

Grade 6 Geometry Workbook

5 lessons · printable · answer key at the back

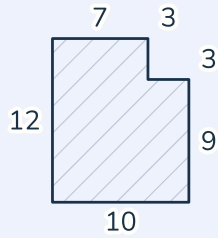
Name _____ Date _____

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Area of Composite Shapes

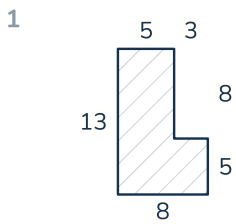
WORKED EXAMPLE



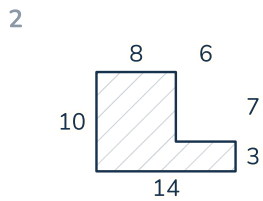
111 cm²

1. Area of composite figures

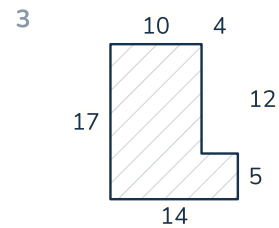
Find the area of each figure. All lengths are in centimeters.



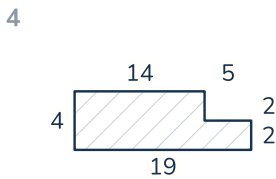
_____ cm²



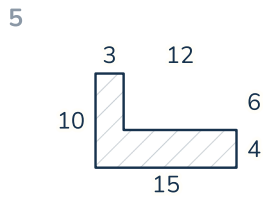
_____ cm²



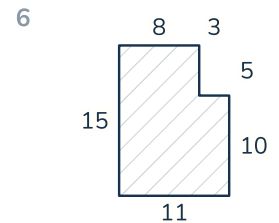
_____ cm²



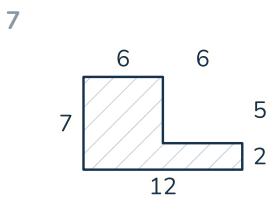
_____ cm²



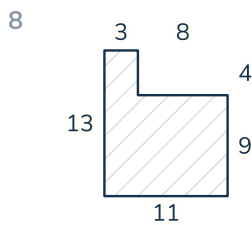
_____ cm²



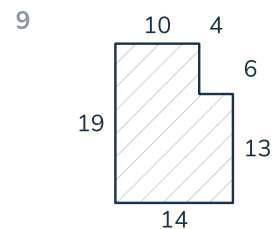
_____ cm²



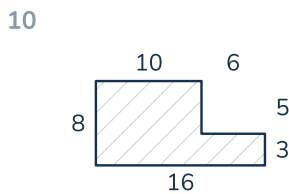
_____ cm²



_____ cm²



_____ cm²



_____ cm²

2. Is it a multiple?

Circle Yes or No for each question.

- 11 Is 6 a multiple of 3? Yes / No
- 12 Is 12 a multiple of 2? Yes / No
- 13 Is 20 a multiple of 3? Yes / No
- 14 Is 9 a multiple of 8? Yes / No
- 15 Is 13 a multiple of 2? Yes / No
- 16 Is 20 a multiple of 10? Yes / No
- 17 Is 12 a multiple of 3? Yes / No
- 18 Is 8 a multiple of 2? Yes / No
- 19 Is 36 a multiple of 3? Yes / No
- 20 Is 5 a multiple of 5? Yes / No

Area of Figures

WORKED EXAMPLE



18 cm²

3. Area

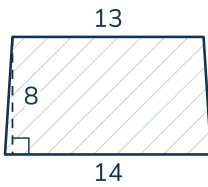
Find the area. Lengths are in cm; the dashed line is the height.

1



_____ cm²

2



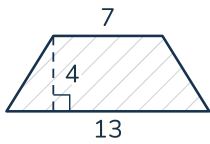
_____ cm²

3



_____ cm²

4



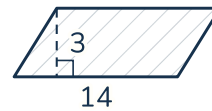
_____ cm²

5



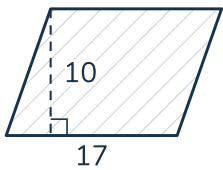
_____ cm²

6



_____ cm²

7



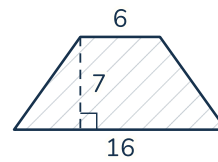
_____ cm²

8



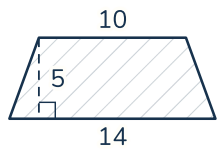
_____ cm²

9



_____ cm²

10



_____ cm²

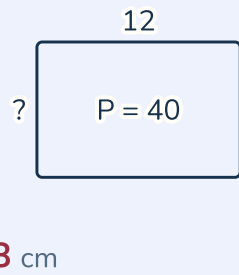
4. List the factors

List all the factors of each number.

- 11 2 → _____
- 12 14 → _____
- 13 23 → _____
- 14 7 → _____
- 15 16 → _____
- 16 19 → _____
- 17 21 → _____
- 18 5 → _____
- 19 26 → _____
- 20 37 → _____

Missing Sides

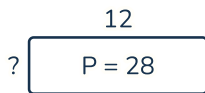
WORKED EXAMPLE



5. Find the missing side

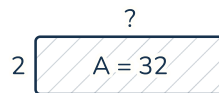
Find the missing side. All lengths are in centimeters.

1



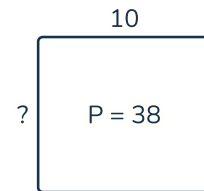
_____ cm

2



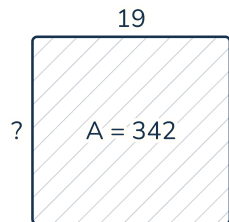
_____ cm

3



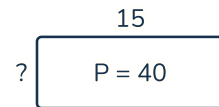
_____ cm

4



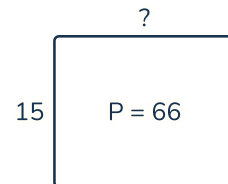
_____ cm

5



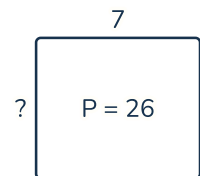
_____ cm

6



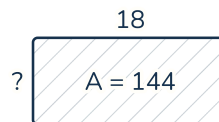
_____ cm

7



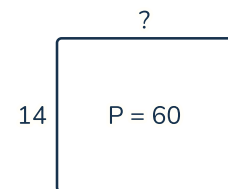
_____ cm

8



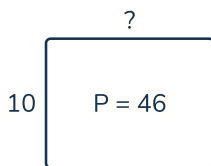
_____ cm

9



_____ cm

10



_____ cm

6. Prime or composite

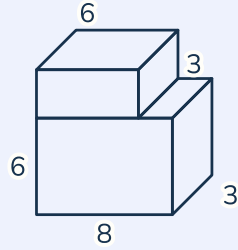
Circle whether each number is prime or composite.

- 11 30 Prime / Composite
- 13 16 Prime / Composite
- 15 14 Prime / Composite
- 17 26 Prime / Composite
- 19 40 Prime / Composite

- 12 3 Prime / Composite
- 14 39 Prime / Composite
- 16 42 Prime / Composite
- 18 43 Prime / Composite
- 20 6 Prime / Composite

Volume of Prisms

WORKED EXAMPLE

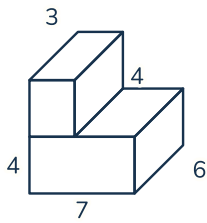


198 cm³

7. Volume of a rectangular prism

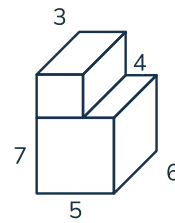
Find the volume of each box. All lengths are in centimeters.

1



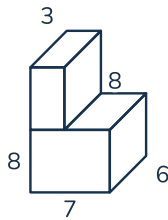
_____ cm³

2



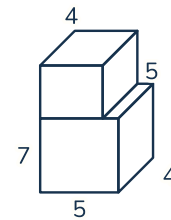
_____ cm³

3



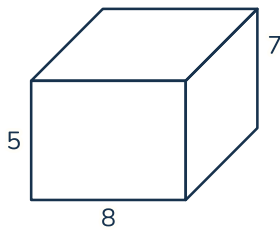
_____ cm³

4



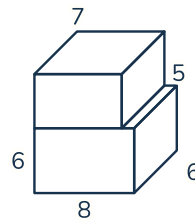
_____ cm³

5



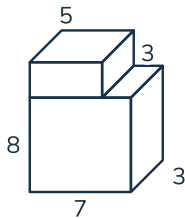
_____ cm³

6



_____ cm³

7



_____ cm³

8. Dividing fractions

Divide. Write each answer in simplest form.

$$8 \quad \frac{2}{5} \div \frac{3}{7} = \text{---}$$

$$9 \quad \frac{1}{8} \div \frac{4}{6} = \text{---}$$

$$10 \quad \frac{3}{4} \div \frac{4}{7} = \text{---}$$

$$11 \quad \frac{3}{4} \div \frac{3}{7} = \text{---}$$

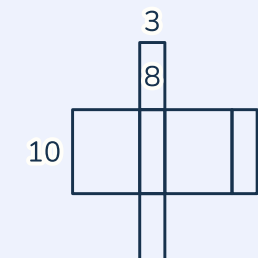
$$12 \quad \frac{3}{4} \div \frac{5}{6} = \text{---}$$

$$13 \quad \frac{2}{4} \div \frac{6}{8} = \text{---}$$

$$14 \quad \frac{4}{5} \div \frac{2}{6} = \text{---}$$

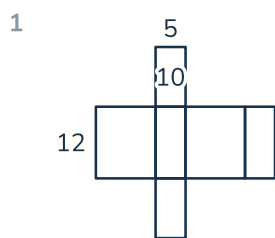
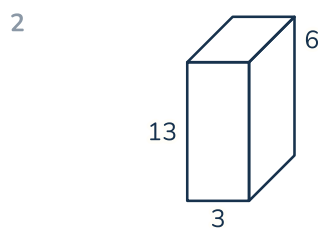
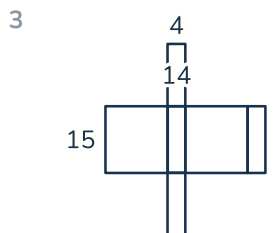
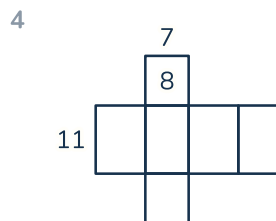
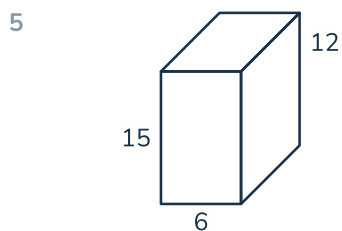
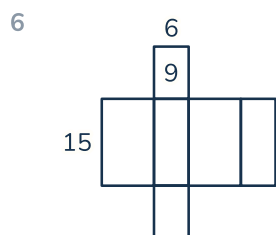
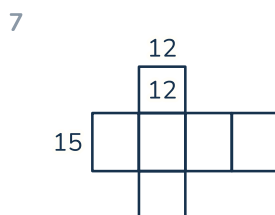
Surface Area

WORKED EXAMPLE

**268** cm²

9. Surface area of a box

Find the surface area of each box. All lengths are in centimeters.

_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²_____ cm²

10. Multiply and divide decimals

Divide. Each quotient is an exact decimal.

8 $37.89 \div 9 = \underline{\hspace{2cm}}$

9 $23.1 \div 7 = \underline{\hspace{2cm}}$

10 $58.73 \div 7 = \underline{\hspace{2cm}}$

11 $24.3 \div 3 = \underline{\hspace{2cm}}$

12 $14.96 \div 2 = \underline{\hspace{2cm}}$

13 $8.91 \div 9 = \underline{\hspace{2cm}}$

14 $117.48 \div 12 = \underline{\hspace{2cm}}$

Answer Key (1 of 2)

Area of Composite Shapes

Area of composite figures

1. 8×13 less 3×8 : 80 cm^2
2. 14×10 less 6×7 : 98 cm^2
3. 14×17 less 4×12 : 190 cm^2
4. 19×4 less 5×2 : 66 cm^2
5. 15×10 less 12×6 : 78 cm^2
6. 11×15 less 3×5 : 150 cm^2
7. 12×7 less 6×5 : 54 cm^2
8. 11×13 less 8×4 : 111 cm^2
9. 14×19 less 4×6 : 242 cm^2
10. 16×8 less 6×5 : 98 cm^2

Is it a multiple?

11. Is 6 a multiple of 3? $\rightarrow$ Yes
12. Is 12 a multiple of 2? $\rightarrow$ Yes
13. Is 20 a multiple of 3? $\rightarrow$ No
14. Is 9 a multiple of 8? $\rightarrow$ No
15. Is 13 a multiple of 2? $\rightarrow$ No
16. Is 20 a multiple of 10? $\rightarrow$ Yes
17. Is 12 a multiple of 3? $\rightarrow$ Yes
18. Is 8 a multiple of 2? $\rightarrow$ Yes
19. Is 36 a multiple of 3? $\rightarrow$ Yes
20. Is 5 a multiple of 5? $\rightarrow$ Yes

Area of Figures

Area

1. triangle $3 \times 16 \div 2 = 24 \text{ cm}^2$
2. trapezoid $(13 + 14) \div 2 \times 8 = 108 \text{ cm}^2$
3. trapezoid $(4 + 8) \div 2 \times 9 = 54 \text{ cm}^2$
4. trapezoid $(7 + 13) \div 2 \times 4 = 40 \text{ cm}^2$
5. trapezoid $(4 + 15) \div 2 \times 16 = 152 \text{ cm}^2$
6. parallelogram $14 \times 3 = 42 \text{ cm}^2$
7. parallelogram $17 \times 10 = 170 \text{ cm}^2$
8. rectangle $15 \times 3 = 45 \text{ cm}^2$
9. trapezoid $(6 + 16) \div 2 \times 7 = 77 \text{ cm}^2$
10. trapezoid $(10 + 14) \div 2 \times 5 = 60 \text{ cm}^2$

List the factors

11. $2 \rightarrow 1, 2$
12. $14 \rightarrow 1, 2, 7, 14$
13. $23 \rightarrow 1, 23$
14. $7 \rightarrow 1, 7$
15. $16 \rightarrow 1, 2, 4, 8, 16$
16. $19 \rightarrow 1, 19$
17. $21 \rightarrow 1, 3, 7, 21$
18. $5 \rightarrow 1, 5$
19. $26 \rightarrow 1, 2, 13, 26$
20. $37 \rightarrow 1, 37$

Missing Sides

Find the missing side

1. $P = 28$, side 12: 2 cm
2. $A = 32$, side 2: 16 cm
3. $P = 38$, side 10: 9 cm
4. $A = 342$, side 19: 18 cm
5. $P = 40$, side 15: 5 cm
6. $P = 66$, side 15: 18 cm
7. $P = 26$, side 7: 6 cm
8. $A = 144$, side 18: 8 cm
9. $P = 60$, side 14: 16 cm
10. $P = 46$, side 10: 13 cm

Prime or composite

11. $30 \rightarrow$ Composite (2×15)
12. $3 \rightarrow$ Prime
13. $16 \rightarrow$ Composite (2×8)
14. $39 \rightarrow$ Composite (3×13)
15. $14 \rightarrow$ Composite (2×7)
16. $42 \rightarrow$ Composite (2×21)
17. $26 \rightarrow$ Composite (2×13)
18. $43 \rightarrow$ Prime
19. $40 \rightarrow$ Composite (2×20)
20. $6 \rightarrow$ Composite (2×3)

Volume of Prisms

Volume of a rectangular prism

1. $7 \times 6 \times 4 + 3 \times 6 \times 4$: 240 cm^3
2. $5 \times 6 \times 7 + 3 \times 6 \times 4$: 282 cm^3
3. $7 \times 6 \times 8 + 3 \times 6 \times 8$: 480 cm^3
4. $5 \times 4 \times 7 + 4 \times 4 \times 5$: 220 cm^3
5. $8 \times 7 \times 5$: 280 cm^3
6. $8 \times 6 \times 6 + 7 \times 6 \times 5$: 498 cm^3
7. $7 \times 3 \times 8 + 5 \times 3 \times 3$: 213 cm^3

Dividing fractions

8. $2/5 \div 3/7 = 14/15$
9. $1/8 \div 4/6 = 3/16$
10. $3/4 \div 4/7 = 21/16$
11. $3/4 \div 3/7 = 7/4$
12. $3/4 \div 5/6 = 9/10$
13. $2/4 \div 6/8 = 2/3$
14. $4/5 \div 2/6 = 12/5$

Surface Area

Surface area of a box

1. $5 \times 10 \times 12 \rightarrow 2(50 + 60 + 120)$: 460 cm^2
2. $3 \times 6 \times 13 \rightarrow 2(18 + 39 + 78)$: 270 cm^2
3. $4 \times 14 \times 15 \rightarrow 2(56 + 60 + 210)$: 652 cm^2

Answer Key (2 of 2)

Surface Area (continued)

Surface area of a box (continued)

4. $7 \times 8 \times 11 \rightarrow 2(56 + 77 + 88)$: 442 cm^2

5. $6 \times 12 \times 15 \rightarrow 2(72 + 90 + 180)$: 684 cm^2

6. $6 \times 9 \times 15 \rightarrow 2(54 + 90 + 135)$: 558 cm^2

7. $12 \times 12 \times 15 \rightarrow 2(144 + 180 + 180)$: 1008 cm^2

Multiply and divide decimals

8. $37.89 \div 9 = 4.21$

9. $23.1 \div 7 = 3.3$

10. $58.73 \div 7 = 8.39$

11. $24.3 \div 3 = 8.1$

12. $14.96 \div 2 = 7.48$

13. $8.91 \div 9 = 0.99$

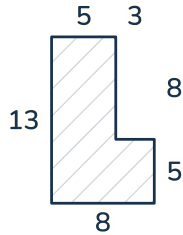
14. $117.48 \div 12 = 9.79$

Solutions (1 of 11)

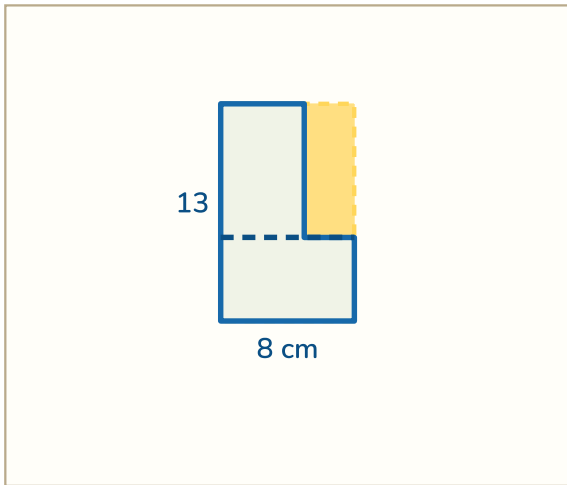
Area of Composite Shapes

Area of composite figures

1.



— cm²



First way: pretend the bite was never taken. The whole rectangle would be $8 \times 13 = 104$.

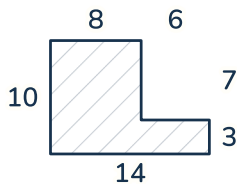
Then take the bite off. It is $3 \times 8 = 24$, so the L is $104 - 24 = 80$ square cm.

Second way, and it works on any of these: cut the L into two rectangles.

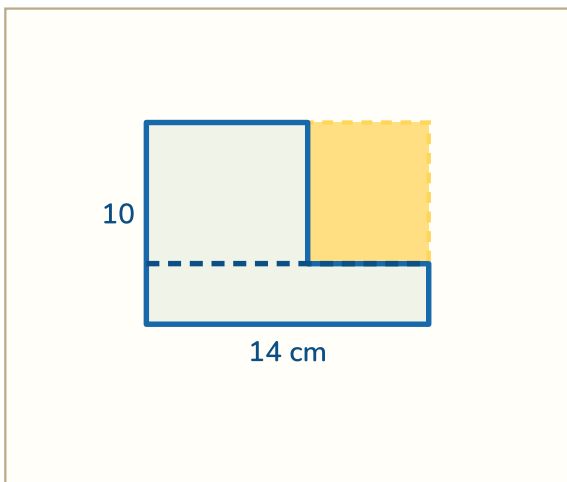
The bottom strip is $8 \times 5 = 40$, and the piece standing on it is $5 \times 8 = 40$.

$40 + 40 = 80$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

2.



— cm²



First way: pretend the bite was never taken. The whole rectangle would be $14 \times 10 = 140$.

Then take the bite off. It is $6 \times 7 = 42$, so the L is $140 - 42 = 98$ square cm.

Second way, and it works on any of these: cut the L into two rectangles.

The bottom strip is $14 \times 3 = 42$, and the piece standing on it is $8 \times 7 = 56$.

$42 + 56 = 98$ square cm — the same answer as the first way. Two methods that agree is how you know the answer is right.

Solutions (2 of 11)

Area of Composite Shapes (continued)

Is it a multiple?

11. Is 6 a multiple of 3? Yes / No

$$6 \div 3 = 2$$

yes

Multiples of 3 are what you get COUNTING IN 3s — they start at 3 and only get bigger. (Factors are the other way: they go into 3 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$6 \div 3 = 2$ exactly — nothing left over. Counting in 3s lands on it, so yes.

12. Is 12 a multiple of 2? Yes / No

$$12 \div 2 = 6$$

yes

Multiples of 2 are what you get COUNTING IN 2s — they start at 2 and only get bigger. (Factors are the other way: they go into 2 and are never bigger than it. The two words are swapped more often than either is misunderstood.)

$12 \div 2 = 6$ exactly — nothing left over. Counting in 2s lands on it, so yes.

Solutions (3 of 11)

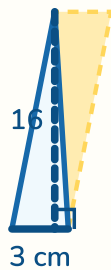
Area of Figures

Area

1.



— cm²



A triangle. Two of its numbers matter and they are not the two longest lines — find them before working anything out.

The base is the side it stands on: 3 cm.

The height is the DASHED line — straight up from the base, at a right angle to it: 16 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

Now the halving. Turn a second copy of the triangle upside down against this one and the two together make a parallelogram — $3 \times 16 = 48$. The triangle is exactly half of it.

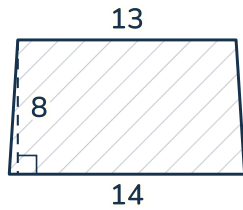
So half of 48 is 24 square cm.

Solutions (4 of 11)

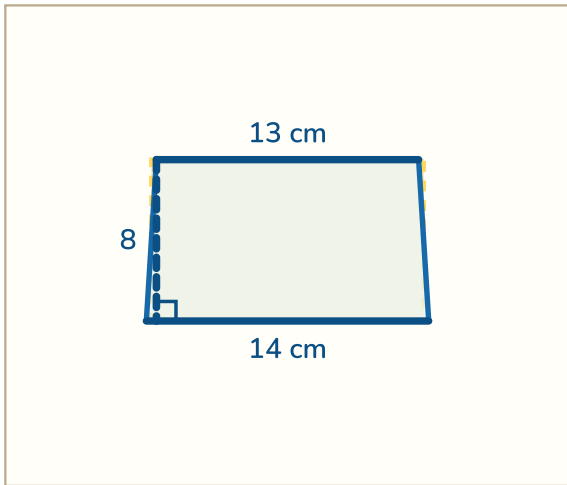
Area of Figures (continued)

Area (continued)

2.



_____ cm²



A trapezium. Two of its numbers matter and they are not the two longest lines — find them before working anything out.

The two PARALLEL sides are 13 cm and 14 cm. They are the pair that counts.

The height is the DASHED line — straight up from the base, at a right angle to it: 8 cm. It is not the sloping side, even though the sloping side is longer and is written right next to it.

Average the two parallel sides: $(13 + 14) \div 2 = 13.5$. That is the width of the rectangle this trapezium is worth.

Then it is that width times the height: $13.5 \times 8 = 108$ square cm.

List the factors

11. 2 → _____

so far: 1 2

Factors come in PAIRS — every one you find hands you a second. So work in from both ends rather than trying every number in turn.

$1 \times 2 = 2$, so 1 and 2 are both factors.

The pair has met in the middle, so the list is finished: 1, 2. 2 factors.

Solutions (5 of 11)

Area of Figures (continued)

List the factors (continued)

12. 14 → _____

so far: 1 2 7 14

Factors come in PAIRS — every one you find hands you a second. So work in from both ends rather than trying every number in turn.

$1 \times 14 = 14$, so 1 and 14 are both factors.

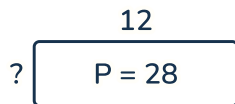
$2 \times 7 = 14$, so 2 and 7 are both factors.

The pair has met in the middle, so the list is finished: 1, 2, 7, 14. 4 factors.

Missing Sides

Find the missing side

1.



_____ cm

$$\begin{aligned} 28 \div 2 &= 14 \\ 14 - 12 &= 2 \text{ cm} \end{aligned}$$

Forwards, the perimeter goes round twice: 28 is $12 + ? + 12 + ?$ — each side counted two times.

So undo the doubling FIRST: half of 28 is 14, and that is one long side plus one short one. Taking 12 off the whole 28 is the natural wrong move — it forgets that 12 is in there twice.

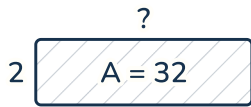
Now take the side you know off that half: $14 - 12 = 2$ cm.

Solutions (6 of 11)

Missing Sides (continued)

Find the missing side (continued)

2.



— cm

$$32 \div 2 = 16 \text{ cm}$$

$$\text{check: } 2 \times 16 = 32$$

Forwards, area is one side times the other: $2 \times ? = 32$. Every number you need is here, which is exactly why the usual mistake is to multiply them.

But the 32 is the ANSWER to that multiplication, not another side. To get back to the missing one, undo the multiply — and the undo of multiplying is dividing.

$32 \div 2 = 16 \text{ cm}$. Check it forwards: $2 \times 16 = 32$, which is what the question said.

Prime or composite

11. **30** Prime / Composite

tried: **2**

$$30 \div 2 = 15$$

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 30.

You do not have to try everything up to 30. Factors come in pairs, so if one were bigger than 5 its partner would be smaller — and you would have found that one first. Testing up to 5 is enough.

2 goes into 30 exactly ($30 \div 2 = 15$), and that is one factor too many. 30 is composite — no need to test any further.

12. **3** Prime / Composite

3: **1** **3**

A prime has exactly two factors: 1 and itself. So the question is whether anything ELSE divides into 3.

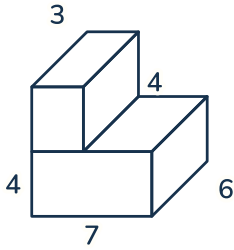
The only whole number between 1 and 3 is 2, and 2 does not go into 3. So 3 has just the two factors: it is prime.

Solutions (7 of 11)

Volume of Prisms

Volume of a rectangular prism

1.



_____ cm³

filled box: 336

notch: 96

$$336 - 96 = \mathbf{240 \text{ cubic cm}}$$

A block standing on a slab. There is no formula for this shape — the job is to turn it into boxes, which do have one, and there is more than one way.

First way: cut it into the two boxes it already is. The slab underneath is $7 \times 6 \times 4 = 168$, and the block standing on it is $3 \times 6 \times 4 = 72$.

$$168 + 72 = 240 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $7 \times 6 \times 8 = 336$, and the notch taken back off is $4 \times 6 \times 4 = 96$.

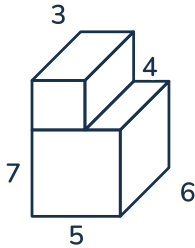
$336 - 96 = 240$ cubic cm. Two methods agreeing is how you know.

Solutions (8 of 11)

Volume of Prisms (continued)

Volume of a rectangular prism (continued)

2.



_____ cm³

filled box: 330

notch: 48

$$330 - 48 = \text{282 cubic cm}$$

A block standing on a slab. There is no formula for this shape — the job is to turn it into boxes, which do have one, and there is more than one way.

First way: cut it into the two boxes it already is. The slab underneath is $5 \times 6 \times 7 = 210$, and the block standing on it is $3 \times 6 \times 4 = 72$.

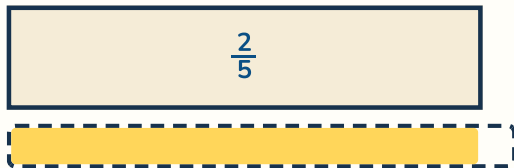
$$210 + 72 = 282 \text{ cubic cm.}$$

Second way: fill the notch in to make one big box. That box is $5 \times 6 \times 11 = 330$, and the notch taken back off is $2 \times 6 \times 4 = 48$.

$330 - 48 = 282$ cubic cm. Two methods agreeing is how you know.

Dividing fractions

8. $\frac{2}{5} \div \frac{3}{7} = \text{—}$



each piece is $\frac{3}{7}$

$$\frac{3}{7} \rightarrow \frac{7}{3}$$

$$\frac{2}{5} \div \frac{3}{7} = \frac{14}{15}$$

$$\frac{2}{5} \times \frac{7}{3} = \frac{14}{15}$$

$2/5 \div 3/7$ is asking a question: how many $3/7$ s fit inside $2/5$?

Lay $3/7$ against it. A whole one does not even fit — it hangs off the end.

$14/15$ of a piece fits — so $2/5 \div 3/7 = 14/15$.

Now try multiplying by $7/3$ — $3/7$ turned over. It lands on the same number.

That is all turning it over does — the two questions are the same question, so either way of writing it will do. $2/5 \div 3/7 = 14/15$.

Solutions (9 of 11)

Volume of Prisms (continued)

Dividing fractions (continued)

9. $\frac{1}{8} \div \frac{4}{6} = \text{—}$



each piece is $\frac{4}{6}$

$$\frac{4}{6} \rightarrow \frac{6}{4}$$

$$\frac{1}{8} \div \frac{4}{6} = \frac{3}{16}$$

$$\frac{1}{8} \times \frac{6}{4} = \frac{3}{16}$$

$$\frac{6}{32} = \frac{3}{16}$$

$\frac{1}{8} \div \frac{4}{6}$ is asking a question: how many $\frac{4}{6}$ s fit inside $\frac{1}{8}$?

Lay $\frac{4}{6}$ against it. A whole one does not even fit — it hangs off the end.

$\frac{3}{16}$ of a piece fits — so $\frac{1}{8} \div \frac{4}{6} = \frac{3}{16}$.

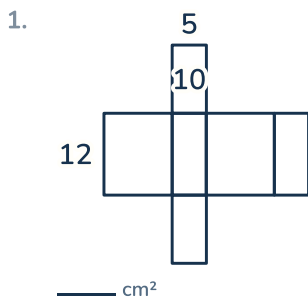
Now try multiplying by $\frac{6}{4}$ — $\frac{4}{6}$ turned over. It lands on the same number.

That is all turning it over does — the two questions are the same question, so either way of writing it will do. $\frac{1}{8} \div \frac{4}{6} = \frac{3}{16}$.

Worked out in full: 1×6 over 8×4 is $\frac{6}{32}$, which simplifies to $\frac{3}{16}$.

Surface Area

Surface area of a box



front and back:	$2 \times 5 \times 12 =$	120
the two sides:	$2 \times 10 \times 12 =$	240
top and bottom:	$2 \times 5 \times 10 =$	100
total:	460	

A net lays all six faces out flat, so none of them is hidden — which is the whole reason a net is easier than the solid. They still come in three PAIRS.

Front and back are 5 by 12, and they are identical — so that pair is $2 \times 5 \times 12 = 120$.

The two sides are 10 by 12, and they are identical — so that pair is $2 \times 10 \times 12 = 240$.

Top and bottom are 5 by 10, and they are identical — so that pair is $2 \times 5 \times 10 = 100$.

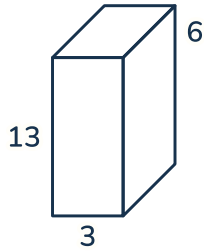
Three pairs, six faces, none missed: $120 + 240 + 100 = 460$ square cm.

Solutions (10 of 11)

Surface Area (continued)

Surface area of a box (continued)

2.



_____ cm²

$$\text{front and back: } 2 \times 3 \times 13 = 78$$

$$\text{the two sides: } 2 \times 6 \times 13 = 156$$

$$\text{top and bottom: } 2 \times 3 \times 6 = 36$$

$$\text{total: } 270$$

Six faces, and the drawing can only show you three of them. The three you cannot see are the reason the usual wrong answer here is five faces added perfectly.

Front and back are 3 by 13, and they are identical — so that pair is $2 \times 3 \times 13 = 78$.

The two sides are 6 by 13, and they are identical — so that pair is $2 \times 6 \times 13 = 156$.

Top and bottom are 3 by 6, and they are identical — so that pair is $2 \times 3 \times 6 = 36$.

Three pairs, six faces, none missed: $78 + 156 + 36 = 270$ square cm.

Multiply and divide decimals

8. $37.89 \div 9 =$ _____

$$\begin{array}{r} 37.89 \div 9 \\ 37.89 \div 9 = 4.21 \\ 4.21 \times 9 = 37.89 \end{array}$$

The number you are dividing by is already whole, so there is nothing to move: divide as usual and the point in the answer comes straight down.

Now divide: $37.89 \div 9 = 4.21$.

Check it the other way round: 4.21×9 should give 37.89 back. A point in the wrong place fails this instantly — 37.89 and a tenth of it are not close.

Solutions (11 of 11)

Surface Area (continued)

Multiply and divide decimals (continued)

9. $23.1 \div 7 = \underline{\hspace{2cm}}$

$$\begin{array}{r} 23.1 \div 7 \\ 23.1 \div 7 = 3.3 \\ 3.3 \times 7 = 23.1 \end{array}$$

The number you are dividing by is already whole, so there is nothing to move: divide as usual and the point in the answer comes straight down.

Now divide: $23.1 \div 7 = 3.3$.

Check it the other way round: 3.3×7 should give 23.1 back. A point in the wrong place fails this instantly — 23.1 and a tenth of it are not close.