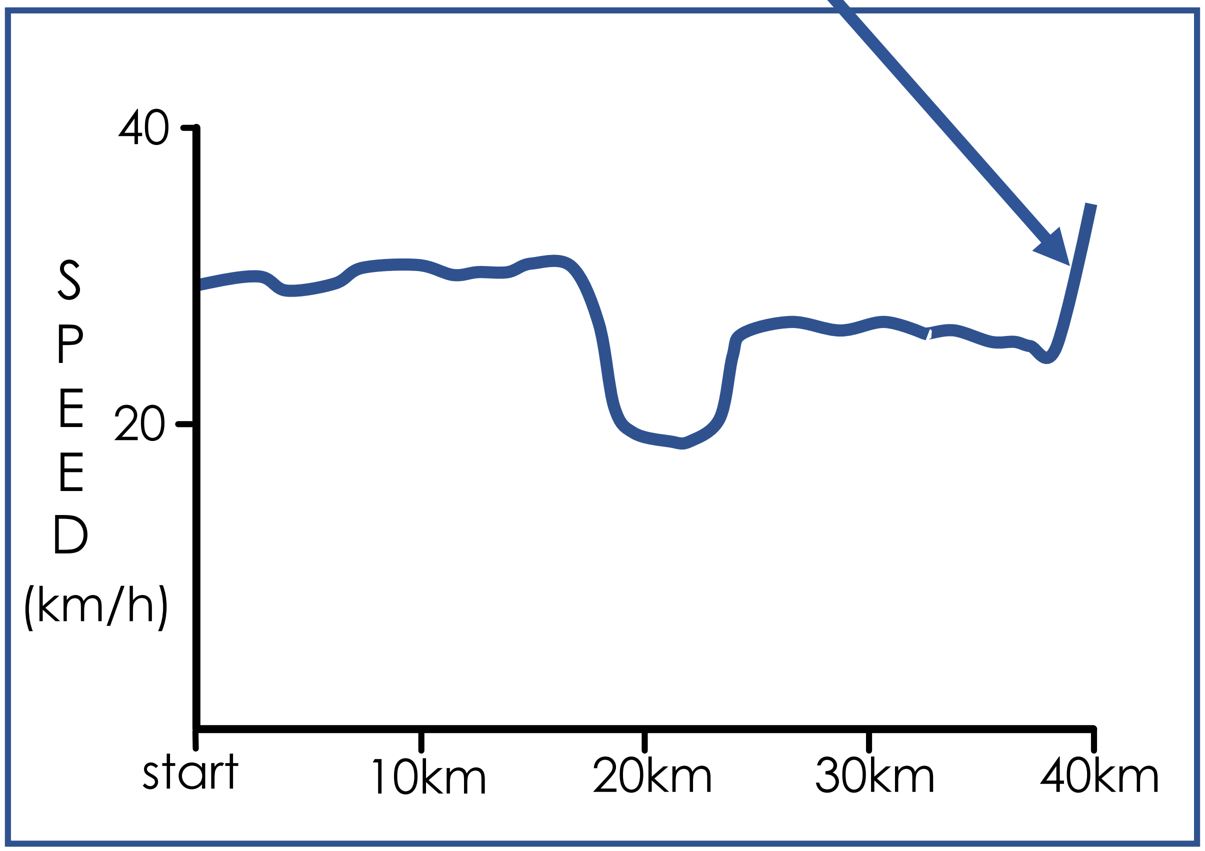


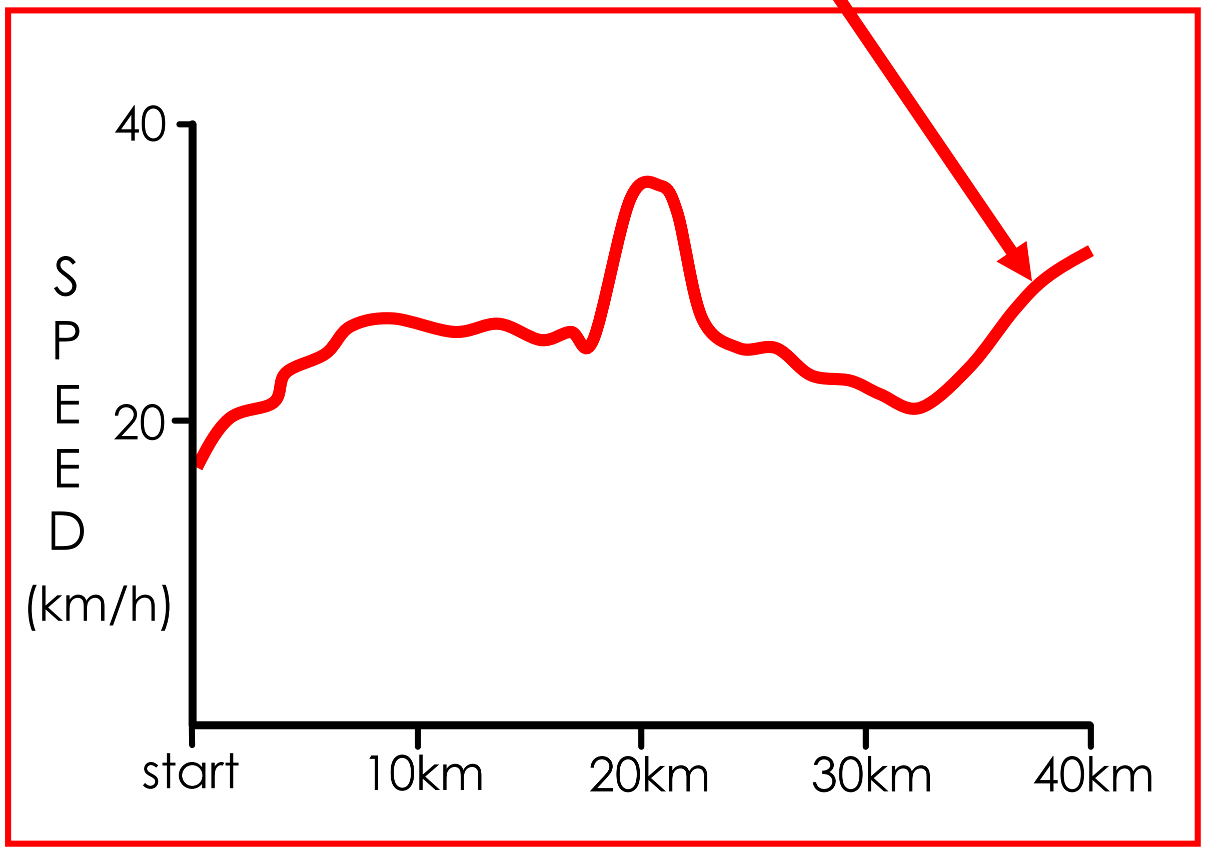
'I slowed down for the last 5km but I did a sprint finish.'

Task 55: Bike race line graphs (question 1)

Sprint finish shown by sudden, short increase in speed ✓

Increase in speed gradual, so not showing a sprint finish ✗



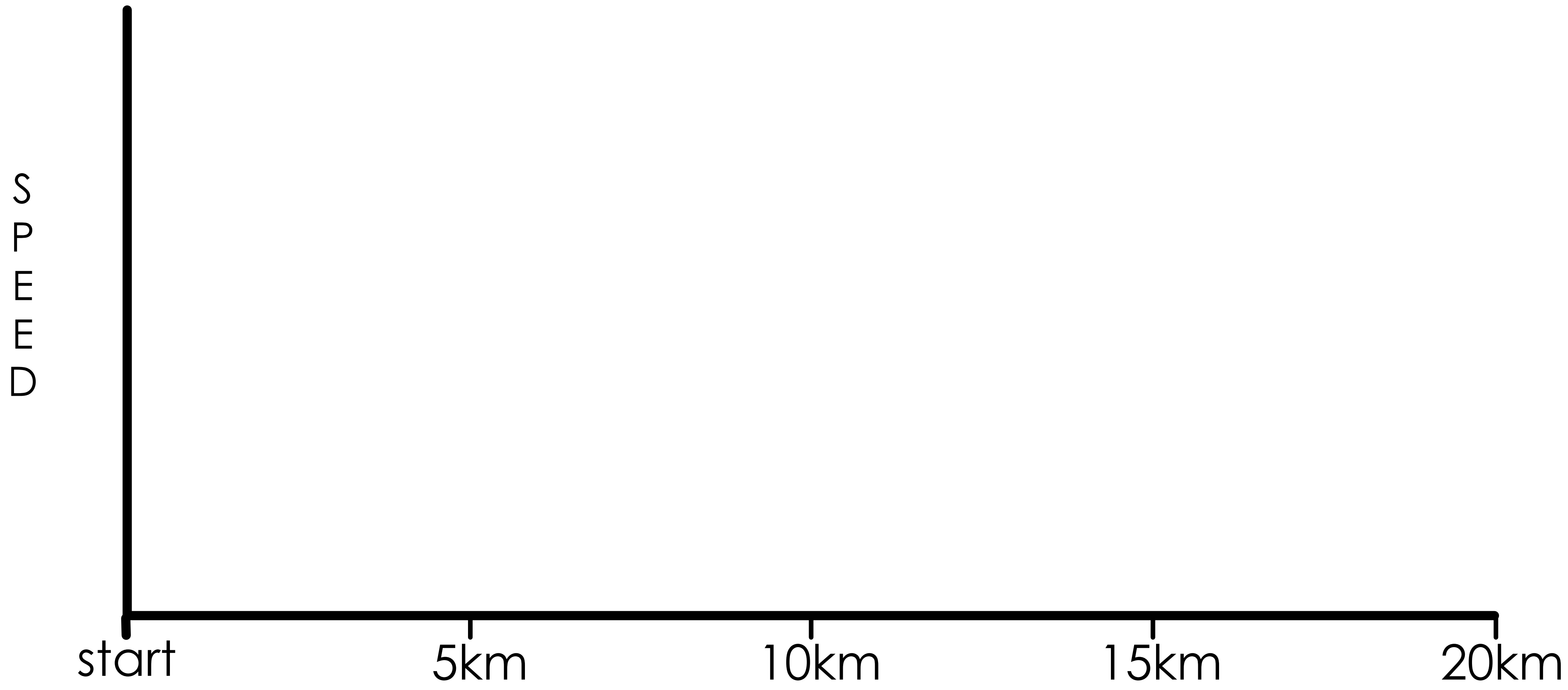


'I slowed down for the last 5km but I did a sprint finish.'

Task 55: Bike race line graphs (question 2)

Example Graph:

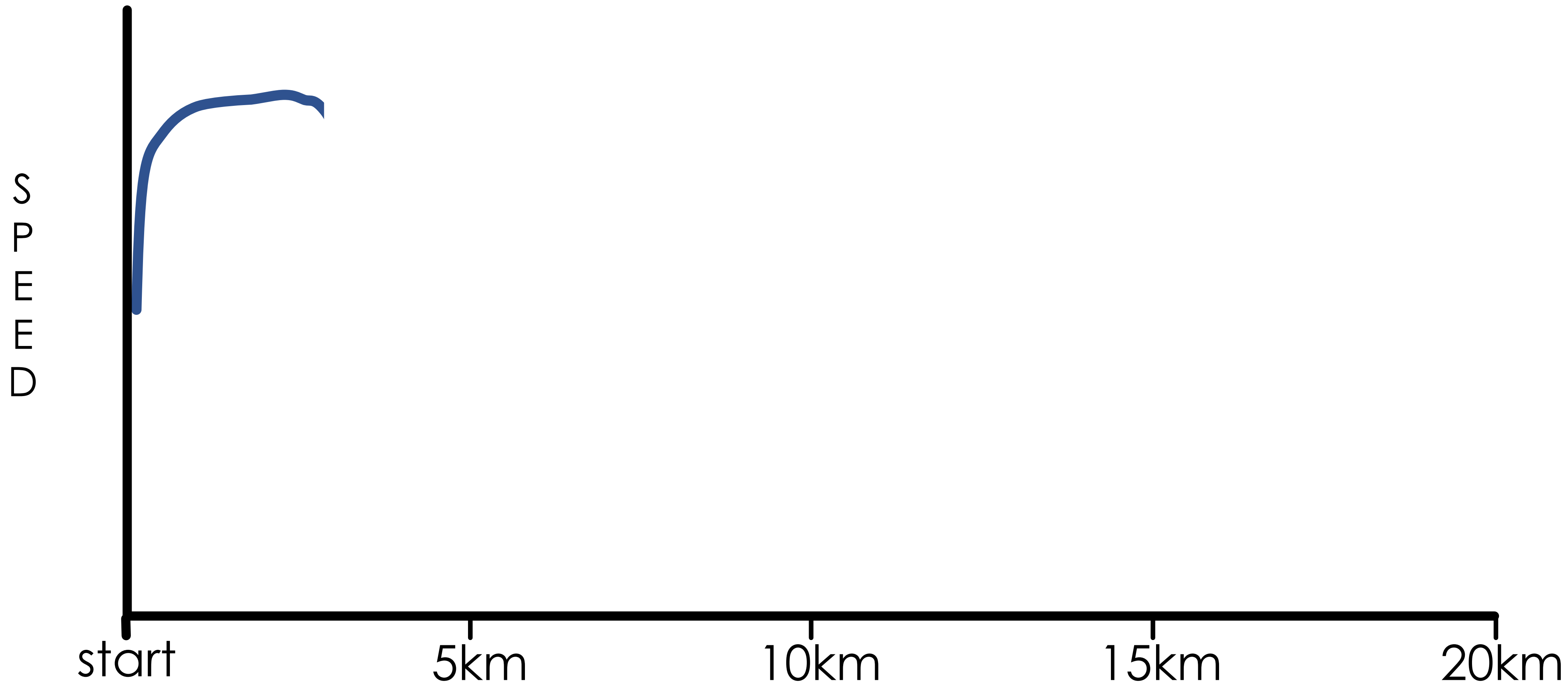
'I started quickly - first 3km of the race was downhill.'



Task 55: Bike race line graphs (question 2)

Example Graph:

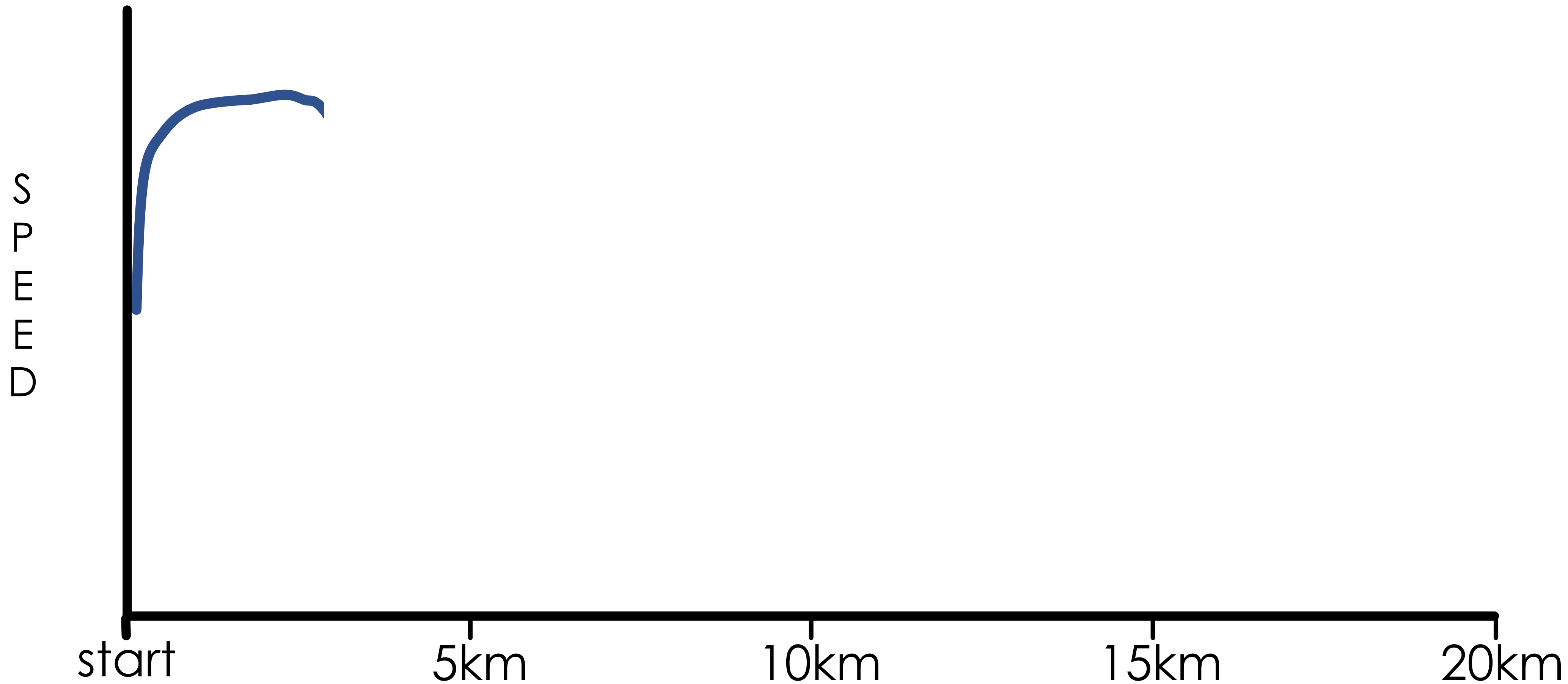
'I started quickly - first 3km of the race was downhill.'



Task 55: Bike race line graphs (question 2)

Example Graph:

'I slowed down after that, cycling at a similar speed in the middle part of the race.'



Task 55: Bike race line graphs (question 2)

Example Graph:

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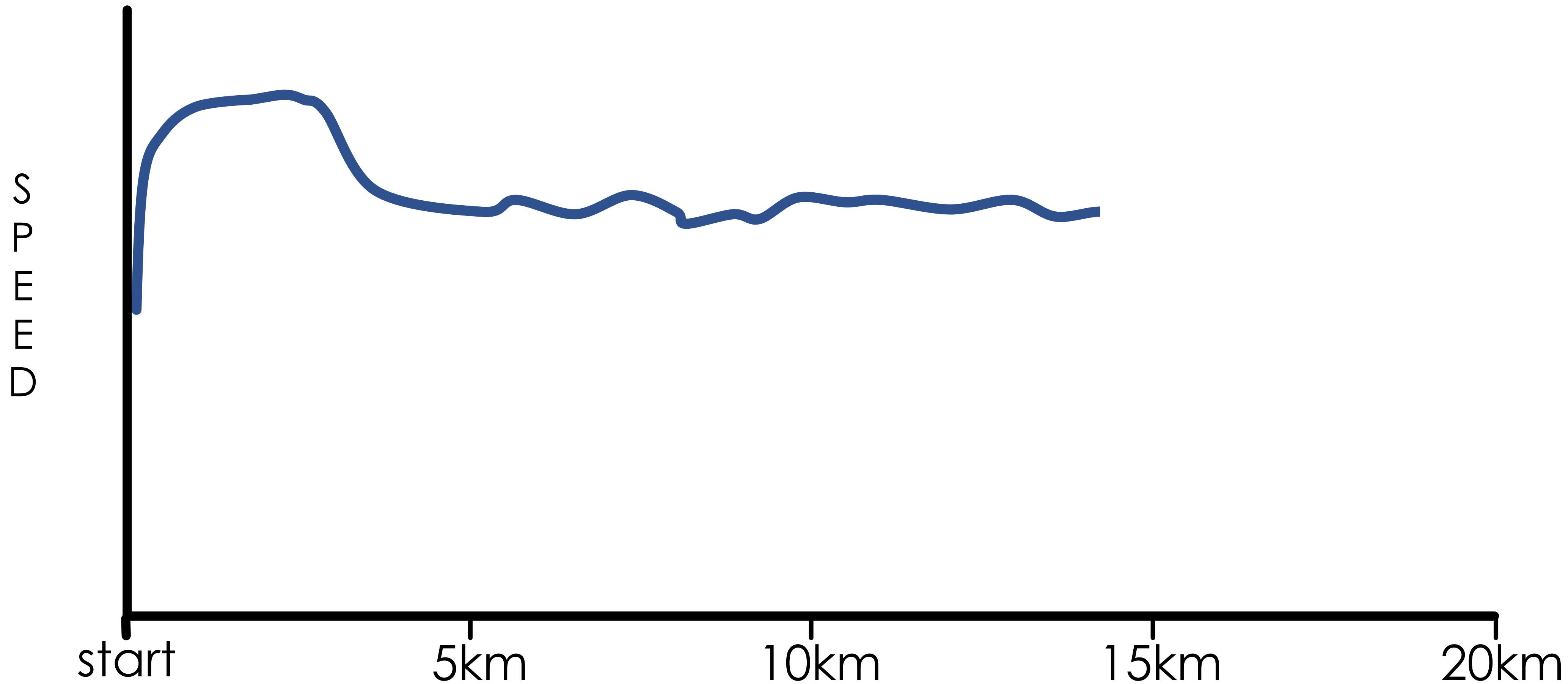
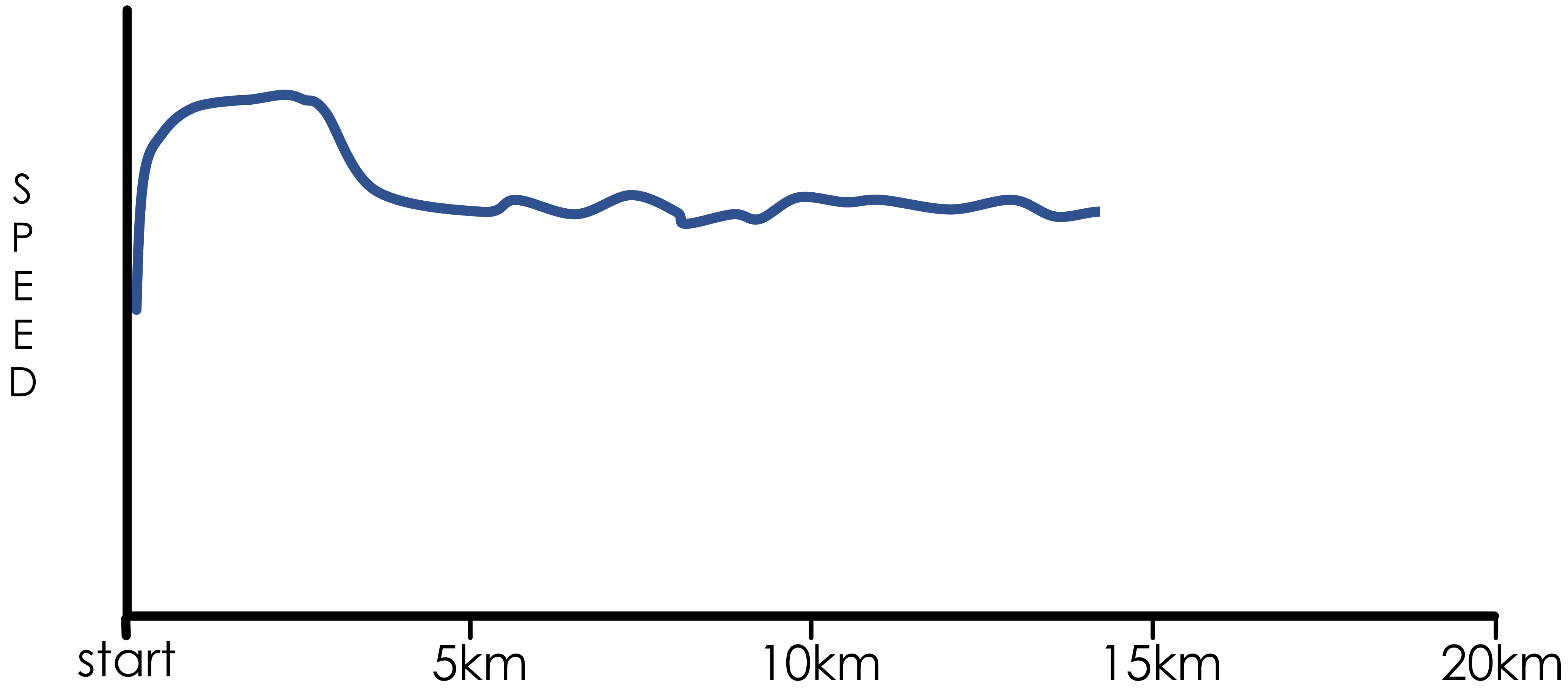


Task 55: Bike race line graphs (question 2)

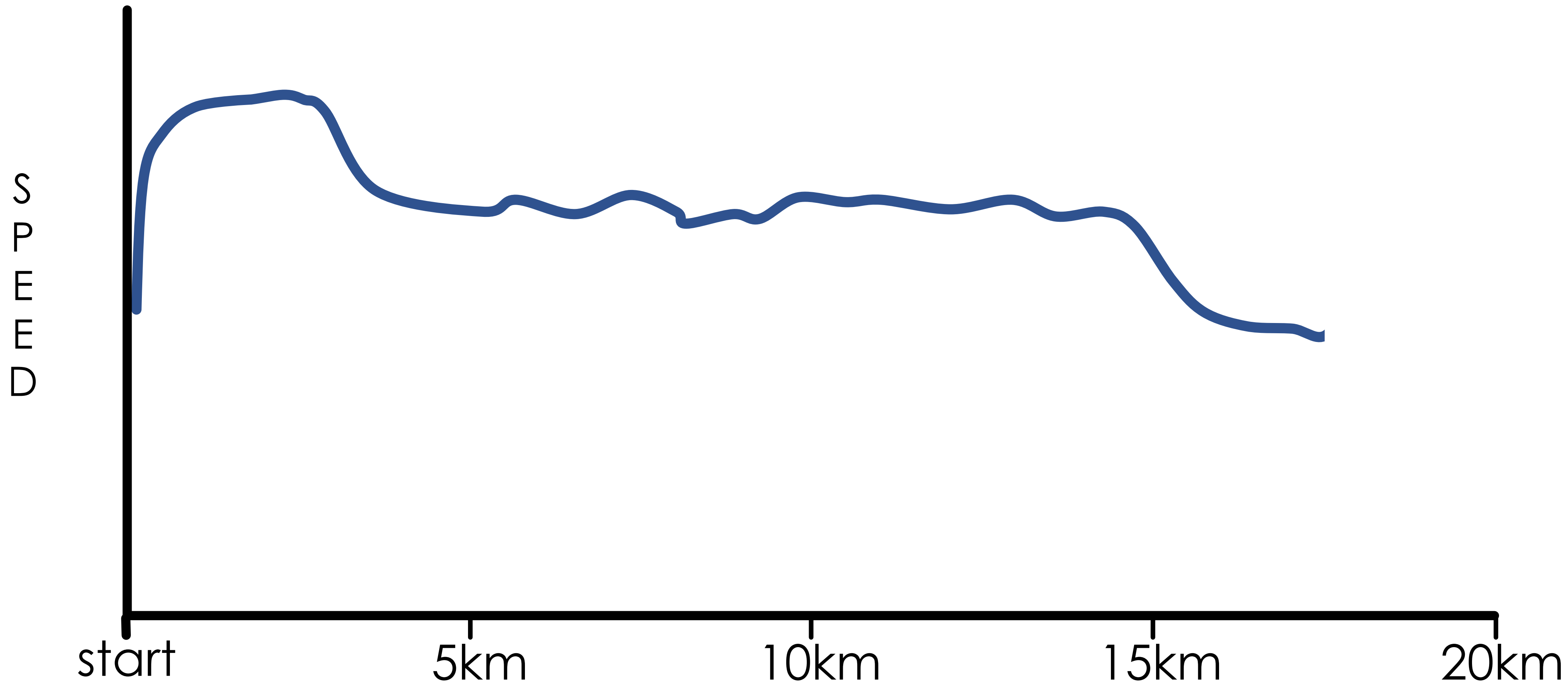
Example Graph:

'There was a long hill that started 15km into the race.'



Example Graph:

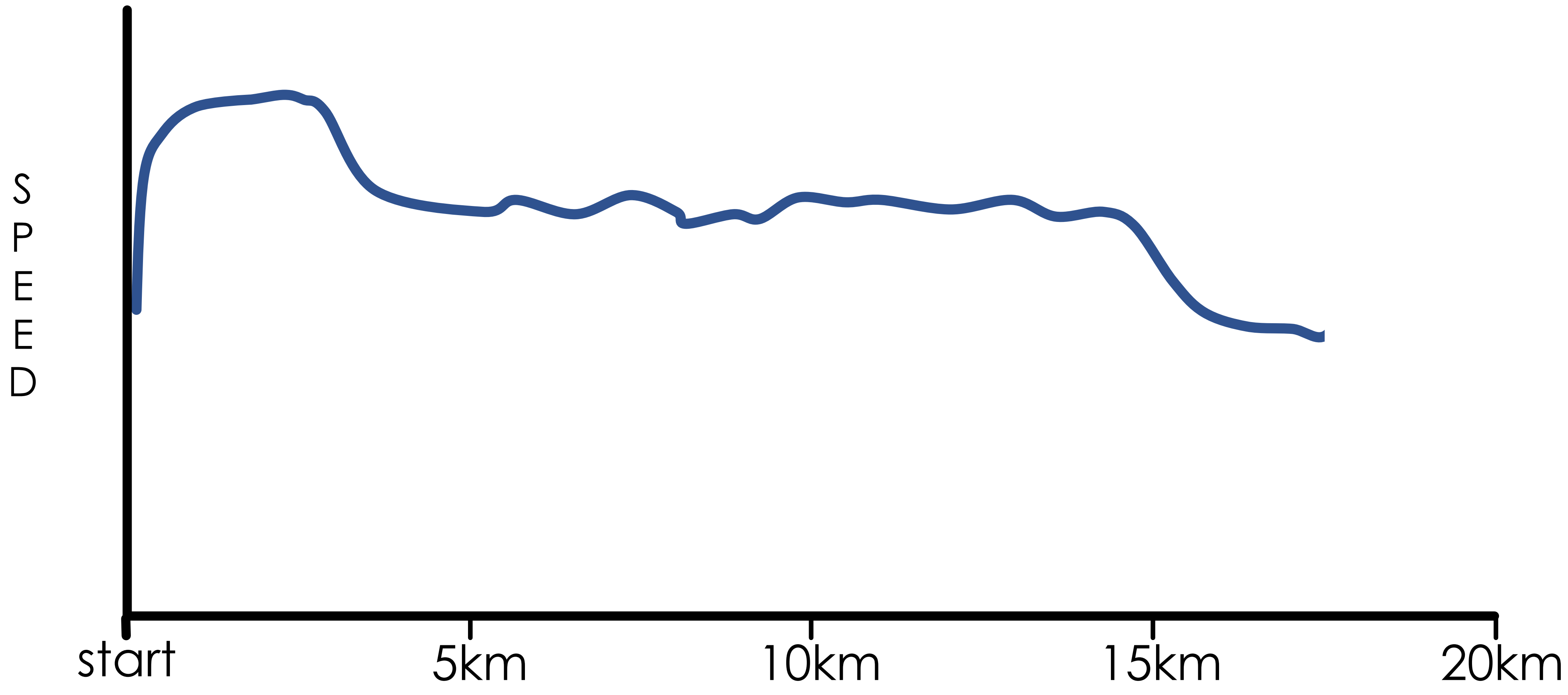
'There was a long hill that started 15km into the race.'



Task 55: Bike race line graphs (question 2)

Example Graph:

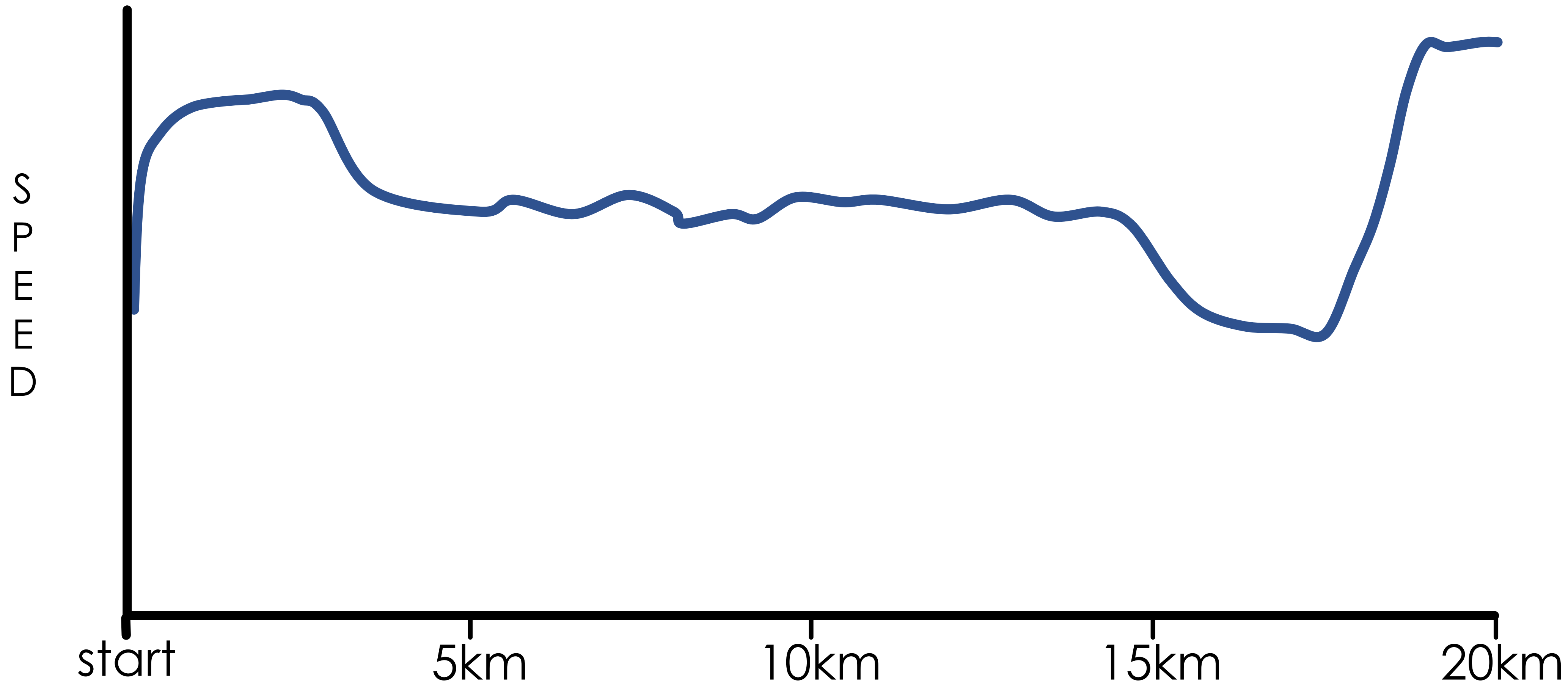
'The fastest part of my race was the last 2km.'



Task 55: Bike race line graphs (question 2)

Example Graph:

'The fastest part of my race was the last 2km.'



Task 56: Train timetables

Stan gets to Doncaster train station at 7:35am.

Sheffield	6:20	7:04	7:58	8:45
Doncaster	6:47	7:33	8:25	9:14
York	7:14	8:00	8:52	9:41
Darlington	7:43	8:29	9:21	10:11
Durham	8:01	8:48	9:39	10:30
Newcastle	8:14	9:01	9:52	10:43

Task 56: Train timetables

Stan gets to Doncaster train station at 7:35am.

Sheffield	6:20	7:04	7:58	8:45
Doncaster	6:47	7:33	**8:25**	9:14
York	7:14	8:00	8:52	9:41
Darlington	7:43	8:29	9:21	10:11
Durham	8:01	8:48	9:39	10:30
Newcastle	8:14	9:01	9:52	10:43

The next train from Doncaster leaves at 8:25.

Task 56: Train timetables

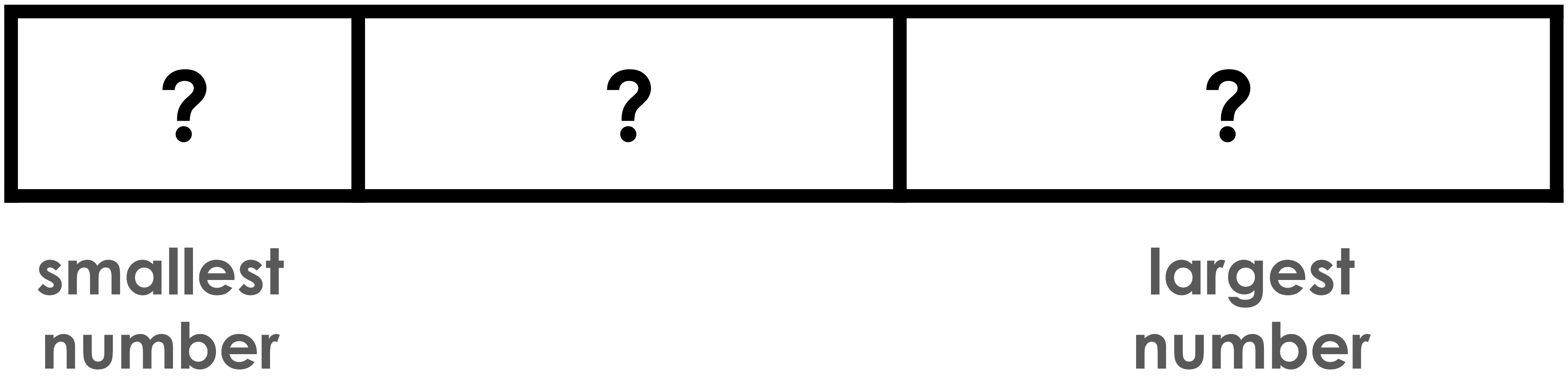
Stan gets to Doncaster train station at 7:35am.

Sheffield	6:20	7:04	7:58	8:45
Doncaster	6:47	7:33	**8:25**	9:14
York	7:14	8:00	8:52	9:41
Darlington	7:43	8:29	9:21	10:11
Durham	8:01	8:48	**9:39**	10:30
Newcastle	8:14	9:01	9:52	10:43

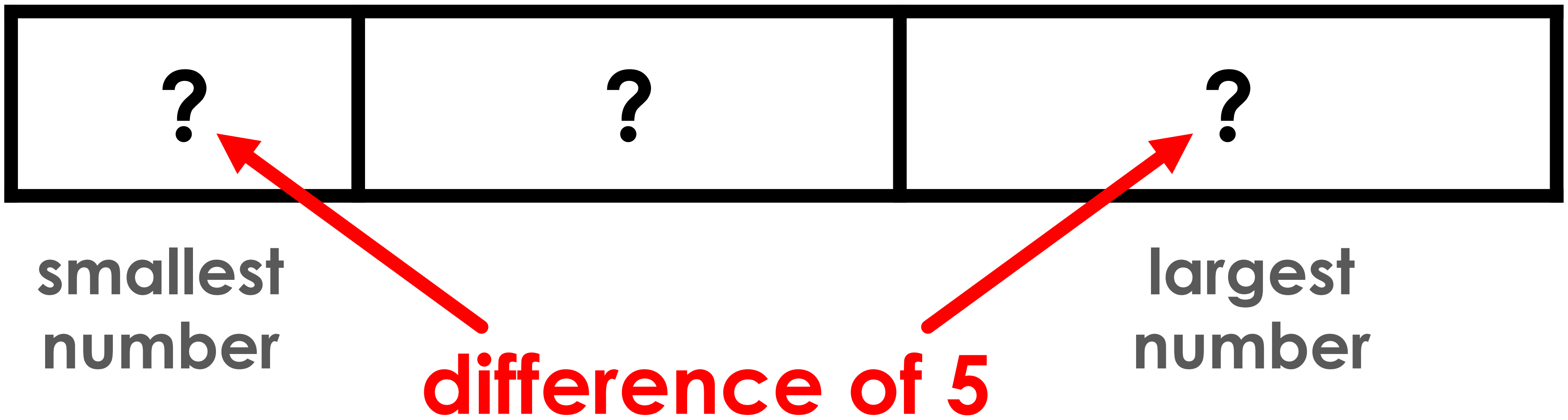
The next train from Doncaster leaves at 8:25

Stan will arrive in Durham at **9:39**

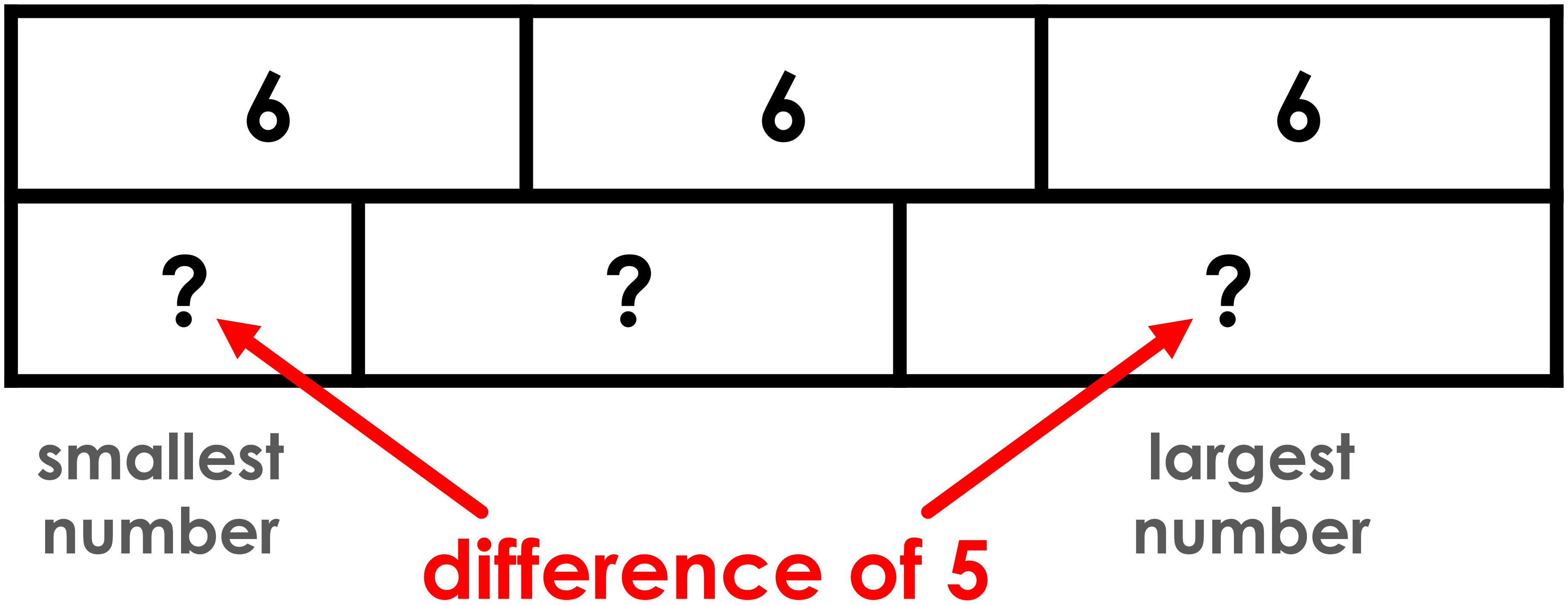
Task 57: Average of 3 numbers



Task 57: Average of 3 numbers

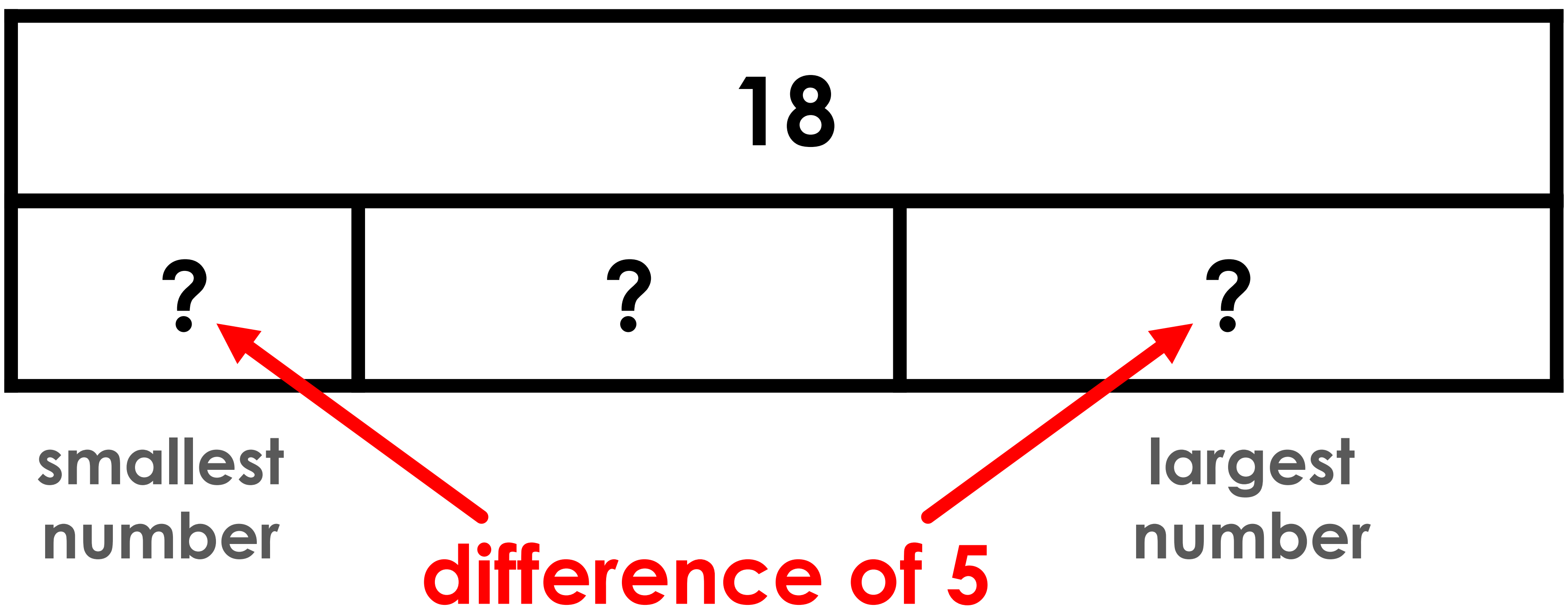


Task 57: Average of 3 numbers



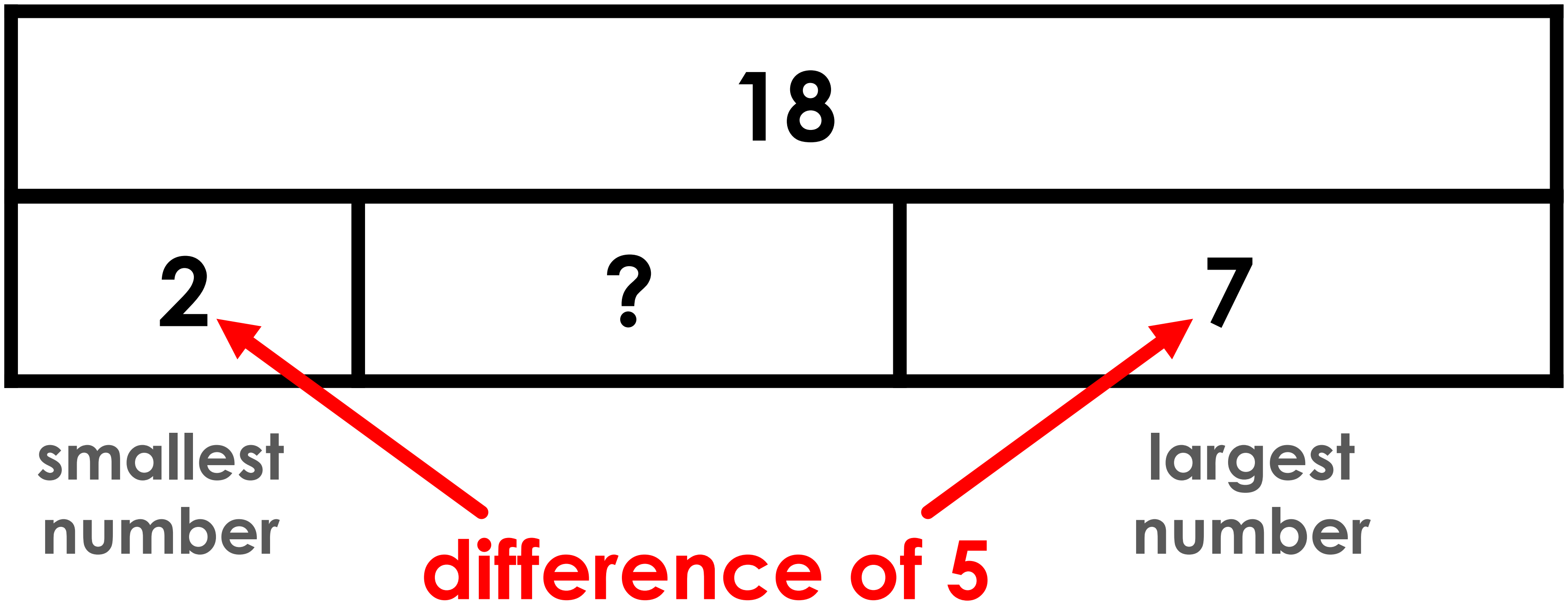
The three numbers have an average of 6.

Task 57: Average of 3 numbers



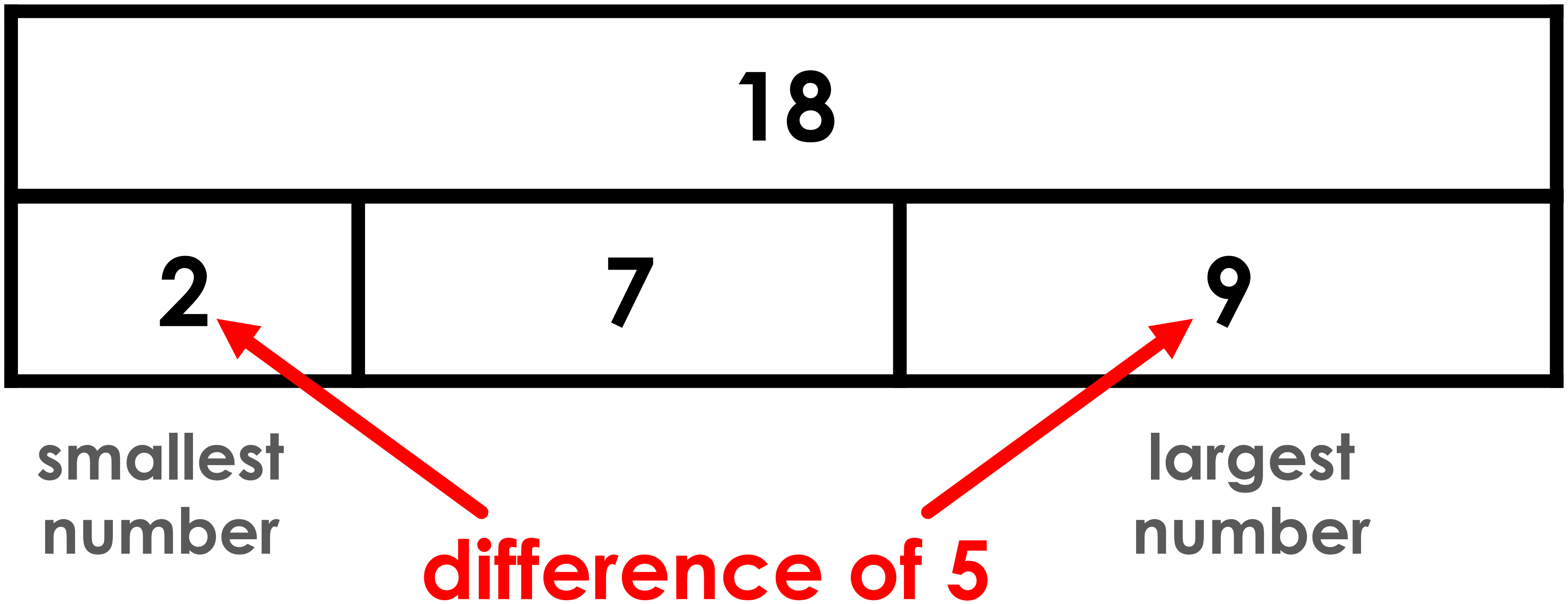
Therefore, the sum of the three numbers is 18.

Task 57: Average of 3 numbers



Can the smallest and largest numbers be 2 and 7?

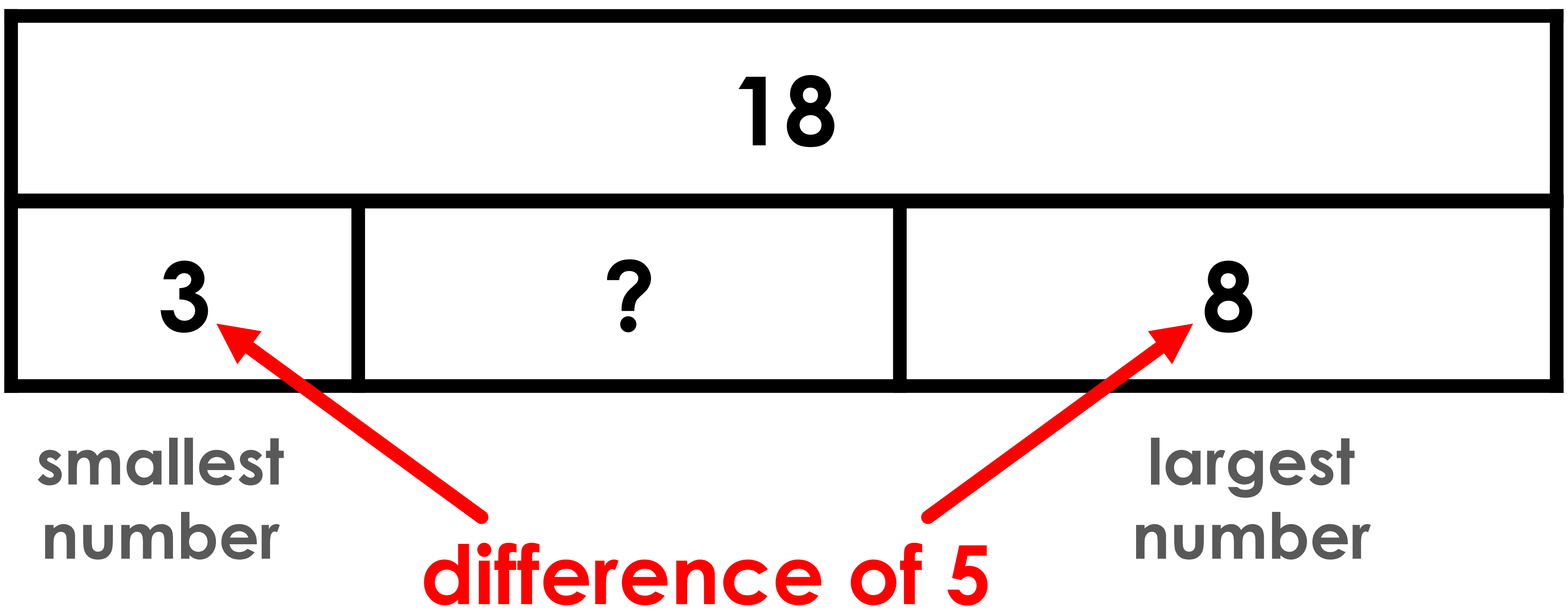
Task 57: Average of 3 numbers



Can the smallest and largest numbers be 2 and 7?

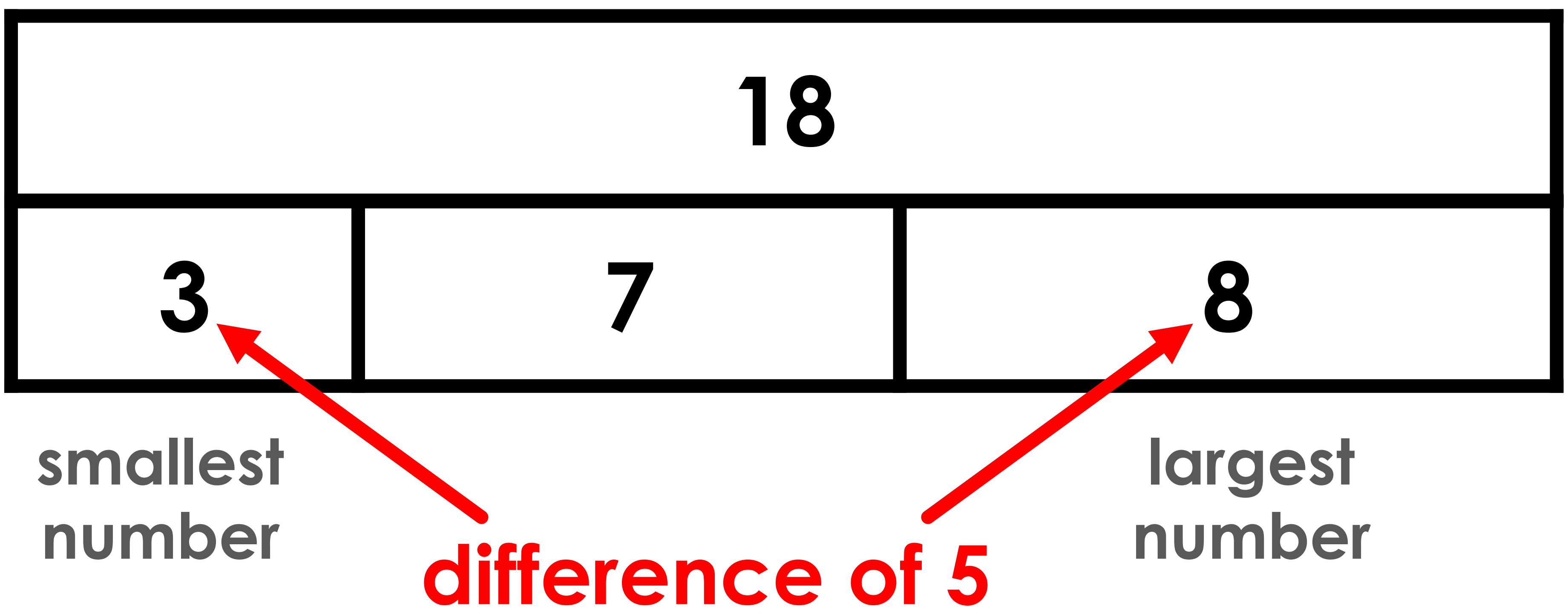
No: to have an average of 6, the other number is 9. This makes the difference between the largest and smallest numbers incorrect.

Task 57: Average of 3 numbers



Can the smallest and largest numbers be 3 and 8?

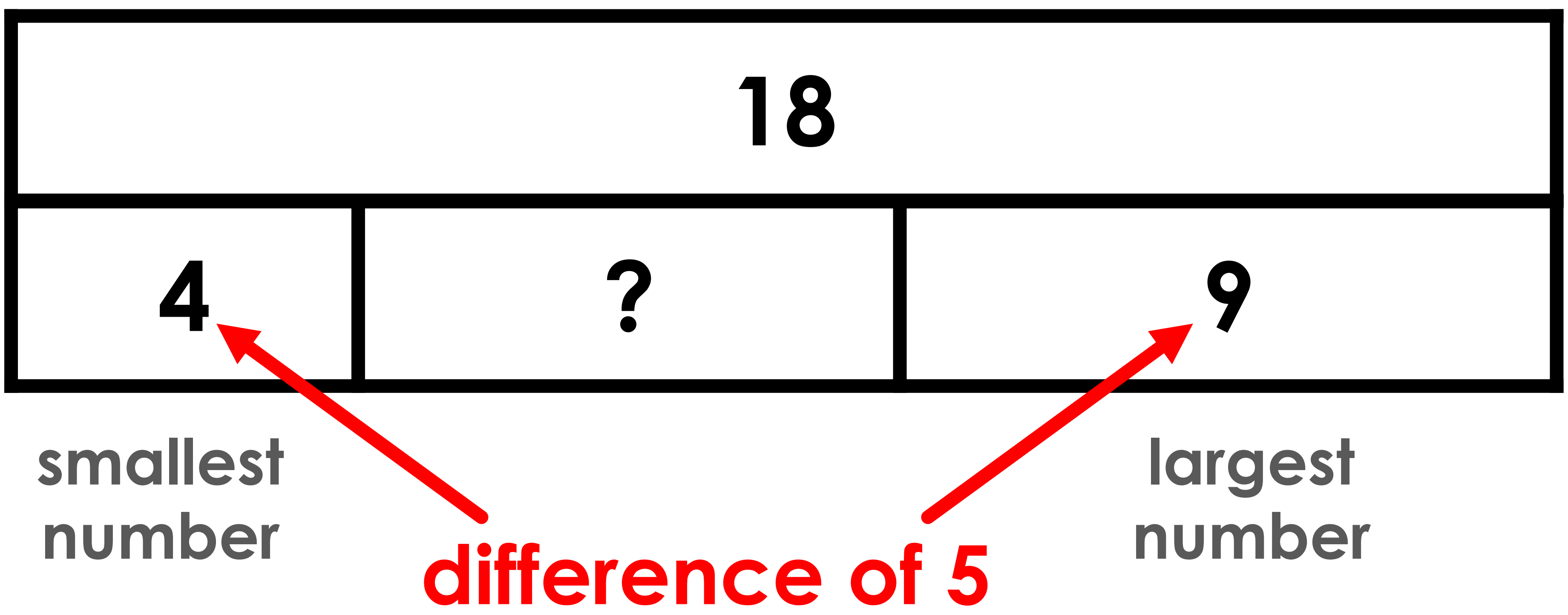
Task 57: Average of 3 numbers



Can the smallest and largest numbers be 3 and 8?

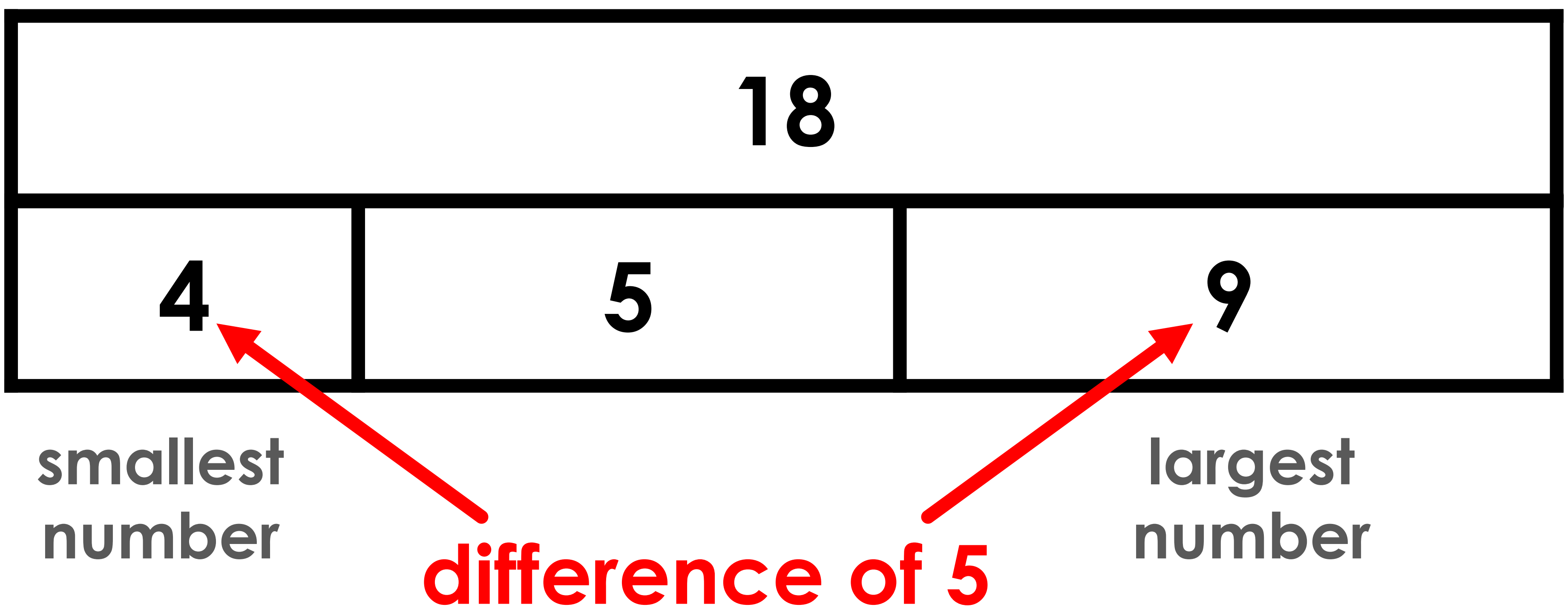
Yes: to have an average of 6, the other number is 7.

Task 57: Average of 3 numbers



Can the smallest and largest numbers be 4 and 9?

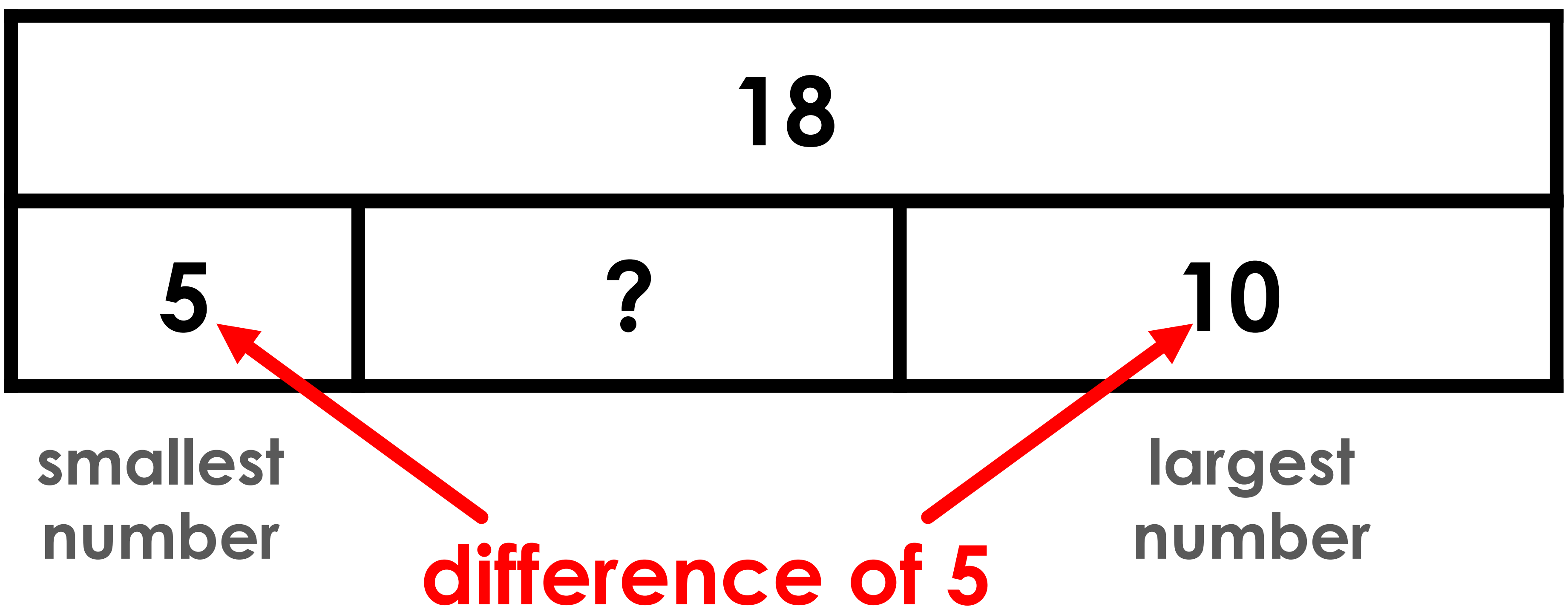
Task 57: Average of 3 numbers



Can the smallest and largest numbers be 4 and 9?

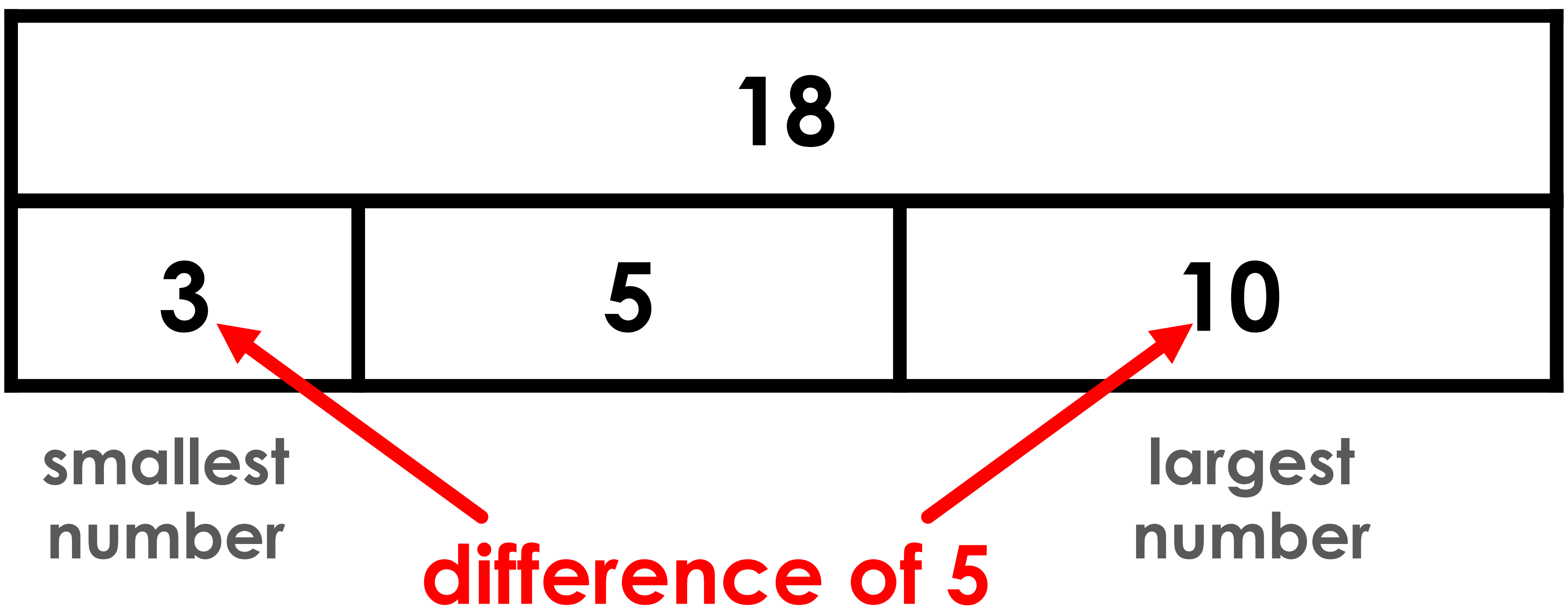
Yes: to have an average of 6, the other number is 5.

Task 57: Average of 3 numbers



Can the smallest and largest numbers be 5 and 10?

Task 57: Average of 3 numbers



Can the smallest and largest numbers be 5 and 10?

No: to have an average of 6, the other number is 3. This makes the difference between the largest and smallest numbers incorrect.

Task 58: Average ages

Three children, ages unknown.

?	?	?

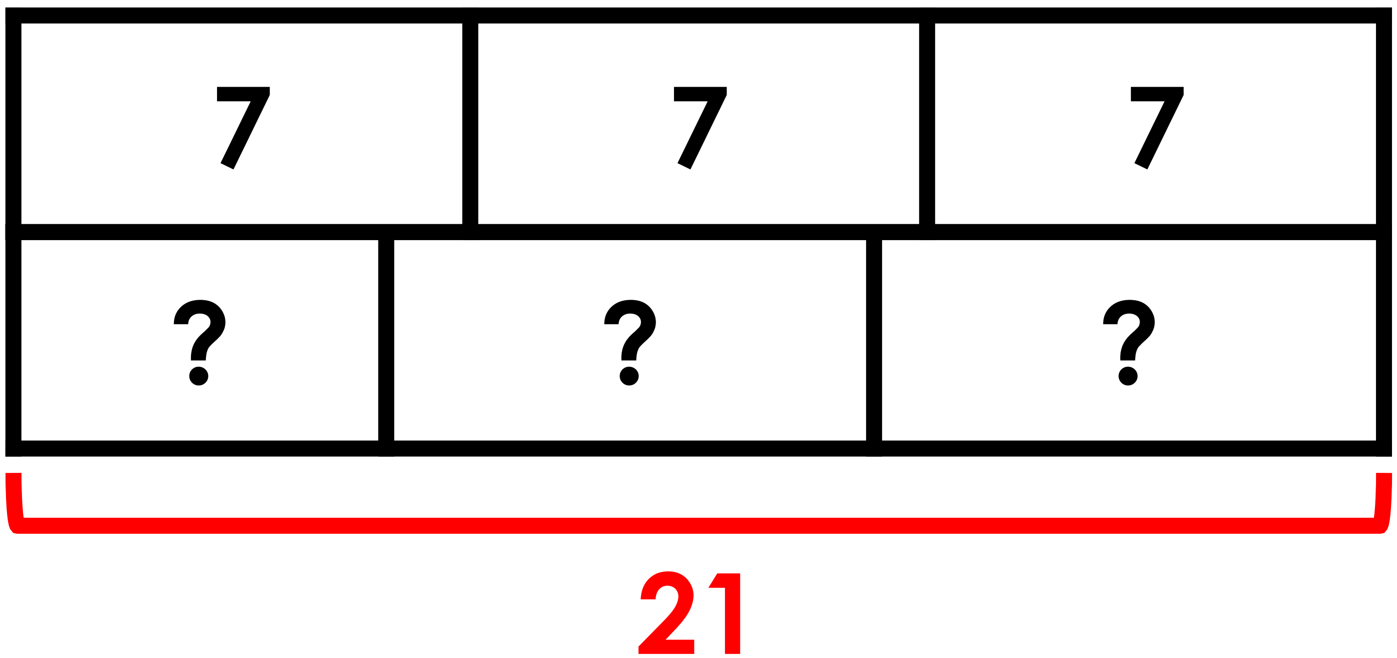
Task 58: Average ages

Three children, ages unknown, average age of 7.

7	7	7
?	?	?

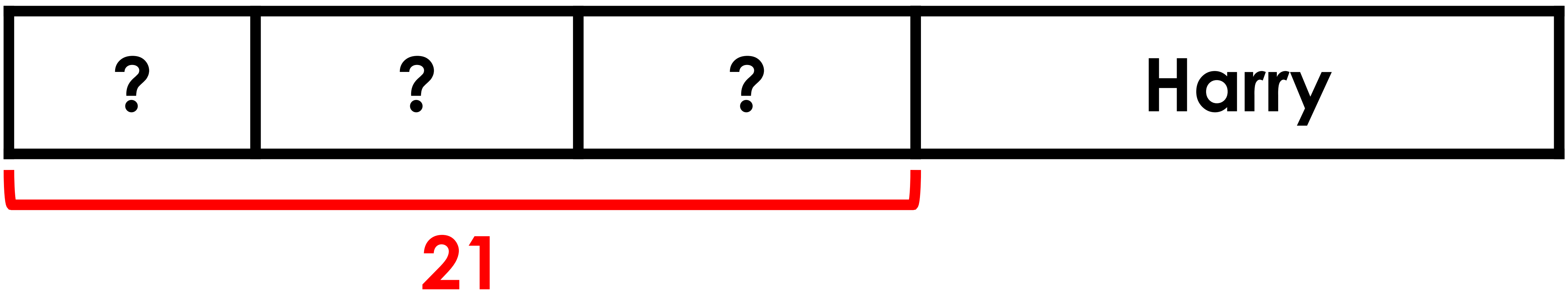
Task 58: Average ages

Sum of three children's ages is 21.



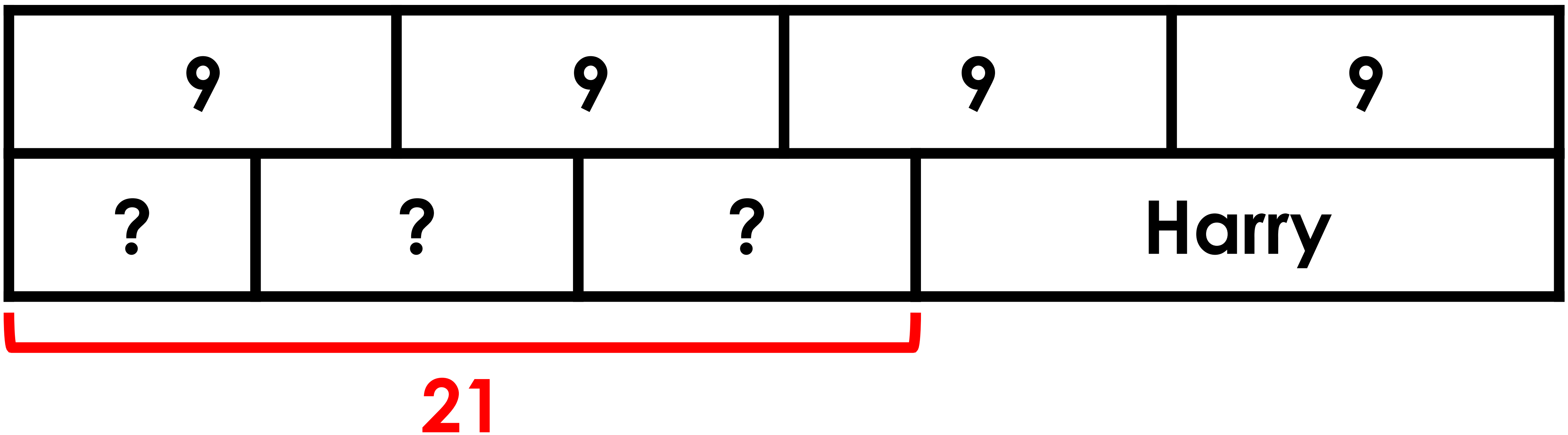
Task 58: Average ages

Harry walks in.



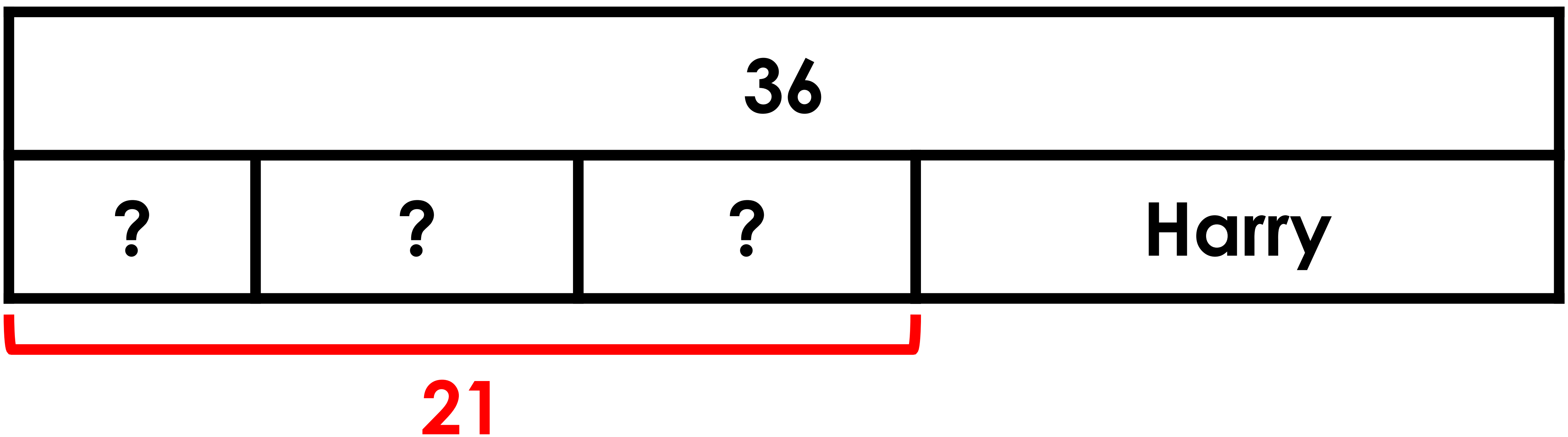
Task 58: Average ages

The average age for the four people is 9.



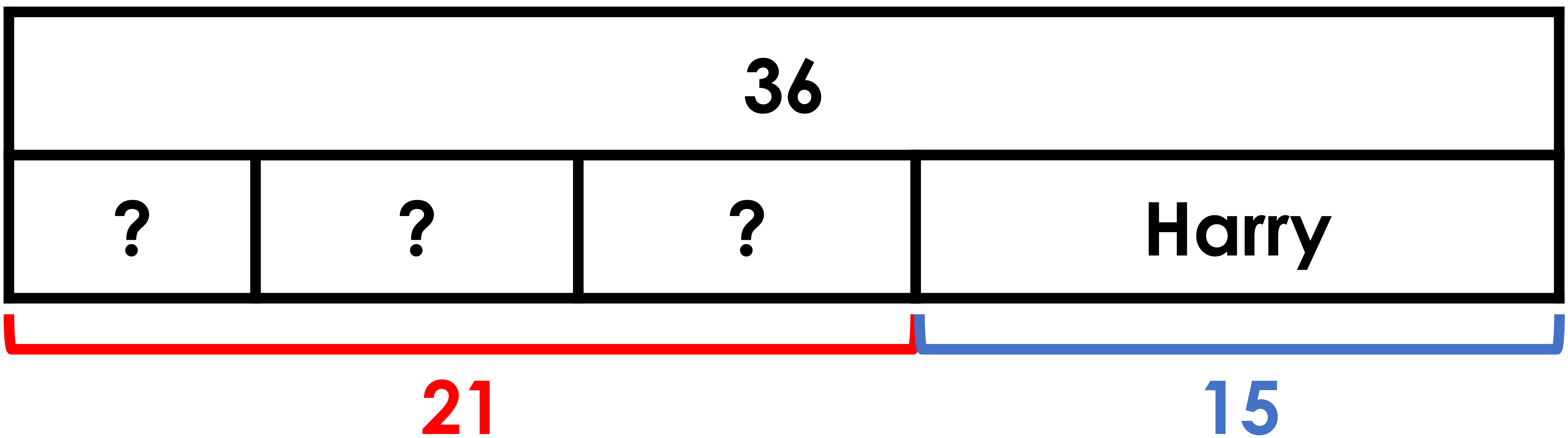
Task 58: Average ages

The sum of the ages for the four people is 36.



Task 58: Average ages

The sum of the ages for the four people is 36.



Harry is <u>15 years old.</u>