1

Fill in the missing numbers and signs.

a) 1 second $<$ (× 60) 1 minute [<] (× 60) 1 hour [<] (× [24]) 1 day [<] (× [7]) 1 week

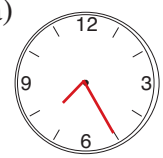
b) 1 hour = [3600] seconds, 1 month ≈ [30] days, 1 year ≈ [52] weeks

1 year = [365] days, 1 year = [12] months, 1 day = [24] hours

c) 85 minutes [=] 1 hour 25 minutes, 1 week = [168] hours

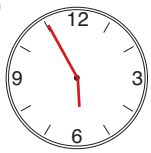
2

Draw the hours and minute hands on the clocks. Write each time in another way.

a) 

e.g. 7 hrs 25 min

7:25

b) 

05:55

Five minutes to six

c) 

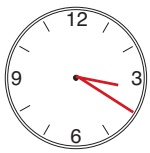
20 min to 8

7:40

d) 

0 hrs 5 min

24:05 or 00:05

e) 

15 h 20 min 45 sec

Twenty minutes and 45 seconds past three

3

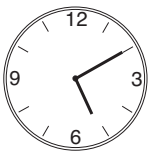
Write these times using the 24-hour clock.

a) morning 

10:35

b) evening 

22:05

c) afternoon 

17:10

d) night 

23:55

e) night 

00:50

4

a) How many days are in the first 5 months of a leap year?

$31 + 29 + 31 + 30 + 31 = 3 \times 31 + 29 + 30$

$= 93 + 59 = 152$ (or $60 + 90 + 2 = 152$)

Answer: There are 152 days in the first 5 months of a leap year.

b) A train travelled 127 km in the first hour and a half of a journey, then it stopped for 12 minutes. It took 65 minutes to cover the remaining 102 km.

How much time did the train take to do the whole journey?

e.g. $1\frac{1}{2}$ hours + 12 min + 65 min = (90 + 12 + 65) min

= 167 min (= 2 hours 47 min)

Answer: The whole journey took 2 hours and 47 minutes.

1

Continue each sequence for 4 more terms.

Rule:

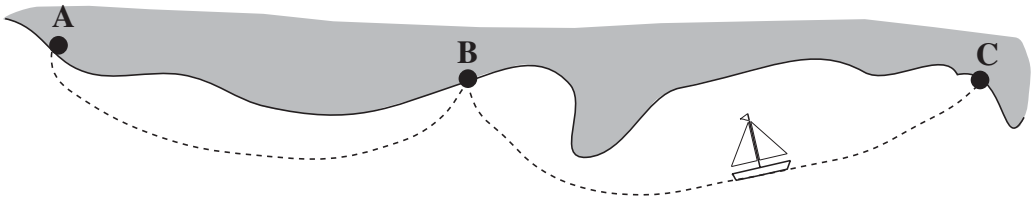
a) 14 h 20 min, 14 h 40 min, 15 h, 15 h 20 m , 15 h 40 m , 16 h , 16 h 20 m , (+ 20 min)

b) 3.50 pm, 3.10 pm, 2.30 pm, 1.50 pm , 1.10 pm , 12.30 pm , 11.50 am , (− 40 min)

c) 03:50, 03:10 , 02:30, 01:50, 01:10 am , 0:30 am , 11:50 pm , 11:10 pm , (− 40 min)

2

A ship sailed from A to B in 1 hour 47 minutes, then from B to C in 2 hours 35 minutes.



a) How much time did it take to sail from A to C?

1 h 47 min + 2 h 35 min = 4 h 22 min

b) How much more time did it take to sail from B to C than from A to B?

2 h 35 min − 1 h 47 min = 48 min

3

Write a plan, do the calculation and check your result in the context of the question. Write the answer as a sentence.

a) How many minutes are there between half past ten in the morning (10:30) and a quarter past one in the afternoon (13:15) of the same day?

Plan: 13 h 15 min − 10 h 30 min

Calculation: 13 h 15 min − 10 h 30 min = 2 h 45 min = 165 min

Answer: There are 165 minutes between these two times.

b) Lenny spent 6 and a half hours on maths last week.

He had 5 maths lesssons of 45 minutes each and spent 90 minutes at the school's maths club. The rest of the time was spent on his maths homework.

How long did it take Lenny to do his maths homework last week?

Plan: 6 h 30 min − (5 × 45 min + 90 min)

Calculation: 6 h 30 min = 390 min

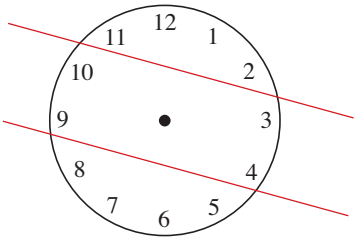
390 min − (225 min + 90 min)

= 75 min = 1 h 15 min

It took Lenny 1 h 15 min to do his maths homework last week.

4

Draw two straight lines to divide this clock face into three parts so that the sum of the numbers in each part is the same.



Check: 11 + 12 + 1 + 2 = 26

10 + 9 + 3 + 4 = 26

8 + 7 + 6 + 5 = 26

1

If 1 lb of cherries costs 32 p, how much do 2 lb, 3 lb, 10 lb, 437 lb of cherries cost?

Continue the table and complete the statement.

Calculations:

1 lb → 32 p

2 lb → 2 × 32 p = 64 p

3 lb → 3 × 32 p = 96 p

10 lb → 10 × 32 p = 320 p = £3.20

437 lb → 437 × 32 p = 13 984 p = £139.84

The costs are in [direct] proportion to one another.

2

Solve this problem in your exercise book and write the answer here.

If 4 equal rolls of material contain 256 m, what length of material would be in 150 such rolls? 150 × (256 ÷ 4) = 150 × 64 = 9600

Answer: There would be 9600 m of material in 150 rolls.

3

Solve this problem in your exercise book and write the answer here.

If 6 pens cost 240 p, how many pens can we buy for 360 p? 360 ÷ (240 ÷ 6) = 360 ÷ 40 = 9

Answer: We can buy 9 pens for 360 p.

4

If 15 kg of paint cost £9.45, how much do

1 kg, 2 kg, 5 kg, 11 kg, 20 kg, 27 kg, 30 kg, 150 kg

of paint cost? Complete the table. Do the calculations in your exercise book.

Quantity	15 kg	1 kg	2 kg	5 kg	11 kg	20 kg	27 kg	30 kg	150 kg
Price	£9.45	63 p	£1.26	£3.15	£6.93	£12.60	£17.01	£18.90	£94.50

5

A journey took 6 hours in a car travelling at an average speed of 50 km per hour.

How much time would the journey have taken if the car had travelled at these average speeds?

Distance travelled was 6 × 50 km = 300 km

50 km per hour → 6 hours (300 km ÷ 6 = 50 km)

25 km per hour → 300 ÷ 25 = 12 (hours)

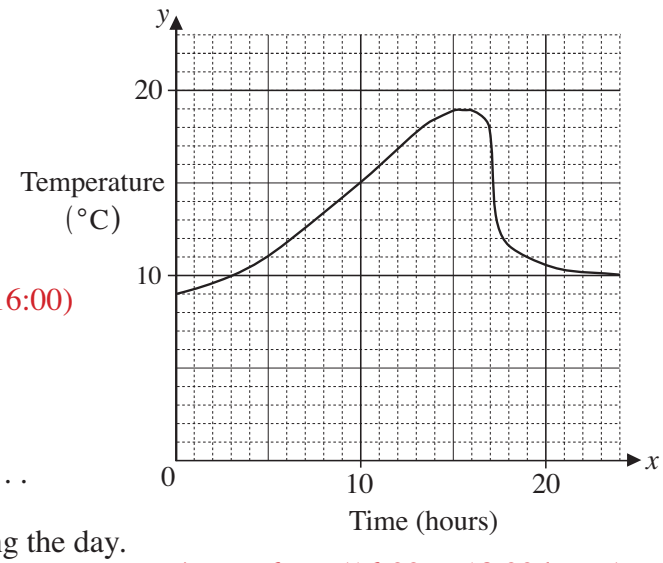
60 km per hour → 300 ÷ 60 = 5 (hours)

100 km per hour → 300 ÷ 100 = 3 (hours)

40 km per hour → 300 ÷ 40 = $7\frac{1}{2}$ (hours)

1

The graph shows the variation in temperature over one day.



a) What temperature was it at 10.00 am?

15 °C

b) At what time of day was it hottest?

3.00 pm - 4.00 pm (15:00 - 16:00)

c) During which times was the temperature rising?

0:00 to 15:00 hours

d) There was a downpour during the day. When do you think that it happened?

4 pm - 6 pm (16:00 to 18:00 hours)
(Temperature dropped suddenly.)

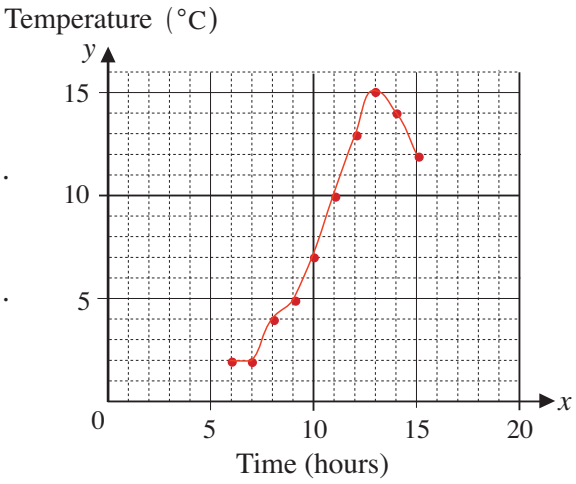
2

One day, we measured the temperature every hour from 6 o'clock in the morning to 3 o'clock in the afternoon. We noted the data as pairs of numbers:

(6, 2), (7, 2), (8, 4), (9, 5), (10, 7), (11, 10), (12, 13), (13, 15), (14, 14), (15, 12)

For example (6,2) means that at 6 o'clock the temperature was 2 °C.

a) Show the data on a graph.



b) Is it correct to join the dots with a continuous curve? Why?
'Yes' and 'No' both correct.
See Lesson Plan for reasoning.

c) When was the temperature highest?

At about 1.00 pm (13:00 hours)

d) Estimate the temperature at:

6.30 am, 9.15 am, 12.45 pm

≈ 2 °C ≈ 5 °C ≈ 15 °C

e) Which season do you think it was?

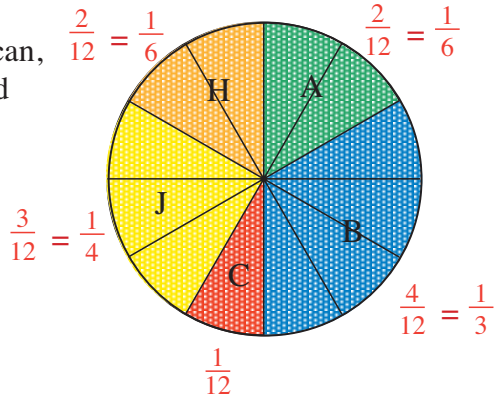
Spring or Autumn

3

Among 60 people at a conference, 10 are American, 20 are British, 5 are Chinese, 15 are Japanese and 10 are Hungarian.

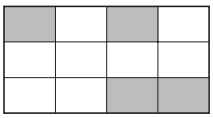
a) Show the data in a **pie chart**.

b) Write what fraction of the circle represents each nationality.



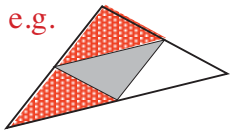
1

Complete the diagrams so that the correct number of grid unit shapes are shaded to make the fraction correct. Write in the boxes the number of extra grid units shapes you had to shade.

a) 

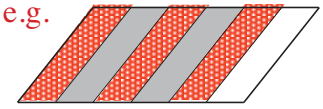
$\frac{1}{3}$ [0]

b) e.g. Shade any 2 of the 3 triangles.



$\frac{3}{4}$ [2]

c) e.g. Shade any 3 of the 4 parallelograms.



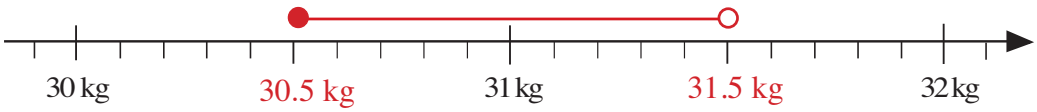
$\frac{5}{6}$ [3]

2

Joe weighed himself and told his friend that he weighed 31 kg, to the nearest kg.

How heavy could Joe be? Write an inequality and show it on the number line.

30.5 kg ≤ J < 31.5 kg



3

Do the calculations and compare the results in each row.

a) $15 \times 8 + 25 \times 8 = 320$ (=) $(15 + 25) \times 8 = 320$ (>) $15 + 25 \times 8 = 215$

b) $42 \times 12 \div 3 = 168$ (=) $(42 \times 12) \div 3 = 168$ (=) $42 \times (12 \div 3) = 168$

c) $24 + 72 \div 3 \times 12 = 312$ (<) $(24 + 72) \div 3 \times 12 = 384$ (>) $24 + 72 \div (3 \times 12) = 26$

4

Which is more? Try to fill in the missing signs without doing the calculations.

a) $(32 + 18) - 16$ (=) $32 + (18 - 16)$

b) $518 - (281 - 81)$ (>) $(518 - 281) - 8$

c) $480 + 237$ (=) $482 + 235$

d) $6512 - 6227$ (>) $6510 - 6329$

e) $(17 + 5) \times 7$ (>) $17 + 5 \times 7$

f) $(6 \times 8) \times 2$ (<) $(6 \times 2) \times (8 \times 2)$

g) 480×60 (=) $400 \times 60 + 80 \times 60$

h) 480×60 (=) $500 \times 60 - 20 \times 60$

5

Solve the equations. Do the calculations in your exercise book. Write the results here.

a) $\square + 35.2 = 209$ ..... 173.8 .....

b) $\square - 756 = 158$ ..... 914 .....

c) $x + x + 0.4 = 1$ ..... 0.3 .....

d) $34\frac{1}{2} - y = -1$ ..... $35\frac{1}{2}$ .....

e) $z \times 35 = 2100$ ..... $z = 60$ .....

f) $x \div x + 40 = 41$ ..... x can be any number except 0 .....

1 How many different 4-digit numbers can you make from these cards?

Continue listing them in order.

4 4 5 6

4456, 4465, 4546, 4564, 4645, 4654, 5446, 5464, 5644, 6445, 6454, 6544

Number possible: 12

2 The five members of a committee, A, B, C, D and E, elected one member as chairman and another as secretary. List the possible outcomes in the table.

Chairman	A	A	A	A	B	B	B	B	C	C	C	C	D	D	D	D	E	E	E	E
Secretary	B	C	D	E	A	C	D	E	A	B	D	E	A	B	C	E	A	B	C	D

How could you work out how many outcomes there could be without listing all the possibilities? For each of the possible members as chairman, there are 4 possible members as secretary. $4 \times 5 = 20$

3 Peter invented a trick for guessing numbers and he is trying it out on his classmates.

Think of a number. Add 5. Double the result. Subtract 10. Subtract your original number. You are left with your original number, aren't you?

Follow Peter's instructions, then write it down in a mathematical way using:

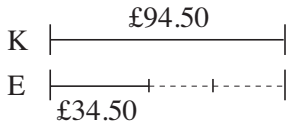
a) your own number: e.g. for 6. $(6 + 5) \times 2 - 10 - 6 = 11 \times 2 - 16 = 22 - 16 = 6$

b) 21: $(21 + 5) \times 2 - 10 - 21 = 26 \times 2 - 31 = 52 - 31 = 21$

c) any number, n: $(n + 5) \times 2 - 10 - n = 2 \times n + 10 - 10 - n$
$= 2 \times n - n$
$= n$

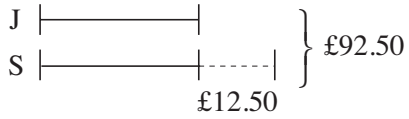
4 Solve the problems. Use the diagrams to help you.

a) Kate has £94.50 and Eve has £34.50. How much should Kate give to Eve so that they both have the same amount?



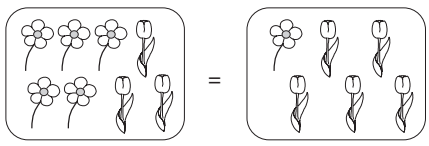
Answer: Kate should give Eve £30.

b) Joe and Sam have £92.50 altogether but Sam has £12.50 more than Joe. How much money do they each have?



Answer: Joe has £40 and Sam has £52.

c) These two bunches of flowers cost the same. How many daisies is a tulip worth?



Answer: 1 tulip is worth 2 daisies.
(and 1 daisy is worth half a tulip - not realistic!)

1

Five friends (A, B, C, D and E) said goodbye to each other after a party and shook hands with each other.

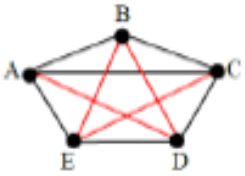
Complete the diagrams and fill in the answers.

a) How many 'goodbye's were said? b) How many handshakes were there?

	A	B	C	D	E
A		✓	✓	✓	✓
B	✓		✓	✓	✓
C	✓	✓		✓	✓
D	✓	✓	✓		✓
E	✓	✓	✓	✓	

20 'Goodbye's

4 + 3 + 2 + 1



10 handshakes

2

Form two 3-digit numbers from the digits 2, 5, 8, 0, 1, 4 so that one of them is the smallest possible and the other is the greatest possible.

Calculate their sum and difference

Smallest: 102

Greatest: 854

Sum:

	8	5	4
+	1	0	2
	9	5	6

Difference:

	8	5	4
−	1	0	2
	7	5	2

3

a)

			1	9	8	
		2	0	4	0	
+	9	9	9	0	3	
1	0	2	1	4	1	

b)

	4	4	8	9
−	1	2	9	4
	3	1	9	5

c)

		3	0	6	
		×	3	5	
	1	5	3	0	
	9	1	8	0	
1	0	7	1	0	

d)

		7	9	6	
		×	4	1	
		7	9	6	
3	1	8	4	0	
3	2	6	3	6	

Practise calculation.

e)

		6	4	r2	
7	4	5	0		
−	4	2			
		3	0		
	−	2	8		
			2		

f)

			5	3	7	r7
1	0	5	3	7	7	
	−	5	0			
			3	7		
		−	3	0		
				7	7	
			−	7	0	
					7	

g)

1			1	0	1	0	1	
1	1	1	1	1	1	1	1	
	−	1	1					
			0	1	1			
			−	1	1			
					0	1	1	
				−		1	1	
							0	

h)

				4	6	5	r 30
1	0	0	4	6	5	3	0
		−	4	0	0		
			6	5	3		
		−	6	0	0		
				5	3	0	
			−	5	0	0	
					3	0	

4

Solve these problems in your exercise book.

a) Yesterday, the temperature at mid-day was 12 °C but at dawn today it is − 3.5 °C.
By how many degrees has the temperature cooled down?
The temperature has cooled by 15.5 °C.

b) Augustus Caesar was born in 63 B.C. and died in 14 A.D. How long did he live?
Augustus Caesar lived for 77 years.

c) The Roman Empire lasted for 1229 years and ended in 476 A.D.
In what year did the Roman Empire begin? The Roman Empire began in 753 BC.

1

Solve the problems in your exercise book. Write the answer in a sentence here.

a) The farmer harvested 983 kg of wheat. He put the wheat into sacks which held 75 kg each. How many sacks did he need? 983 ÷ 75 = 13 r 8

Answer: The farmer needs 14 sacks.

b) If 30 cans of lemonade are packed in 5 boxes, how many boxes should we buy if we need 44 cans of lemonade for a party? 30 ÷ 5 = 6, so 6 cans per box.

We should buy 8 boxes. 44 ÷ 6 = 7 r 2

c) 3 metres of a certain type of material cost £6.00. What would be the price of 12 metres of the same material? 3 m cost £6.00 so 1 m costs £2.00

Answer: 12 metres would cost £24.00 12 m cost 12 × £2.00 = £24.00

2

Do the calculations in your exercise book and write the results here.

a) $1273 - 27 \times 19 - 8 =$ 752

b) $(1273 - 27) \times (19 - 8) =$ 13 706

c) $1273 - (27 \times 19 - 8) =$ 768

d) $1273 - 27 \times (19 - 8) =$ 976

3

Continue each sequence for 5 more terms. Write the rule that you used.

a) 0, 1, – 2, 3, – 4, 5, – 6, – 8, 9, – 10, 11,

Rule: Absolute value (i.e. distance from 0) increasing by 1, and signs alternating between + and –.

b) $-\frac{1}{3}$, 0, $\frac{1}{3}$, $\frac{2}{3}$, 1, $1\frac{1}{3}$, $1\frac{2}{3}$, 2, $2\frac{1}{3}$, *Rule:* Add $\frac{1}{3}$ to previous term.

c) 0.1, 0.2, 0.4, 0.8, 1.6, 3.2, 6.4, 12.8, 25.6, *Rule:* Double previous term.

d) 1, 3, 6, 10, 15, 21, 28, 36, 45, 55, 66,

Rule: Difference between terms increases by 1 each time.

e) 0, 1, 3, 7, 15, 31, 63, 127, 255, 511,

Rule: Difference between terms doubles each time.

4

In how many ways can you read the word EXETER in these grids if you can only move one step down or one step to the right?

a)

E
X
E
T
E
R

1

b)

E	X
X	E
E	T
T	E
E	R

5

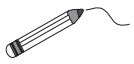
c)

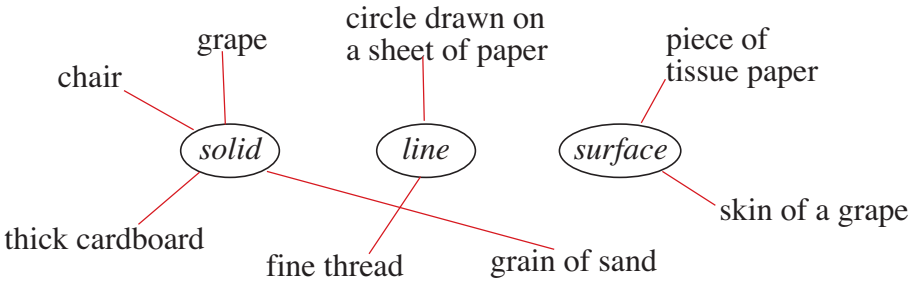
E	X	E
X	E	T
E	T	E
T	E	R

10

1

Join up each item to the matching label.



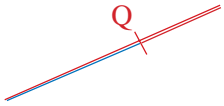


2

Use a ruler and a pair of compasses. Draw on plain paper. Follow the instructions.

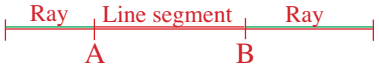
a) Draw a **straight** line with a ruler.

b) Mark a **point** on the line and label it Q.



c) Draw over one part of the line in *red* and the other part in *blue*.
What colour is the point Q? Q can be half red and half blue, red, blue or neither colour - pupils to give reasoning for their answers.

d) Draw another straight line. Mark two different points on the line and label them A and B. Draw over the **segment** between A and B in *red*. Draw over the other parts of the line in *green*.

e.g. 

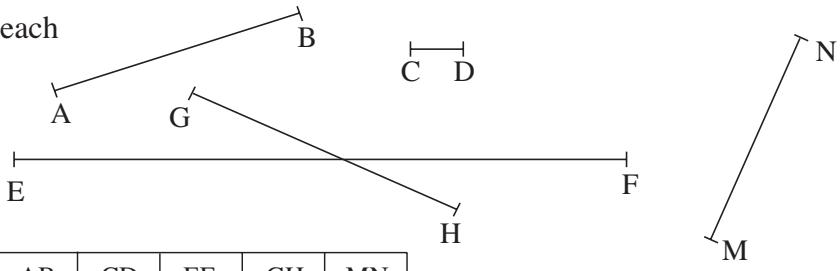
e) Using the pair of compasses, copy your **segment AB** on to the line below.
Estimate its length first, then measure its actual length to the nearest mm.

e.g. 

Estimation: ☐ *Length:* ☐ mm

3

Estimate the length of each line segment in cm, then measure it accurately to the nearest mm.

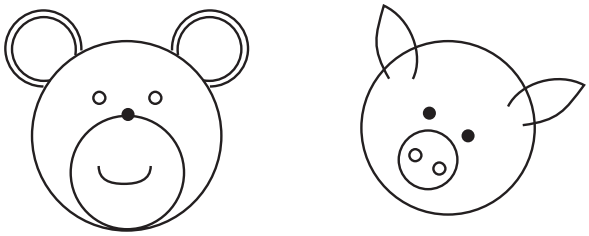


Fill in the table. e.g.

	AB	CD	EF	GH	MN
Estimated (cm)	3	1	8	4	3
Measured (mm)	34	7	81	38	29
Difference (mm)	4	3	1	2	1

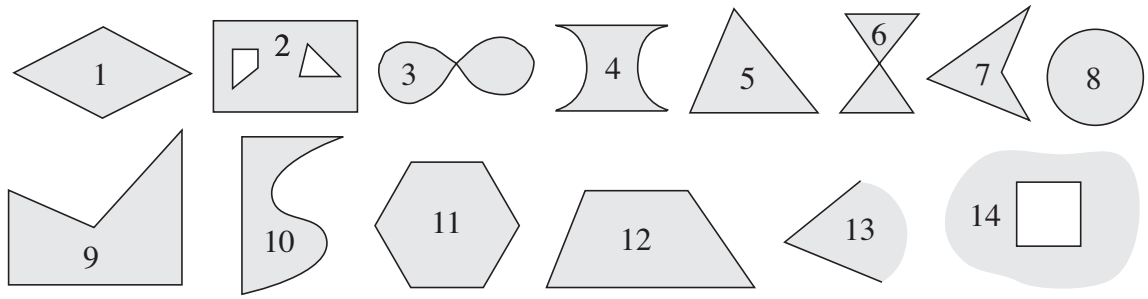
4

Draw a copy of these shapes on plain paper using only a pair of compasses.



1

List the numbers of the plane shapes which match the descriptions.



a) It is enclosed only by straight lines. 1, 2, 5, 6, 7, 9, 11, 12

b) It is enclosed by straight and curved lines. 4, 10

c) It is enclosed only by curved lines. 3, 8

d) It is not enclosed. 13, 14

e) It has parallel sides. 1, 2, 4, 6, 9, 11, 12, 14

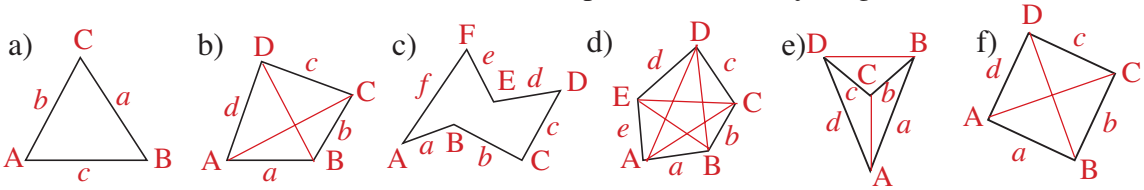
f) It has perpendicular sides. 2, 9, 10, 14

g) It has exactly 4 straight sides. 1, (6), 7, 12, 14

h) It has exactly 6 vertices. 11

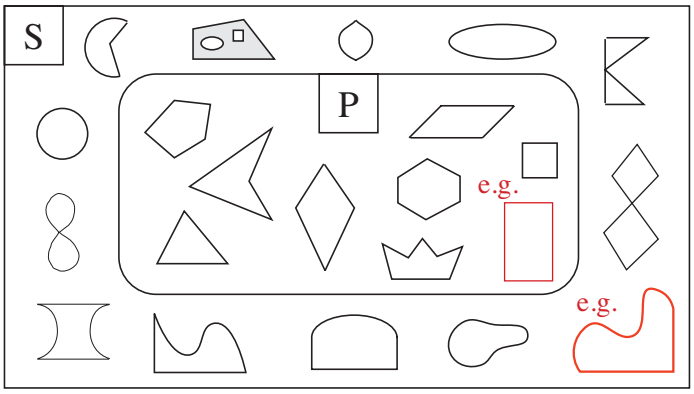
2

Label the vertices. Write the name of the shape and how many diagonals it has below it.



triangle	quadrilateral	hexagon	pentagon	deltoid	square
0	2	9	5	2	2

3



a) Write what the labels S and P might mean.

S: {plane shapes}

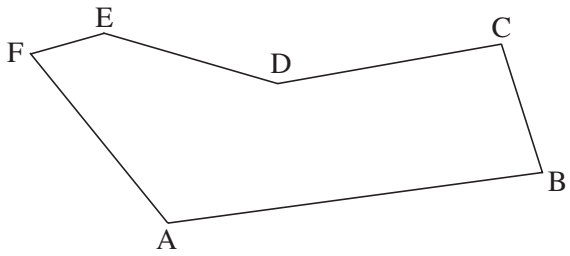
P: {polygons}

b) Draw one more element in each set.

c) Fill in the missing words.

Every [polygon] is a [plane] [shape] but not every [plane] [shape] is a [polygon].

1 Measure the length of each side of this polygon and calculate the length of its perimeter.



AB = 5 cm BC = 1.8 cm

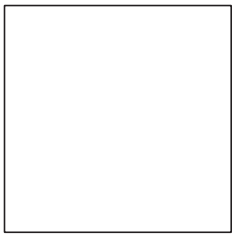
CD = 3 cm DE = 2.4 cm

EF = 1 cm FA = 2.9 cm

P = 5 + 3 + 1 + 1.8 + 2.4 + 2.9
= 14 + 2.1 = 16.1 cm

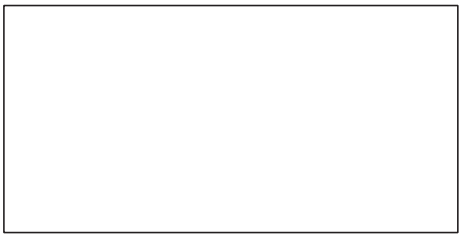
2 Measure the sides then calculate the length of each perimeter.

a) 3 cm, 3 cm



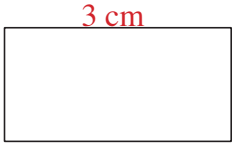
P = 12 cm

b) 6 cm, 3 cm



P = 18 cm

c) 3 cm, 1.5 cm

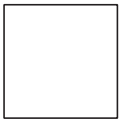


P = 9 cm

d) 5.5 cm, 1.5 cm

P = 14 cm

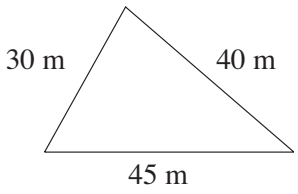
e) 1.5 cm, 1.5 cm



P = 6 cm

3 What length of fence (including the gate) is needed to enclose each of these gardens?

a)

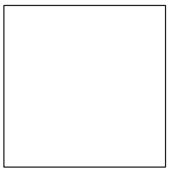


P = 115 m

b)

P = 130 m

c)



P = 400 m

4 a) Calculate the perimeter of a rectangle if:

i) one side is 17 cm and the other is 38 cm, P = 110 cm = 1 m 10 cm

ii) one side is 2 m 10 cm and the other is 130 cm, P = 680 cm = 6 m 80 cm

iii) each side is 31 cm. P = 124 cm = 1 m 24 cm

b) Calculate the length of the other side of a rectangle if one side is 70 cm and its perimeter is 350 cm. b = 105 cm

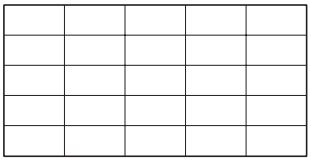
c) Calculate the side of a square if its perimeter is:

i) 360 cm a = 90 cm ii) 1 m 4 cm a = 26 cm

1

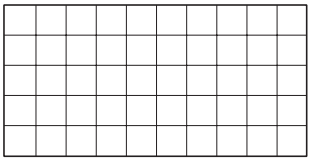
The floor of a doll's house can be covered by three different shapes of tiles.
What is the unit of area used in each case and how many such units are needed?

a)  4 cm
8 cm



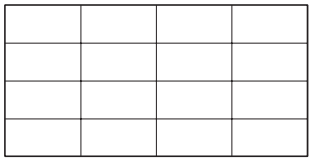
Units used: $8 \times 4 = 32$ (cm^2)
Units needed: $5 \times 5 = 25$

b)  4 cm
4 cm



Units used: $4 \times 4 = 16$ (cm^2)
Units needed: $5 \times 10 = 50$

c)  5 cm
10 cm

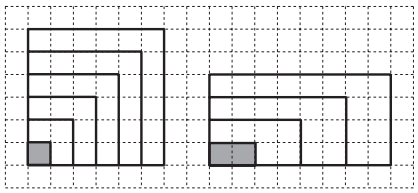


Units used: $10 \times 5 = 50$ (cm^2)
Units needed: $4 \times 4 = 16$

2

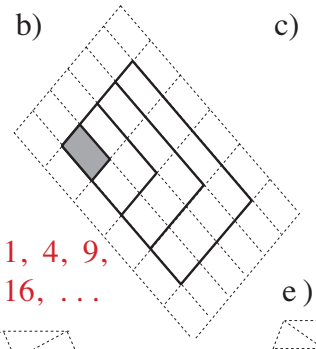
How does the area of a polygon change if each side is enlarged by the same number of times? (In each part, the shaded shape is 1 unit.)

a)



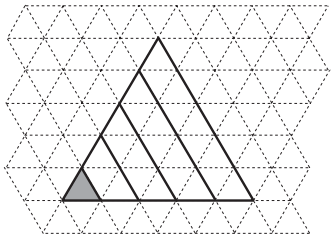
1, 4, 9, 16, 25, 36, . . .

b)

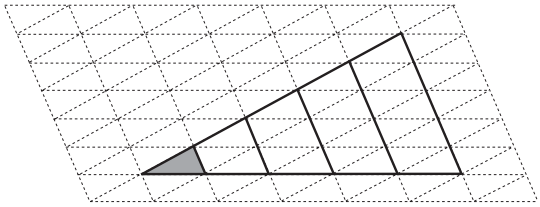


1, 4, 9, 16, . . .

c) 1, 4, 9, 16, 25, . . .

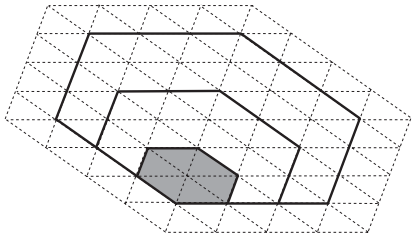


d)



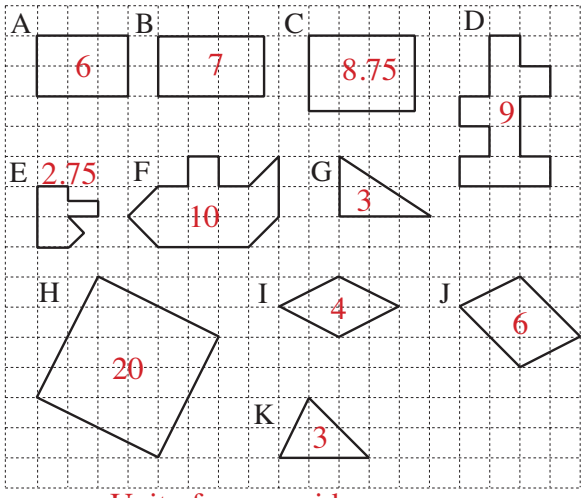
1, 4, 9, 16, 25, . . .

e)



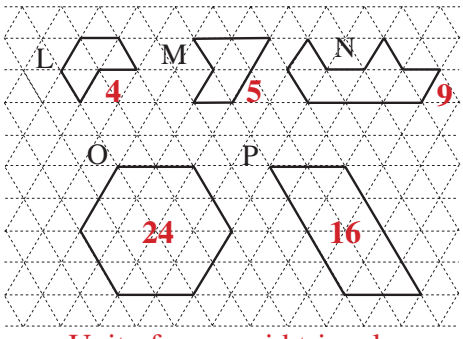
1, 4, 9, . . .

3



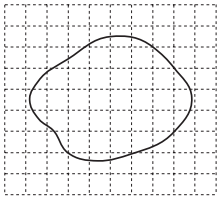
Unit of area: grid squares

Count or calculate the areas of these polygons and write them in your exercise book.



Unit of area: grid triangles

4



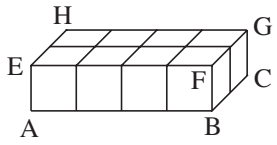
The area of this shape is: i) more than . . . 22 grid squares . . .

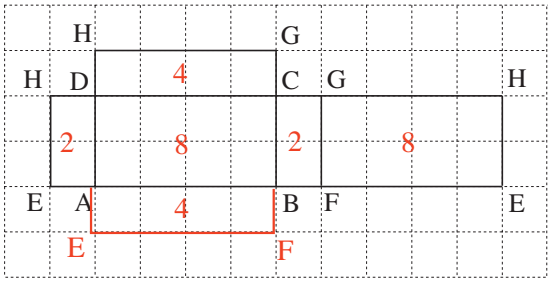
ii) less than . . . 42 grid squares . . .

(22 grid squares $<$ A $<$ 42 grid squares)

1

a) Complete the drawing of the net. Calculate the area of each face and then the surface area of the cuboid.





ABCD = 8

EFGH = 8

ABFE = 4

DCGH = 4

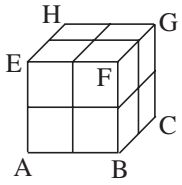
ADHE = 2

BCGF = 2

Total area = 2 × (8 + 4 + 2) grid squares
= 28 grid squares

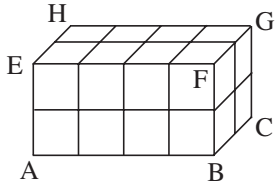
b) In your exercise book, draw a net for each of these cuboids, then calculate the area of each face and its total surface area. Write the surface area here.

i)



A = 6 × 4 grid squares
= 24 grid squares

ii)



A = (2 × 4) grid squares + (4 × 8) grid squares
= 40 grid squares

2

In your exercise book, draw 3 different nets for a cube of side 2 units. See Lesson Plan.

3

Calculate the surface area of each cuboid if a, b and c are the lengths of its edges.

a) a = 5 cm, b = 10 cm, c = 3 cm

A = 5 × 10 × 2 + 5 × 3 × 2 + 10 × 3 × 2
= 100 + 30 + 60 = 190 (cm²)

or

A = 2 × (5 × 10 + 5 × 3 + 10 × 3)
= 2 × (50 + 15 + 30) = 2 × 95 = 190 (cm²)

b) a = 8 m, b = 7 m, c = 10 m

A = 2 × (8 × 7 + 8 × 10 + 7 × 10)
= 2 × (56 + 80 + 70 = 2 × 206 = 412 (m²)

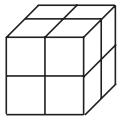
c) a = 1 m, b = 1 m, c = 7 m 50 cm

A = 2 × (1 + 7.5 + 7.5) = 2 × 16 = 32 (m²)

4

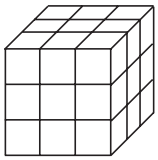
How many unit cubes are needed to build these cubes?

a)



8 unit cubes

b)

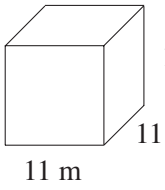


27 unit cubes

1

Calculate the surface area of these cuboids.

a)

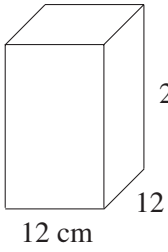


$A = 6 \times (11 \times 11)$

$= 6 \times 121$

$= 726\ (m^2)$

b)



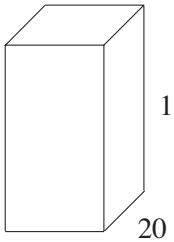
$A = 2 \times (12 \times 12) + 4 \times (12 \times 25)$

$= 2 \times 144 + 4 \times 300$

$= 288 + 1200 = 1488\ (cm^2)$

(square-based cuboid)

c)



$A = 2 \times (45 \times 20 + 45 \times 110 + 20 \times 110)$

$= 2 \times (900 + 4950 + 2200)$

$= 1800 + 9900 + 4400 = 16\ 100\ (cm^2)$

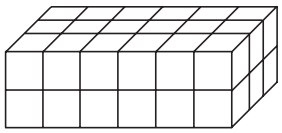
$(= 1\ m^2\ 6100\ cm^2)$

2

Calculate the surface area of these solids in your exercise book. Write the answers here.

How many unit cubes is each of them made from? This is its **volume**.

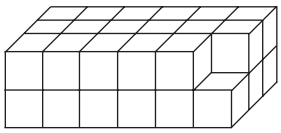
a)



$A =$ 72 square units

$V =$ 36 unit cubes

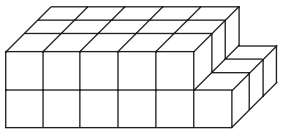
b)



$A =$ 72 square units

$V =$ 35 unit cubes

c)



$A =$ 70 square units

$V =$ 33 unit cubes

3

A box is shaped like a cuboid but is open at the top. Inside, it is 1.4 m long, 1 m wide and 80 cm high. What is its inner surface area? 1.4 m = 140 cm, 1 m = 100 cm

$A = (140 \times 100) + 2 \times (140 \times 80) + 2 \times (100 \times 80)$

$= 14\ 000 + 2 \times 11\ 200 + 2 \times 8000$

$= 14\ 000 + 22\ 400 + 16\ 000$

$= 52\ 400\ (cm^2)$ $[= 5\ m^2\ 2400\ cm^2]$ (as $10\ 000\ cm^2 = 1\ m^2$)

Answer:
The inner surface area is 52 400 cm^2

4

Calculate the surface area of a small box which has these measurements.

$a = 5$ cm

$b = 17$ mm

$c = 4$ cm 3 mm

$A = 2 \times (50 \times 17 + 50 \times 43 + 17 \times 43)$

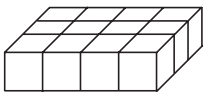
$= 2 \times (850 + 2150 + 731)$

$= 2 \times 3731$

$= 7462\ (mm^2)$ $[= 74\ cm^2\ 62\ mm^2 = 74.62\ cm^2]$

(as $100\ mm^2 = 1\ cm^2$)

1 Pete has already made the base layer of a cuboid from unit cubes.
If Pete has 72 unit cubes, how high can he build his cuboid?



Number of unit cubes in base: 12

Number of layers: 6

Height of cuboid: 6 units

2 Calculate the volume of each of these cuboids if the length of its edges in units are:

a) $a = 8,\ b = 5,\ c = 6$ $V =$ 240 (cubic units)

b) $a = b = 5,\ c = 10$ $V =$ 250 (cubic units)

c) $a = b = c = 9$ $V =$ 729 (cubic units)

3 Use the tables to show the lengths of the edges of different cuboids which can be made from these numbers of cubes (in any order).

a) 7 unit cubes

Only 1 cuboid is possible.

a	1					
b	1					
c	7					

b) 8 unit cubes

3 cuboids are possible.

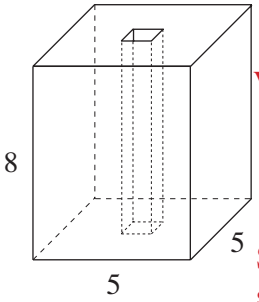
a	1	1	2			
b	1	2	2			
c	8	4	2			

c) 30 unit cubes

5 cuboids are possible.

a	1	1	1	1	2	
b	1	2	3	5	3	
c	30	15	10	6	5	

4 This solid has a 1 unit square hole bored right through its centre.



a) How many unit cubes would be needed to build the solid?

Volume of solid = volume of whole cuboid − volume of part removed

$V = (5 \times 5 \times 8) - (1 \times 1 \times 8)$

$= 200 - 8 = 192$ (unit cubes)

Answer:
192 unit cubes would be needed.

b) What is its surface area?

Surface area of solid = surface area of whole cuboid − the sqaures on top and bottom + surface area inside the hole

$A = 2 \times (5 \times 5) + 4 \times (5 \times 8) - 2 \times (1 \times 1) + 4 \times (1 \times 8)$

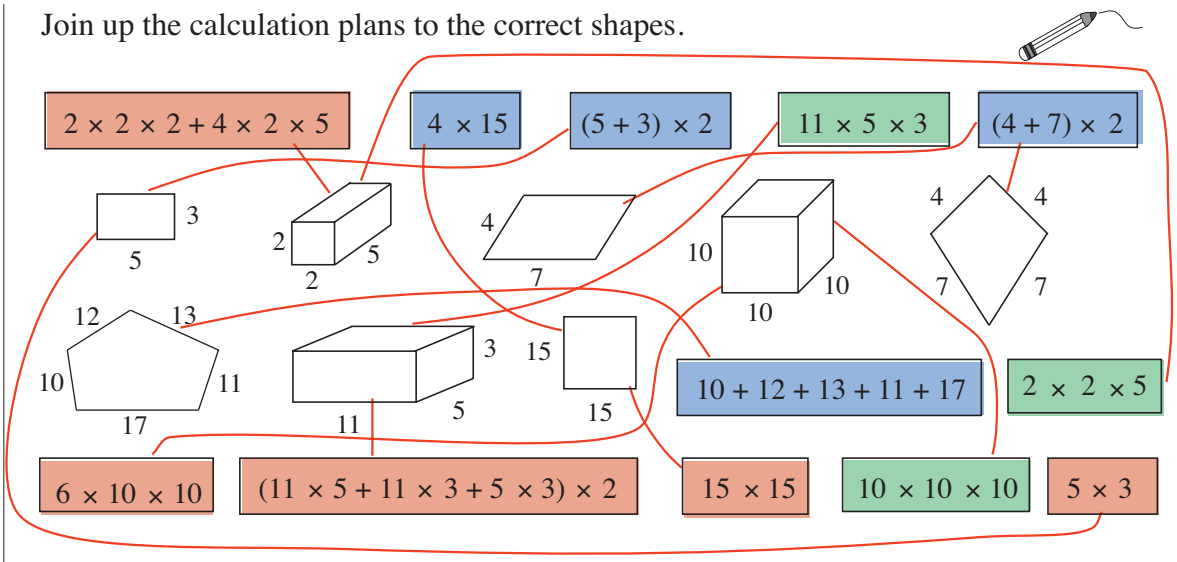
$= 2 \times 25 + 4 \times 40 - 2 \times 1 + 4 \times 8$

$= 50 + 160 - 2 + 32 = 210 + 30 = 240$ (unit squares)

Answer:
Its surface area is 240 unit squares.

1

Join up the calculation plans to the correct shapes.

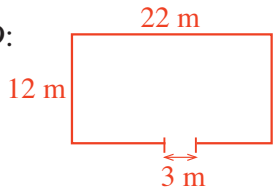


Colour the plan *blue* if it is a perimeter, *red* if it is an area and *green* if it is a volume.

2

A rectangular-shaped garden is 22 m long and 12 m wide.

D:



a) How long is the fence around it if the gate is 3 m wide?
Draw a diagram first.

Plan: F = 2 × (22 m + 12 m) − 3 m

C: (44 + 24) − 3 = 68 − 3
= 65

Answer: The fence around the garden is 65 m long.

b) What is the area of the garden?

Plan: A = 22 m × 12 m

C: 22 × 12 = 264

Answer: The area of the garden is 264 m^2.

3

Solve these problems in your exercise book. Write only the answers here.

a) The area of the surface of a cube is 150 cm^2.
What is its volume in centimetre cubes (cm^3)?

V = 125 cm^3

b) A cube is built from 64 1 cm cubes, so its volume is 64 cm^3.
What is its surface area in centimetre squares (cm^2)?

A = 96 cm^2

4

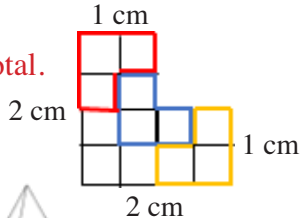
Solve these problems in your exercise book.

a) We poured water into a 10 cm cube which was open at the top.
How much water did we pour in if the water level was: i) 5 cm ii) 3.5 cm?

i) Volume = 10 × 10 × 5 = 500 (cm^3) equivalent to 500 ml = 50 cl
ii) Volume = 10 × 10 × 3.5 = 350 (cm^3) equivalent to 350 ml = 35 cl

b) Divide this hexagon into 4 **congruent** parts.

Divide the hexagon into 3 squares.
Divide each square into 4 equal parts, making 12 grid squares in total.
Divide the 12 grid squares into 4 equal parts; each part is made up of 3 grid squares.



c) Make 4 **congruent** triangles
from 6 straws of equal length. Impossible in 1 plane but can be done in space (i.e. 3-D).