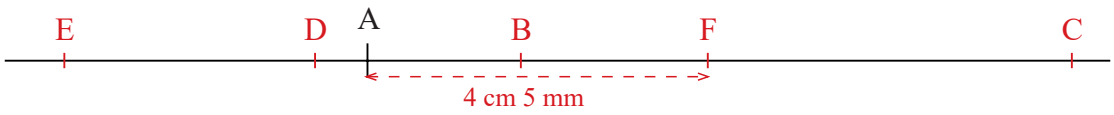
1

Start from point **A** on the straight line. Follow the instructions.



a) Move 2 cm to the right. Label that point **B**.

b) From **B**, move 7 cm 3 mm to the right. Label that point **C**.

c) From **C**, move 10 cm to the left. Label that point **D**.

d) From **D**, move 3 cm 3 mm to the left. Label that point **E**.

e) From **E**, move 8 cm 5 mm to the right. Label that point **F**.

How far in which direction is point **F** from point **A**? Point F is 4 cm 5 mm to the right of point A.

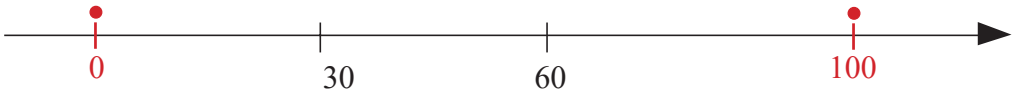
2

Use a ruler.

a) Write the correct number below each dot.

b) Mark and label the positions of 16 and 23.

c) Mark and label the positions of 100 and 0.

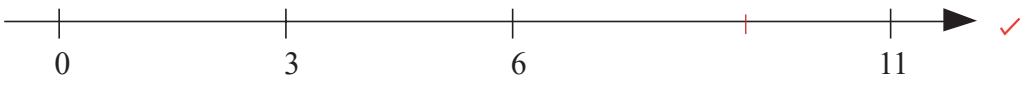


3

Use a ruler and/or a pair of compasses.

Check whether each number line is accurate. If it is, tick it but if it is not, correct it.

a)



b)

4

Where is the position of 3 on this number line?

Assuming that zero it at the left-hand end of the line:

otherwise, the number 3 can be anywhere on the number line, depending on the length of the unit used,

1

a) Ted spent 310 p in the morning and 490 p in the afternoon. Bob spent 490 p in the morning and 310 p in the afternoon. How much did they each spend?

Ted: 310 p + 490 p = 800 p = £ 8 Bob : 490 p + 310 p = 800 p = £8

b) Complete this sentence. The terms of an addition are ..interchangeable...

2

Do the calculations by grouping the terms in the easiest way.

a) 49 + 63 + 17 = ..49 + 80 = 129.....

b) 47 + 21 + 53 + 19 = ..100 + 40 = 140.....

c) 354 + 106 + 14 + 46 = 460 + 60 = 520.....

3

Dad earned £6870 and won £546 on the lottery. He spent £250 on presents for the family and £70 on books. Then he calculated how much he had left.

Tick the plans which he might have used.

a) 6870 + 546 – 250 – 70 ✓ b) 6870 + (546 – 250 – 70) ✓

c) (6870 + 546) – (250 – 70) d) 6870 + 546 – (250 + 70) ✓

4

a) Cathy had £375 and spent £125. Linda had £125 and spent £375. How much money do they each have now?

Cathy: £250 Linda: −£250 (£250 in debt)

b) Complete this sentence.

In a subtraction, the **reductant** and the **subtrahend** are [not] inter-changeable, unless they are equal.

5

Write a plan for each calculation, using brackets where necessary.

I have £48 in my right pocket and £17 in my left pocket.

a) How much do I have altogether? ..£48 + £17 = £65.....

b) How will the amount change if I:

i) put another £52 in my right pocket ..£65 + £52 = £117.....

ii) take out £10 from my left pocket ..£65 – £10) = £55.....

iii) put another £8 in both pockets ..£65 + 2 × £8 = £65 + £16 = £81..

iv) take £8 out of both pockets? ..£65 – 2 × £8 = £65 – £16 = £49..

c) If I put another £15 into my left pocket, how should I change the amount in my right pocket so that the total amount does not change? (£48 – £15) + (£17 + £15) =£33 + £32 = £65 (total amount)

1 Do these calculations in a clever way.

a) $27 \times 5 \times 20 =$ 27 × 100 = 2700

b) $62 \times 15 =$ 62 × 10 + 62 × 5 = 620 + 310 = 930 or 31 × 30 = 30 × 30 + 30 = 930

c) $80 \times 25 =$ 40 × 50 = 2000

d) $172 \times 4 \times 25 =$ 172 × 100 = 17 200

e) $374 \div 17 =$ 340 ÷ 17 + 34 ÷ 17 = 20 + 2 = 22

f) $998 \times 4 =$ 4000 − 8 = 3992

g) $135 \div 5 =$ 100 ÷ 5 + 35 ÷ 5 = 20 + 7 = 27

h) $183 + 1666 + 17 =$ 200 + 1666 = 1866

2 Calculate the perimeter and area of each of these polygons. (The diagrams are not drawn to scale.) Colour the shapes which are **similar**.

a) 4 cm, 17 cm

$P =$ 42 cm 2 × (4 +17) = 42

$A =$ 68 cm^2 17 × 4 = 68

b) 11 m, 20 m

$P =$ 62 m 2 × (11 +20) = 62

$A =$ 220 m^2 11 × 20 = 220

c) 16 mm, 68 mm

$P =$ 168 mm 2 × (16 + 68) = 168

$A =$ 1088 mm^2 16 × 68 = 1088

3 Workmen are putting up street lights at every 40 m along a new road.
If the road is 820 m long, how many lamp posts will they need?

Plan: 820 m ÷ 40 m = 82 m ÷ 4 m
= 20 (times), r 2 m

C:

Answer: 20 spaces of 40 m, but a lamp post will be needed at the beginning (or end) of the given part of the road, so they will need 21 lamp posts.

4 Continue the sequence for 3 more terms in both directions.

Rule

a) 103, 127, 151, 175, 199, 223, 247, 271, 295, — + 24

b) 1415, 1310, 1205, 1100, 995, 890, 785, 680, 575, — − 105

c) 1, 3, 9, 27, 81, 243, 729, 2187, 6561, — × 3

1 Write these numbers in the appropriate sets.

20 300 55 60 110 27 64 100 125 324 10 900

Divisible by 3	Divisible by 4	Divisible by 5
300 60 27 324	20 300 60 64 100 324 10 900	20 300 55 110 60 125 100 10 900

Multiple of 10	Multiple of 25	Multiple of 100
20 300 60 110 100 10 900	300 100 125 10 900	300 100 10 900

2 Do the divisions in column form and check them. Write the results here.

a) $217 \div 3 = 72$ r 1 b) $217 \div 5 = 43$ r 2 c) $217 \div 7 = 31$

d) $392 \div 6 = 65$ r 2 e) $392 \div 5 = 78$ r 2 f) $392 \div 9 = 43$ r 5

3

a) $a + 1462 = 2000$ b) $b - 357 = 569$ c) $3143 - c = 606$

$a =$ 538 $b =$ 926 $c =$ 2537

d) $19 \times d + 2 = 40$ e) $e \div 24 - 5 = 5$ f) $2693 \times f = 0$

$d =$ 2 $e =$ 240 $f =$ 0

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

Cinema tickets cost £2 60 p for adults and £1 90 p for children.

a) How much would it cost a family of 2 adults and 2 children to go to the cinema?

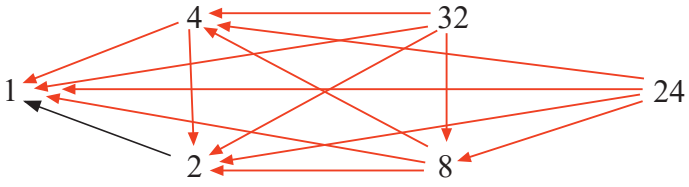
Answer: £2.60 = 260 p, £1.90 = 190 p
(260 + 190) × 2 = 900 It would cost £9.00.

b) John is 10 years old and has been given a cinema token worth £20 for his birthday. How many friends could he take with him to the cinema using his token?

Answer: £20 = 2000 p, £1 90 p = 190 p 10 × 190 = 1900
John could take 9 friends and also pay for his own ticket. He would have £1 left over.

5 The arrows point towards the **factors**.

Continue drawing the arrows.



1 Decide whether the statement is true or false and write a ✓ or a × in the box.

a) Any positive number is an integer. [F]

b) There is a number which is 2 less than its opposite number. [T]

c) Zero can be positive or negative. [F]

d) The greater of two positive numbers is the number furthest from zero. [T]

2 Which is more? Fill in the missing signs.

a) 4.5 m [>] 45 cm b) 91 kg [>] 910 g c) 1800 sec. [>] 3 min

d) $-4-4$ [=] $-4+(-4)$ e) £150 20 p [>] 1502 p

f) $12-14$ [<] $14-12$ g) $-1+(-2)$ [<] $-2+1$ h) $0\div 7$ [=] $0\div 2$

3 Fill in the missing numbers.

a) 8 is more than 0 by [8] $8-0=$[8] [8] $+0=8$

b) -8 is less than [0] by 8 $-8-0=$[-8] [-8] $+0=-8$

c) 8 is more than 2 by [6] $8-2=$[6] [6] $+2=8$

d) 8 is more than -3 by [11] $8-(-3)=$[11] [11] $+(-3)=8$

e) -3 is more than -7 by [4] $-3-(-7)=$[4] [4] $+(-7)=-3$

f) 4 is less than [13] by 9 $4-13=$[-9] [-9] $+13=4$

g) -2 is less than 3 by [5] $-2-3=$[-5] [-5] $+3=-2$

4 Work out the rule and complete the table. Write the rule in different ways.

r	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
s	9	8	7	6	5	4	3	2	1	0	-1	-2	-3

$r = 2 - s$ $s = 2 - r$ $r + s = 2$

5 What could the temperatures be? Answer by writing an inequality.

a) The temperature is more than -5 °C but less than -2 °C.

$-5 < t < -2$, t: -4 °C, -3 °C

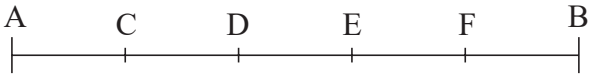
b) The temperature is less than 2 °C but is at least -1 °C.

$-1 \le t < 2$, t: -1 °C, 0 °C, 1 °C

c) The temperature is not more than 10 °C and is not less than -1 °C.

$-1 \le t \le 10$, t: 10 °C, 9 °C, … , 0°C, -1°C

1 The line segment AB has been divided into 5 equal parts at the points C, D, E and F.



What fraction of AB is:

a) AD $\frac{AD}{AB} = \boxed{\frac{2}{5}}$ Draw it here. .....

b) DE $\frac{DE}{AB} = \boxed{\frac{1}{5}}$ Draw it here. .....

c) AF $\frac{AF}{AB} = \boxed{\frac{4}{5}}$ Draw it here. .....

d) DB $\frac{DB}{AB} = \boxed{\frac{3}{5}}$ Draw it here. .....

2 Circle the numbers which are greater than 1.

$\frac{3}{5}$, $\frac{8}{7}$, – 3.4, $\frac{100}{100}$, $\frac{19}{17}$, 1.001, $1\frac{1}{4}$, – 1099, $\frac{27}{4}$, $\frac{5}{5}$

3 Write these decimals as mixed numbers or fractions.

e.g. a) 8.08 = $8\frac{8}{100}$ b) 92.40 = $92\frac{4}{10}$ c) 0.6 = $\frac{6}{10}$ d) 0.75 = $\frac{3}{4}$

e) 17.01 = $17\frac{1}{100}$ f) 50.2 = $50\frac{2}{10}$ g) 0.0005 = $\frac{5}{10\,000}$ h) 3912.3 = $3912\frac{3}{10}$

4 Express these quantities as decimals.

a) 796 cl = 7.96 litres

b) 92 m 45 cm = 92.45 m

c) 9 km 81 m = 9.081 km

d) 3 m 630 mm = 3.630 m

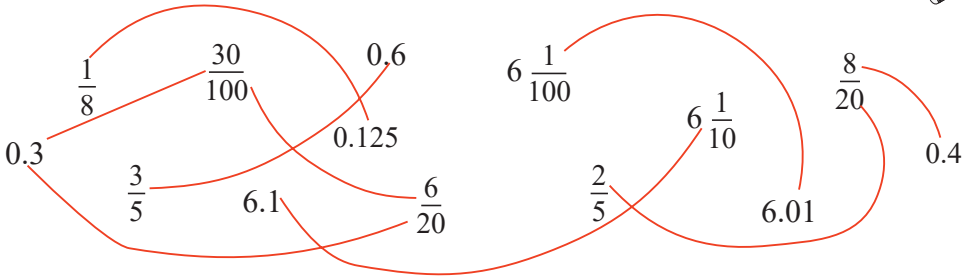
e) 11 kg 29 g = 11.029 kg

f) 27 kg 100 g = 27.1 kg

g) 4 hours 15 min. = 4.25 hours

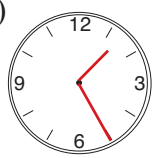
h) 3 hours 6 min. = 3.1 hours

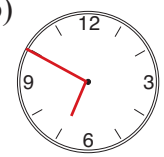
5 Join up the equal numbers.



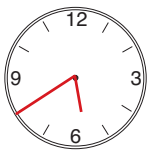
1

Show the times on the clocks.

a)  13:25

b)  ten to seven

c)  9.12 am

d)  5 h 40 min

e)  twenty-five to three

2

Practise addition and subtraction of units of time.

a)
5 hours 24 minutes 36 seconds
+ 6 hours 55 minutes 41 seconds
12 hours 20 minutes 17 seconds

b)
22 hours 17 minutes 44 seconds
– 11 hours 20 minutes 10 seconds
10 hours 57 minutes 34 seconds

3

Practise addition and subtraction in your exercise book. Write the answers here.

a) $3478 + 123 + 6032 =$ 9633

b) $7359 + 22 + 450 + 13\,687 =$ 21 518

c) $14\,722 - 1853 =$ 12 869

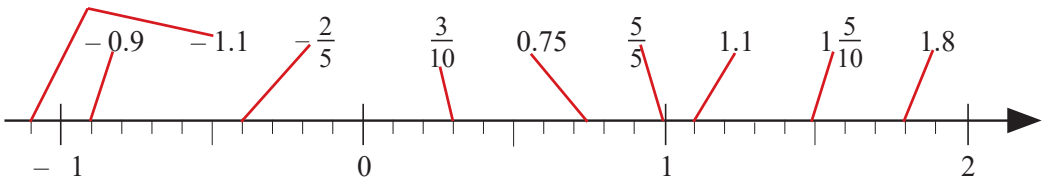
d) $5380 - 3953 =$ 1427

e) $\frac{4}{5} + \frac{7}{10} - 1\frac{2}{10} =$ $\frac{3}{10}$

f) $12.35 + 37.9 - 0.98 =$ 49.27

4

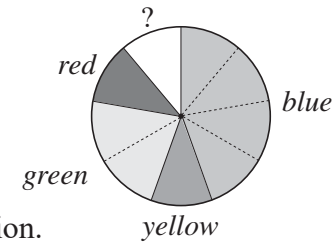
Join these numbers to the corresponding points on the number line.



5

The teacher of a class of 27 pupils asked each pupil to say which of the colours *red*, *blue*, *yellow* or *green* he or she liked best.

The teacher drew this pie chart to show the data.



a) How many pupils chose each colour? Write an operation.

red $\frac{1}{9}$ of $27 = 27 \div 9 = 3$ — 3 pupils chose red

blue $\frac{4}{9}$ of $27 = 27 \div 9 \times 4 = 12$ — 12 pupils chose blue

yellow $\frac{1}{9}$ of $27 = 27 \div 9 = 3$ — 3 pupils chose yellow

green $\frac{2}{9}$ of $27 = 27 \div 9 \times 2 = 6$ — 6 pupils chose green

b) What could the uncoloured part of the pie chart represent?

Absent pupils or those who did not like any of these four colours.

1 Do these operations in the easiest way.

a) $3210 - 738 + 49 - 262 + 4051$ $3210 - (738 + 262) + (49 + 4051)$
$= 3210 - 1000 + 4100 = 2210 + 4100 = 6310$

b) $220 + 65 \times 3 - 95 \div 5 - 729 \div 9 = 220 + 195 - 19 - 81 = 220 + 195 - 100$
$= 220 + 95 = 315$

c) $25 \times 9 + (150 - 25) \div 25 - 175 \div 5 = 225 + 125 \div 25 - 35$
$= 225 + 5 - 35 = 230 - 35 = 195$

2 The table shows the departure and arrival times of some high speed trains. Complete the table.

Route	Departs	Arrives	Journey time
London – Birmingham	09:15	10:35	1 hour 20 minutes
London – Manchester	10:05	12:03	1 hour 58 minutes
Liverpool – London	07:26	09:37	2 hours 11 minutes
Manchester – Glasgow	08:49	11:12	2 hours 23 minutes
London – Carlisle	11:55	15:12	3 hours 17 minutes
Glasgow – London	17:30	21:42	4 hours 12 minutes

3 Solve these problems in your exercise book.

a) John had 29 sweets. He ate 8 of them and shared the rest equally among 3 of his friends. How many sweets did he give each friend? 7 sweets

b) After spending 35 p a day for 6 days, Harvey has 60 p of his pocket money left. How much pocket money was Harvey given? £2.70

c) Suzy bought 3 packets of crisps at 23 p each and 6 chocolate bars at 40 p each. If she had 49 p left, how much money did Suzy have at first? £3.58

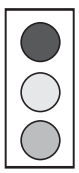
d) Eight identical bottles of wine contain 6 litres.

i) How many bottles of wine should I buy if I need 15 litres for a party? 20 bottles

ii) How much wine does each bottle contain? 75 cl

4 In your exercise book, write a word problem for this plan. $(183 - 36) \div 3 - 27 \div 3$
$(183 - 36) \div 3 - 27 \div 3 = 61 - 12 - 9 = 40$ (pence)

5



Traffic lights light up in the order: *R*, *RA*, *G*, *A*, *R* . What other possible combinations could be used?

R, A, G, A, R; *R, AG, G, A, R;* *R, RA, G, GA, R*

1 Complete the table for the perimeter of a rectangle. Write the rule.

a	5	3	4	24	6	17	58.5	8	12
b	9	7	6	4	57	7	9	8	60
P	28	20	20	56	126	48	135	32	144

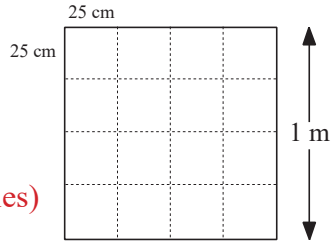
Rule: $P = 2 \times (a + b)$ $(= 2a + 2b)$

2 Floors are often tiled with 25 cm square tiles.

a) How many tiles would be needed to cover an area of

i) 1 m^2 ii) 2 m^2 iii) 5 m^2 iv) 8 m^2

16 32 80 128 (tiles)



b) How many tiles would be needed to cover a kitchen floor which measured 4 m by 3 m?

192 tiles

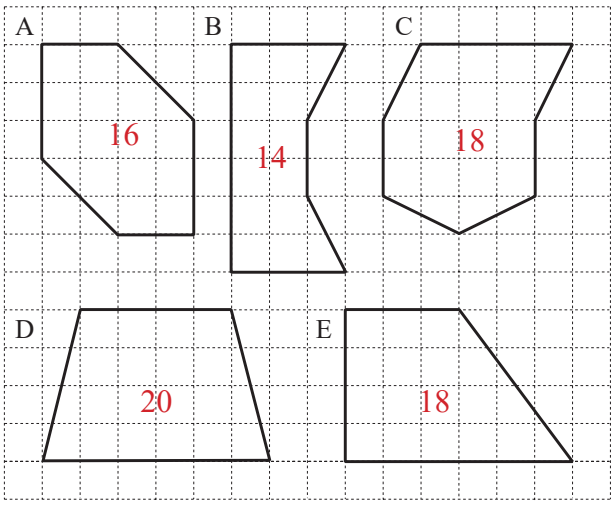
3 The perimeter of a rectangle with sides a cm and b cm is 36 cm.

a) Complete the table.

a	1	2	3	4	5	6	7	8	9
b	17	16	15	14	13	12	11	10	9

b) Circle the column which shows the rectangle which has the greatest area.

4 a) Write inside each polygon its area in unit squares.

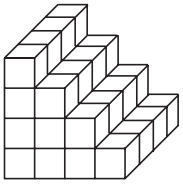


b) Which polygon has: i) the greatest area D ii) the smallest area? B

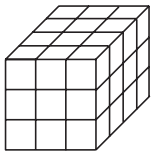
c) Which polygons have equal areas? C and E

1

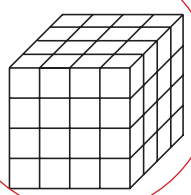
These solids are made from 1 cm cubes. Calculate their surface area and volume .

a) 

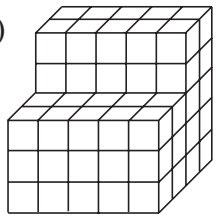
V = 40 cm^3 A = 84 cm^2

b) 

V = 36 cm^3 A = 66 cm^2

c) 

V = 64 cm^3 A = 96 cm^2

d) 

V = 80 cm^3 A = 122 cm^2

Circle the solids which are cuboids and colour the solid which is a cube.

2

A cuboid is made from 216 unit cubes. Write the possible lengths of its edges in the table.

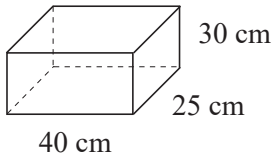
a	1	1	1	1	1	1	1	1	2	2	2	2	2	3	3	3	3	4
b	1	2	3	4	6	8	9	12	2	3	4	6	9	3	4	6	8	6
c	216	108	72	54	36	27	24	18	54	36	27	18	12	24	18	12	9	9

Colour *yellow* the column in the table which gives the least possible surface area.

3

Write operations and calculate the results.

A rectangular tank measures 40 cm by 25 cm by 30 cm.



a) How many litres of water are in the tank when it is full? (1 litre = 1000 cm^3)

$V = 40 \times 25 \times 30 = 1000 \times 30 = 30\,000$ cm^3

30 000 cm^3 is equivalent to 30 litres

Answer: There are 30 litres of water in a full tank.

b) If the tank contains 8 litres of water, at what height is the water level?

8 litres is equivalent to 8000 cm^3.

h = 8000 cm^3 ÷ (40 cm × 25 cm)

= 8000 cm^3 ÷1000 cm^2 = 8 cm

Answer: The water level is at a height of 8 cm.

4

Solve these problems in your exercise book.

a) The volume of a cube is 512 cm^3. What is the length of each edge?

(8 × 8 × 8 = 512)

Answer: The length of each edge is 8 cm

b) A storage reservoir is 12 m long and 5 m wide. Its volume is 300 m^3.

i) What is the height of the tank?

h = 300 m^3 ÷ (12 m × 5 m)

= 300 m^3 ÷ 60 m^2 = 5 m

Answer: The height of the tank is 5 m.

ii) How much water in litres could it hold?

1 m^3 = 1 000 000 cm^3 which is equivalent to 1000 litres

Answer: The tank could hold 300 000 litres.

iii) If there is a hole in the bottom of the tank and it loses 500 litres of water per day, after how many days will the tank be empty? 300 000 litres ÷ 500 litres = 600 (times)

Answer: The tank will be empty after 600 days.

1

Complete the addition table. Use the table to complete these sums.

+	– 3	– 2	– 1	0	+ 1	+ 2	+ 3
– 3	– 6	– 5	– 4	– 3	– 2	– 1	0
– 2	– 5	– 4	– 3	– 2	– 1	0	+ 1
– 1	– 4	– 3	– 2	– 1	0	1	2
0	– 3	– 2	– 1	0	+ 1	+ 2	+ 3
+ 1	– 2	– 1	0	+ 1	+ 2	+ 3	+ 4
+ 2	– 1	0	+ 1	+ 2	+ 3	+ 4	+ 5
+ 3	0	+ 1	+ 2	+ 3	+ 4	+ 5	+ 6

a) $+3+(-1) = \boxed{2}$

b) $-1+(-2) = \boxed{-3}$

c) $-3+(-2) = \boxed{-5}$

d) $+3+(-3) = \boxed{0}$

e) $0+(-3) = \boxed{-3}$

f) $+2+(-3) = \boxed{-1}$

g) $-1+0 = \boxed{-1}$

2

Calculate as simply as possible.

a) $256 + 137 + 44 + 64 = (256 + 44) + (137 + 63 + 1) = 300 + 201 = 501$

b) $125 + 49 + 151 + 50 = (125 + 50) + (49 + 151) = 175 + 200 = 375$

c) $43 + 291 + 69 + 17 = (43 + 17) + (291 + 9 + 60) = 60 + 360 = 420$

d) $299 + 163 + 87 + 113 = 300 + 162 + (87 + 113) = 462 + 200 = 662$

e) $1324 + 9999 + 1001 = 1324 + (9999 + 1 + 1000) = 1324 + 11\,000 = 12\,324$

3

Do the calculations as quickly as you can and check them.

a)
$$\begin{array}{r} 324 \\ 1092 \\ +\ \ \ 92 \\ \hline 1508 \end{array}$$

b)
$$\begin{array}{r} 592 \\ \ \ \ 84 \\ +\ 1758 \\ \hline 2434 \end{array}$$

c)
$$\begin{array}{r} 2007 \\ \ \ \ 748 \\ +\ 1980 \\ \hline 4735 \end{array}$$

d)
$$\begin{array}{r} 6247 \\ 31482 \\ +\ \ \ 3760 \\ \hline 41489 \end{array}$$

4

Calculate as simply as possible.

a) $472 + 123 - 172 = (472 - 172) + 123 = 300 + 123 = 423$

b) $89 + 111 - 27 + 30 = (89 + 111) + (30 - 27) = 200 + 3 = 203$

c) $216 - 90 - 66 + 39 = (216 + 39) - (90 + 66) = 255 - 156 = 100 - 1 = 99$

d) $426 + 117 - 125 - 67 = (426 - 125) + (117 - 67) = 301 + 50 = 351$

e) $1725 + 310 - 525 + 90 = (1725 - 525) + (310 + 90) = 1200 + 400 = 1600$

5

Do the calculations as quickly as you can and check them mentally with addition.

a)
$$\begin{array}{r} 4840 \\ -\ 2768 \\ \hline 2072 \end{array}$$

b)
$$\begin{array}{r} 5728 \\ -\ 1742 \\ \hline 3986 \end{array}$$

c)
$$\begin{array}{r} 3000 \\ -\ 1642 \\ \hline 1358 \end{array}$$

d)
$$\begin{array}{r} 21305 \\ -\ \ 1488 \\ \hline 19817 \end{array}$$

1

Fill in the missing numbers.

a) $+6+(-3) = \boxed{+3}$ b) $0-(-10) = \boxed{+10}$ c) $-8+(-2) = \boxed{-10}$

d) $-6+(-6) = \boxed{-12}$ e) $-15+(-8) = \boxed{-23}$ f) $-15-(-8) = \boxed{-7}$

2

Complete the statements.

a) $(-2)+(-2)+(-2)+(-2) = \boxed{+4} \times \boxed{-2} = \boxed{-8}$

b) $(-3)+(-3)+(-3)+(-3)+(-3)+(-3)+\ldots = \boxed{-3} = \boxed{-15}$

c) $\boxed{-3}+\boxed{-3}+\boxed{-3}+\boxed{-3}+\boxed{-3}+\boxed{-3}+\boxed{-3} = 7 \times \boxed{-3} = -21$

3

Calculate as simply as possible.

a) $12 \times 12 = 144$ b) $20 \times 20 = 400$ c) $13 \times 13 = 169$ d) $12 \times 21 = 252$

e) $19 \times 20 = 380$ f) $49 \times 8 = 392$ g) $30 \times 31 = 930$ h) $29 \times 12 = 348$

4

Practise long multiplication.

a)

	2	7	4
	×	2	3
	8	2	2
+ 5	4	8	0
6	3	0	2

b)

		4	7
	×	2	6
	2	8	2
+	9	4	0
1	2	2	2

c)

		6	1	2
	×	1	0	7
	4	2	8	4
+ 6	1	2	0	0
6	5	4	8	4

d)

		4	6	7
	×	2	0	5
	2	3	3	5
+ 9	3	4	0	0
9	5	7	3	5

5

Practise mental division.

a) $45 \div 9 = 5$ b) $24 \div 8 = 3$ c) $63 \div 7 = 9$ d) $40 \div 10 = 4$

e) $15 \div 3 = 5$ f) $28 \div 7 = 4$ g) $81 \div 9 = 9$ h) $42 \div 7 = 6$

i) $48 \div 6 = 8$ j) $26 \div 3 = 8\frac{2}{3}$ (or 8, r 2) k) $52 \div 6 = 8\frac{2}{3}$ (or 8, r 4) l) $60 \div 8 = 7\frac{1}{2}$ (or 7, r 4)

6

Practise division.

a) $217 \div 3 = 72\frac{1}{3}$ (or 72, r 1) $2170 \div 30 = 72\frac{1}{3}$ (or 72, r 10) $2170 \div 3 = 723\frac{1}{3}$ (or 723, r 1)

b) $495 \div 5 = 99$ $4950 \div 50 = 99$ $4950 \div 5 = 990$

c) $156 \div 4 = 39$ $1560 \div 40 = 39$ $1560 \div 4 = 390$

7

Practise division.

a)

		8	1	r 3
6	4	8	9	

b)

		4	7	3	r 6
9	4	2	6	3	

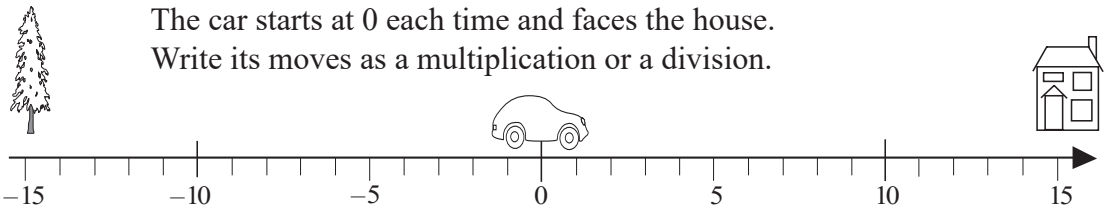
c)

			2	9	2	r 18
2	1	6	1	5	0	

d)

			2	7	r 6
1	8	4	9	2	

1



The car starts at 0 each time and faces the house.
Write its moves as a multiplication or a division.

a) It moves 3.5 units per second for 4 seconds towards the house.

3.5 units × 4 = 14 units

b) It moves 4 units per second for 2.5 seconds towards the tree.

−2.5 × 4 units = −10 units

c) It moves 10 units towards the tree in 3 seconds. How many units does it move each second?

$-10 \text{ units} \div 3 = -3\frac{1}{3} \text{ units}$

d) It moves 25 units towards the tree at a steady speed of 5 units per second. How many seconds does it take?

−25 units ÷ (−5 units) = 5 (seconds)

2

Write these additions as multiplications and calculate the answers.

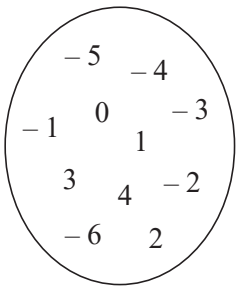
a) $(-7) + (-7) + (-7) + (-7) + (-7) =$ $5 \times -7 = -35$

b) $(-11) + (-11) + (-11) + (-11) + (-11) + (-11) =$ $-11 \times 6 = -66$

c) $(-30) + (-30) + (-30) + (-30) =$ $-30 \times 4 = -120$

3

Do the numbers in the set make the statements true or false? Complete the table.



Statement	Numbers which make it true	Numbers which make it false
$6 - \square = 9$	−3	−6, −5, −4, −2, −1, 0, 1, 2, 3, 4
$6 + \square = 0$	−6	−5, −4, −3, −2, −1, 0, 1, 2, 3, 4
$\square < 2$	−6, −5, −4, −3, −2, −1, 0, 1	2, 3, 4
$3 - \square > 4$	−6, −5, −4, −3, −2	−1, 0, 1, 2, 3, 4
$4 + \square \leq 2$	−6, −5, −4, −3, −2	−1, 0, 1, 2, 3, 4

4

Find a rule and complete the table. Draw a graph to show the data in your exercise book.

x	−3	+4	+1	−5	−2	0	−1	+2	3	−4	+5
y	+2	−5	−2	4	+1	−1	0	−3	−4	3	−6

Rule: $x + y = -1$, or $x = -1 - y$, or $y = -1 - x$

1

Find a rule.

Complete the table.

e.g.

x	4	5	2	4	5	10	6	5	9	3
y	2	3	9	7	5	1	6	4	0	7
z	7	14	17	27	24	9	35	19	-1	20

Rule:

$z = x \times y - 1$

$y = (z + 1) \div x$ where $(y \neq 0)$

$x = (z+1) \div y$ except $y \neq 0$

2

Write a plan and calculate the result. Write the answer as a sentence.

The cost of hiring an 18-seater minibus for a holiday is £1152.

a) How much would it cost per person if 16 people go on this holiday?

Plan: £1152 ÷ 16 = £576 ÷ 8 = £72 *C:*

Answer: . It would cost £72 per person for 16 people. . . . . .

b) If the cost per person was £64, how many people went on the holiday?

Plan: £1152 ÷ £64 = £576 ÷ £32 *C:*
= £72 ÷ £4 = 18 (times)

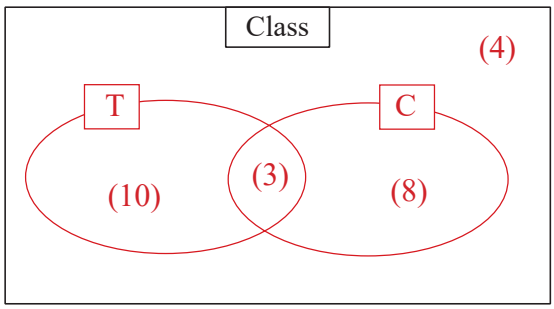
Answer: . 18 people went on holiday at a cost of £64 each. . . . . .

3

The teacher of a class of 25 pupils asked them if they liked tea and coffee.

13 pupils liked tea, 11 pupils liked coffee, 3 pupils liked both tea and coffee, and 4 pupils liked neither tea nor coffee.

How is it possible?
Draw a Venn diagram to show the data.



4

a) A farmer sold 300 chickens for £2.75 each. With the money he received from the sale, he bought 50 geese. What was the price of each goose?

£2.75 × 300 ÷ 50 = £2.75 × 6 = £16.50

Each goose cost £16.50.

b) A typist can type at a rate of 50 words per minute. How long will it take her to type 12 pages which contain 300 words per page?

300 × 12 ÷ 50 = 3600 ÷ 50 = 360 ÷ 5 = 72 (min.)

or 300 ÷ 50 = 6 (min); 6 min × 12 = 72 min

It will take her 72 minutes (or 1 h 12 min) to type 12 pages.

5

The charges for a taxi fare in a city are:

£2.20 for the first 1.5 km and £0.14 for each additional 100 m.

a) How much will it cost for a journey of 4 km?

4 km − 1.5 km = 2.5 km = 2500 m = 25 × 100 m

Cost for 1.5 km: £2.20

Cost for 2.5 km: 14 p × 25 = 250 p + 100 p = £3.50

Total cost: £2.20 + £3,50 = £5.70

b) If the cost of a journey was £7.66, what distance was travelled?

£7.66 − £2.20 = £5.46 = 546 p

14 p → 100 m

546 p → 100 m × (546 ÷ 14)
= 100 m × (273 ÷ 7)
= 3.9 km

Total distance: 3.9 km + 1.5 km = 5.4 km

1

a) In your exercise book, construct the triangle which has:

i) two sides of length 5 cm each and a perimeter of 18 cm
sides of lengths 5 cm, 5 cm and one of 18 cm –(5 + 5) cm = 18 cm – 10 cm = 8 cm

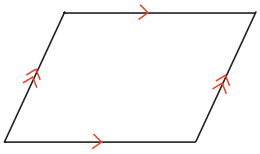
ii) sides of lengths 3 cm, 4 cm and 5 cm

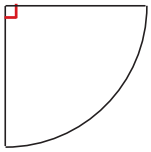
iii) a perimeter of 20 cm, two sides of equal length and its 3rd side 8 cm long. sides of lengths 8 cm, 6 cm and 6 cm

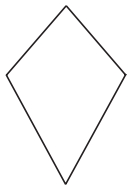
b) Colour the triangle which has a pair of perpendicular sides.
Triangle ii) should be coloured.

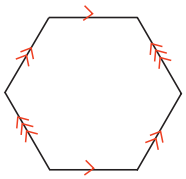
2

Mark on the diagrams the perpendicular and parallel lines.

a) 

b) 

c) 

d) 

3

a) Draw a set of x and y axes in your exercise book.

b) Draw the set of points which are 4 units from the x axis.

c) Draw the set of points which are 2 units from the y-axis.

d) Write the coordinates of the points which satisfy both conditions.
$(-2,-4),(2,-4),(2,4),(-2,4)$

See Lesson Plan for answers.

4

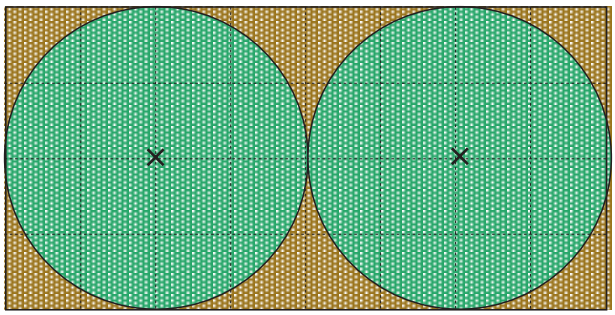
The diagrams show the scale drawing of a garden. *Scale*: 1 cm → 1 m

Garden sprinklers can water an area of soil up to 2 m in any direction. They are always positioned so that they reach as much of the garden as possible.

a) Show on the diagram where 2 sprinklers should be placed.

i) Colour *green* the points reached by the sprinklers.

ii) Colour *brown* the points **not** reached by the sprinklers.

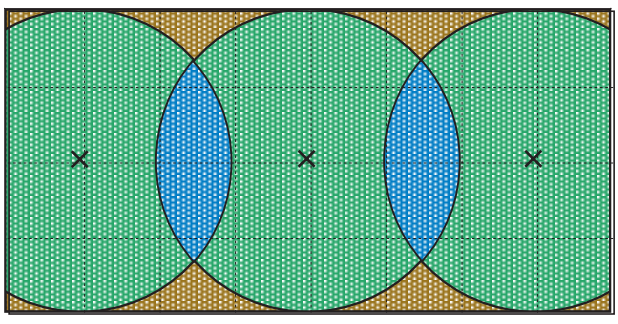


b) Show on the diagram where 3 sprinklers should be placed.

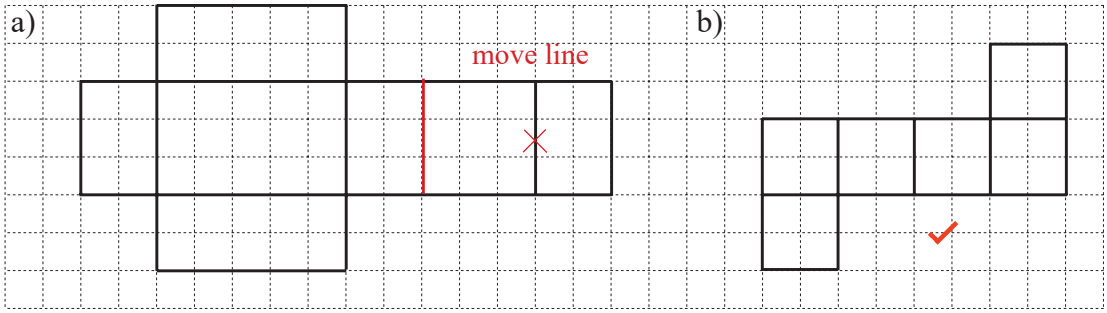
i) Colour *blue* the poi
which are reached
more than one spri

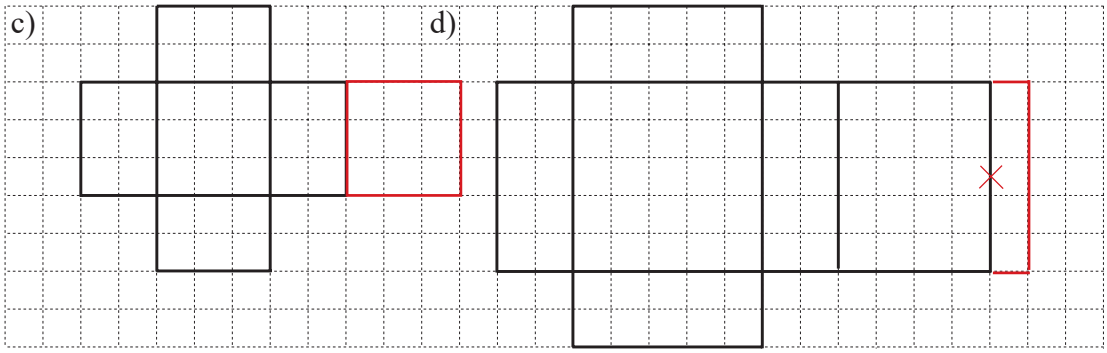
ii) Colour *green* the p
which are reached
just one sprinkler.

iii) Colour *brown* the p
which are not reach
by any sprinkler.

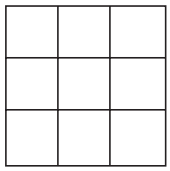


1 These nets should form a solid. Tick them if they do and correct them if they do not.



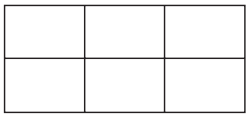


2 a) How many squares can you see in this diagram?



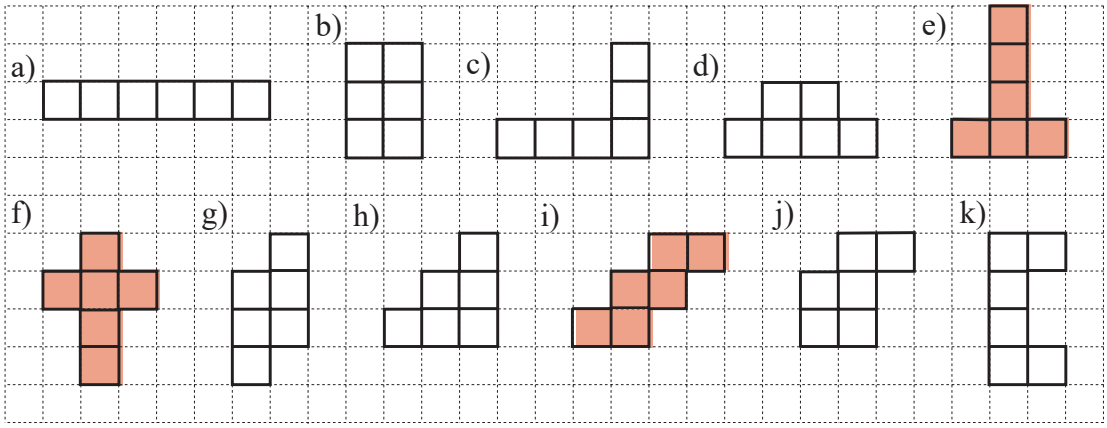
14

b) How many rectangles can you see in this diagram?



18

3 **Hexominoes** are formed by connecting 6 squares along at least one side.
Here are 11 examples of different hexominoes.



i) In your exercise book, draw as many other different hexominoes as you can. How many hexominoes have you found altogether?

35

ii) Colour the hexominoes in the diagram and in your exercise book which could be used as the net for a cube. How many did you colour?

3 in this diagram plus 8 others

1 Measure the angles of this quadrilateral and add them up.

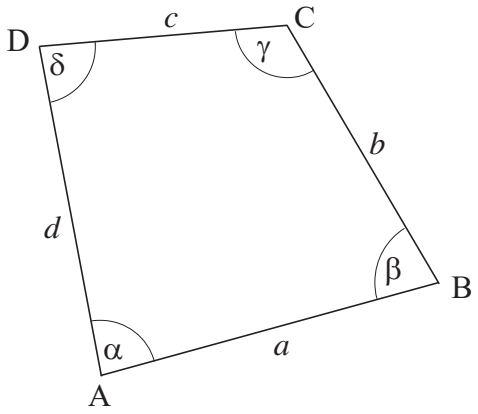
$\alpha \approx$ 85 °

$\beta \approx$ 75 °

$\gamma \approx$ 115 °

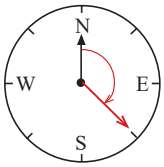
$\delta \approx$ 85 °

$\alpha + \beta + \gamma + \delta \approx$ 360 °



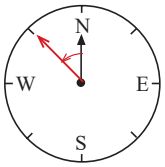
2 Start at the compass direction North and draw the rotations asked for.

Write the new compass directions below the diagrams.

a) 

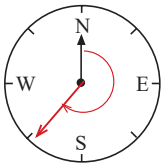
1 and a half right angles clockwise

South East

b) 

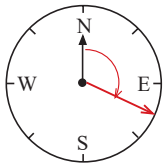
half a right angle anti-clockwise

North West

c) 

2 and a half right angles clockwise

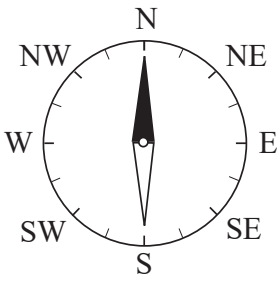
South West

d) 

1 and a quarter right angles clockwise

East South-East

3 Measure or calculate the angles between the given compass directions.



a) S and W 90°

b) S and NE 135°

c) E and SW 135°

d) N and SE 135°

e) NW and SW 90°

f) NW and E 135°

g) SSW and SE 67.5°

h) SSW and NNE 180°

4

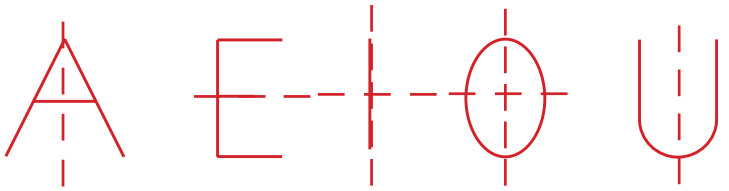
a) You are facing North and turn clockwise to face South-East.
Through what angle do you turn? −135°

b) You are facing North-West and turn anti-clockwise through 90°.
In which direction are you now facing? SW

c) After turning anti-clockwise through 225°, you are facing East.
In which direction were you facing at the start? NW

d) You make 4 equal turns from NE to SE. What angle is each turn? –22.5°

1 How many lines of symmetry do each of these letters have? Draw them all.

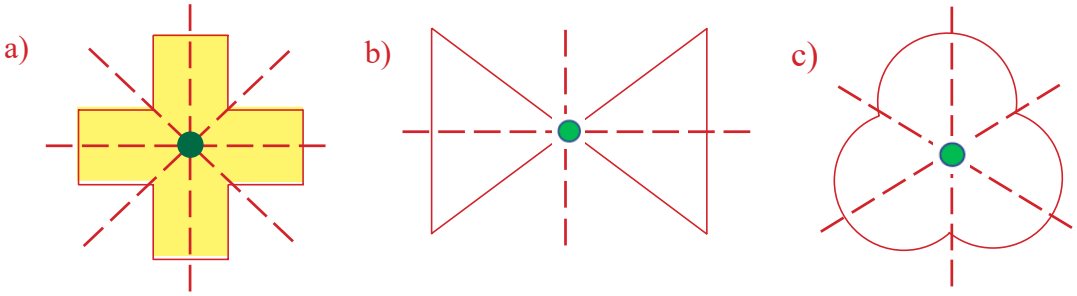


2 If the shape has **line symmetry**, draw the lines of symmetry in *red*.

If the shape has **rotational symmetry**, mark the centre of rotation in *green*.

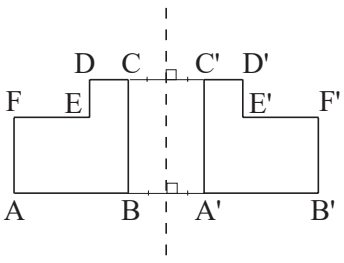
If the shape is a **polygon**, colour it *yellow*.

a) b) c)

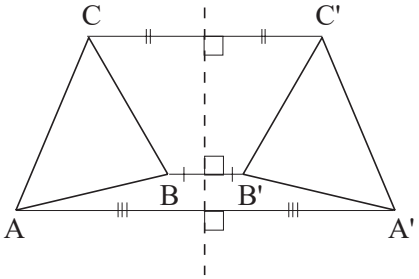


3 **Reflect** each shape in the *mirror line*. Label the corresponding points A', B', etc.

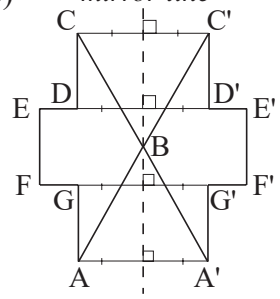
a) *mirror line*



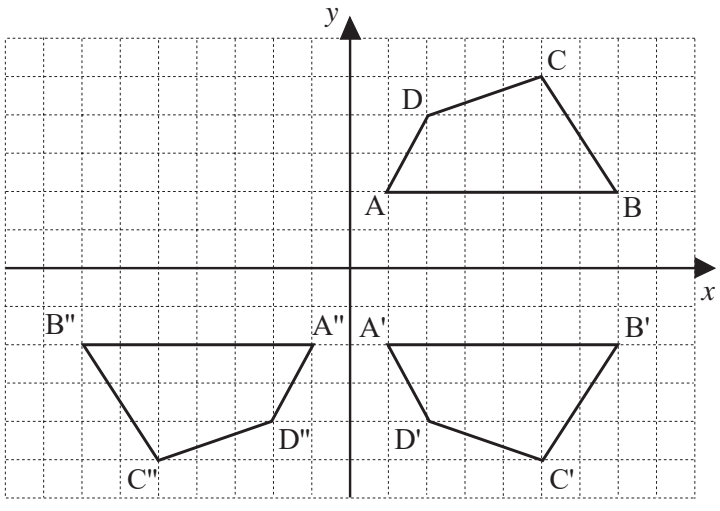
b) *mirror line*



c) *mirror line*



4 **Reflect** the quadrilateral in the x-axis, then **reflect** its image in the y-axis.



a) BC = B'C' T

b) BC = B"C" T

c) BC // B'C' F

d) BC // B"C" T

e) BC $\perp$ B'C' F

1

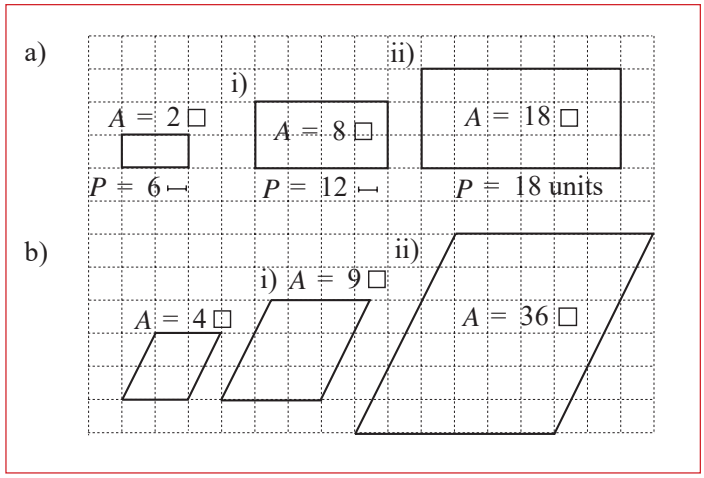
a) **Enlarge** the rectangle in the ratio of:

i) 2:1 ii) 3:1.

Write the area and perimeter of each shape.

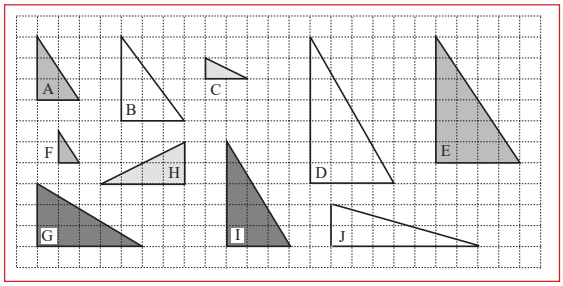
b) **Enlarge** the parallelogram in the ratio of:

i) 3:2 ii) 3:1



2

Colour **similar** triangles in the same colour. Calculate their areas in your exercise book.



A ~ F ~ E, C ~ H, G ≈ I

Areas: A: A = 3 square units B: A = 6 square units

C: A = 1 square unit D: A = 14 square units

E: A = 12 square units F: $A = \frac{3}{4}$ of a square unit

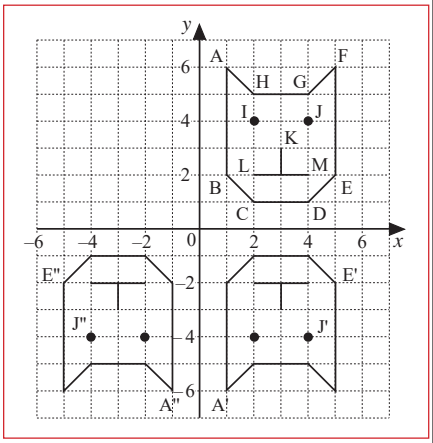
G: $A = 7\frac{1}{2}$ square units H: A = 4 square units

I: A = $7\frac{1}{2}$ square units J: A = 7 square units

3

a) Write the coordinates of these points.

A (1, 6), B (1, 2), C (2, 1), D (4, 1)
E (5, 2), F (5, 6). G (4, 5), H (2, 5),
I (2, 4), J (4, 4), K (3, 3) L (2, 2),
M (4, 2)



b) Reflect the shape in the x-axis.
Write the coordinates of:

A' (1, – 6), E' (5, – 2), J' (4, – 4)

c) Reflect the new shape in the y-axis.
Write the coordinates of:

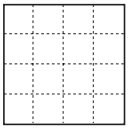
A" (– 1, – 6), E" (– 5, – 2), J" (– 4, – 4)

d) How have the coordinates of the original points changed to make the third shape?

The original coordinates have changed to their opposite values in the 3rd shape.

1

a) 1 unit



If this square is 1 unit, what part of the unit is 1 grid square? $\boxed{\frac{1}{16}}$

b) Compare the fractions. Fill in the missing signs. (<, >, =)

i) $\frac{1}{16} \boxed{<} \frac{3}{16}$ ii) $\frac{5}{16} \boxed{>} \frac{1}{4}$ iii) $\frac{12}{16} \boxed{=} \frac{6}{8}$ iv) $\frac{8}{16} \boxed{>} \frac{7}{16}$

v) $\frac{5}{16} \boxed{<} \frac{1}{2}$ vi) $\frac{1}{4} \boxed{=} \frac{4}{16}$ vii) $\frac{17}{16} \boxed{<} \frac{19}{16}$ viii) $\frac{16}{16} \boxed{>} \frac{7}{8}$

2

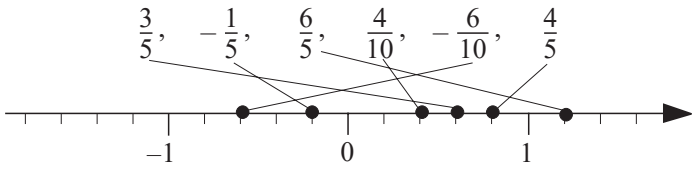
Fill in the missing numerators and denominators.

a) $\frac{4}{12} = \frac{\boxed{1}}{3}$ b) $\frac{3}{\boxed{6}} = \frac{1}{2}$ c) $\frac{15}{20} = \frac{\boxed{3}}{4}$ d) $\frac{\boxed{5}}{10} = \frac{1}{2}$

e) $\frac{5}{\boxed{15}} = \frac{1}{3}$ f) $\frac{4}{8} = \frac{\boxed{16}}{32}$ g) $\frac{3}{7} = \frac{\boxed{9}}{21}$ h) $\frac{\boxed{36}}{48} = \frac{3}{4}$

3

a) Mark these fractions on the number line.



b) List all the fractions in decreasing order.

$\frac{6}{5} > \frac{3}{5} > \frac{4}{5} > \frac{4}{10} > -\frac{1}{5} > -\frac{6}{10}$

4

Compare the quantities. Fill in the missing signs. (>, <, =)

a) $1\frac{1}{2}$ litres $\boxed{=}$ 1500 ml b) $1\frac{1}{4}$ litres $\boxed{<}$ 1500 ml

c) $1\frac{2}{3}$ hours $\boxed{=}$ 100 minutes d) $1\frac{1}{3}$ days $\boxed{>}$ 30 hours

e) $2\frac{1}{4}$ km $\boxed{<}$ 2500 m f) $1\frac{2}{3}$ years $\boxed{=}$ 20 months

g) $1\frac{1}{20}$ m $\boxed{=}$ 105 cm h) $1\frac{4}{5}$ kg $\boxed{>}$ 1400 g

5

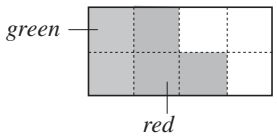
Compare the fractions. Fill in the missing signs. (<, >, =)

a) $\frac{3}{4} \boxed{<} \frac{7}{8}$ b) $\frac{1}{7} \boxed{<} \frac{1}{6}$ c) $-\frac{2}{9} \boxed{>} -\frac{1}{3}$ d) $\frac{4}{10} \boxed{=} \frac{20}{50}$

e) $\frac{2}{3} \boxed{<} \frac{3}{4}$ f) $\frac{1}{7} \boxed{=} \frac{4}{28}$ g) $\frac{30}{25} \boxed{<} \frac{25}{20}$ h) $\frac{15}{45} \boxed{=} \frac{2}{6}$

1

Jim planted 3 eighths of his vegetable garden with beetroot and one quarter of it with leeks.



a) Shade the part used for beetroot in *red* and the part used for leeks in *green*.

b) What part of the vegetable garden has not yet been used?

$\frac{3}{8}$

2

a) $a = \frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$ b) $b = \frac{5}{7} - \frac{1}{7} = \frac{4}{7}$ c) $c = \frac{9}{5} - \frac{7}{5} = \frac{2}{5}$

d) $d = \frac{4}{9} + \frac{5}{9} = \frac{9}{9} = 1$ e) $e = 2 - \frac{3}{8} = 1\frac{5}{8}$ f) $f = \frac{7}{6} - 1 = \frac{7}{6} - \frac{6}{6} = \frac{1}{6}$

3

Solve the problems in your exercise book.

a) John has £7 left.

b) i) Sally gave 60 stamps to her brother.

ii) Sally still has 120 stamps left.

4

Calculate the sums and differences.

a) $\frac{3}{5} + \frac{3}{10} = \frac{6+3}{10} = \frac{9}{10}$ b) $\frac{7}{8} + \frac{1}{4} = \frac{7+2}{8} = \frac{9}{8}$

c) $\frac{1}{2} + \frac{1}{10} - \frac{2}{5} = \frac{5+1-4}{10} = \frac{2}{10} = \frac{1}{5}$ d) $\frac{4}{11} + \frac{5}{11} - \frac{2}{11} = \frac{4+5-2}{11} = \frac{7}{11}$

e) $\frac{7}{12} - \frac{1}{3} = \frac{7-4}{12} = \frac{3}{12} = \frac{1}{4}$ f) $\frac{5}{7} - \frac{5}{21} = \frac{15-5}{21} = \frac{10}{21}$

g) $\frac{2}{3} + \frac{2}{9} - \frac{3}{18} = \frac{12+4-3}{18} = \frac{13}{18}$ h) $\frac{1}{4} + \frac{3}{8} - \frac{5}{16} = \frac{4+6-5}{16} = \frac{5}{16}$

i) $1\frac{1}{5} - \frac{3}{10} = \frac{6}{5} - \frac{3}{10} = \frac{12-3}{10} = \frac{9}{10}$

5

a) What has been done to $\frac{7}{8}$ to get $1\frac{1}{2}$? $1\frac{1}{2} - \frac{7}{8} = \frac{3}{2} - \frac{7}{8} = \frac{12}{8} - \frac{7}{8} = \frac{5}{8}$

b) What has been done to $\frac{10}{17}$ to get 2? $2 - \frac{10}{17} = \frac{34}{17} - \frac{10}{17} = \frac{24}{17} = 1\frac{7}{17}$

c) What has been done to $\frac{3}{10}$ to get $\frac{3}{5}$? $\frac{3}{5} - \frac{3}{10} = \frac{6-3}{10} = \frac{3}{10}$

d) What has been done to 3 to get $\frac{3}{4}$? $3 - \frac{3}{4} = \frac{12}{4} - \frac{3}{4} = \frac{9}{4} = 2\frac{1}{4}$

1 Calculate the quantities.

a) $\frac{3}{4}$ of 12 hours $= 12 \text{ hours} \div 4 \times 3 = 3 \text{ hours} \times 3 =$ 9 hours

b) $\frac{4}{5}$ of 200 m $= 200 \text{ m} \div 5 \times 4 = 40 \text{ m} \times 4 =$ 160 m

c) $\frac{4}{3}$ of 60 kg $= 60 \text{ kg} \div 3 \times 4 = 20 \text{ kg} \times 4 =$ 80 kg

d) $3\frac{1}{8}$ times 40 litres $= 3 \times 40 + \frac{1}{8}$ of 40 litres

$= 120 \text{ litres} + 40 \text{ litres} \div 8 = 120 \text{ litres} + 5\text{litres} =$ 125 litres

2 Calculate the whole quantity if:

a) $\frac{3}{4}$ of it is 12 hours $\frac{4}{4} \rightarrow 12 \text{ hours} \div 3 \times 4 = 4 \text{ hours} \times 4 =$ 16 hours

b) $\frac{4}{5}$ of it is 200 m $\frac{5}{5} \rightarrow 200 \text{ m} \div 4 \times 5 = 50 \text{ m} \times 5 =$ 250 m

c) $\frac{4}{3}$ of it is 60 kg $\frac{3}{3} \rightarrow 60 \text{ kg} \div 4 \times 3 = 15 \text{ kg} \times 3 =$ 45 kg

d) $3\frac{1}{8}$ times it is 50 litres $\frac{8}{8} \rightarrow 50 \text{ litres} \div 25 \times 8 = 2 \text{ litres} \times 8 =$ 16 litres

3 The farmer had some chickens. He sold $\frac{5}{8}$ of them and had 180 chickens left.

How many chickens did the farmer have at first? 480 (chickens)

4 Exchange the quantities.

a) $\frac{1}{2}$ min = 30 sec b) $\frac{7}{10}$ kg = 700 g c) $\frac{2}{5}$ km = 400 m

d) $\frac{3}{10}$ litre = 300 ml e) $\frac{1}{6}$ hour = 10 min f) $\frac{3}{4}$ yr = 9 month

g) 40 cl = $\frac{2}{5}$ litre h) 75 cm = $\frac{3}{4}$ m i) 200 g = $\frac{1}{5}$ kg

j) 40 min = $\frac{2}{3}$ hour k) 6 hours = $\frac{1}{4}$ day l) 3 days = $\frac{3}{7}$ week

5 Solve these problems in your exercise book.

a) Ann bought some mini chocolate eggs. She gave half of them to her nephews and nieces and used a quarter of them to decorate her Easter cake. She had 9 eggs left. How many mini chocolate eggs did she buy? 36 eggs

b) Mary made 96 small cakes. She took 2 thirds of them to the school fair and gave an eighth of them to her neighbours. How many cakes did Mary have left?

20 cakes

1 Practise calculation. Write details in your exercise book.

a) $\frac{3}{8}+\frac{7}{20}=\frac{29}{40}$ b) $\frac{4}{7}+\frac{11}{21}=1\frac{2}{21}$ c) $\frac{2}{9}+\frac{3}{8}=\frac{43}{72}$

d) $\frac{5}{6}-\frac{1}{3}=\frac{1}{2}$ e) $\frac{5}{12}-\frac{1}{3}=\frac{1}{12}$ f) $\frac{11}{15}-\frac{3}{5}=\frac{2}{15}$

g) $\frac{3}{4}\times 8=6$ h) $\frac{2}{15}\times 5=\frac{2}{3}$ i) $\frac{7}{8}\times 4=3\frac{1}{2}$

j) $\frac{5}{9}\div 5=\frac{1}{9}$ k) $\frac{4}{7}\div 2=\frac{2}{7}$ l) $\frac{3}{8}\div 4=\frac{3}{32}$

2 Which natural numbers could be written instead of each of the shapes?

a) $\frac{\bigcirc}{7}<\frac{5}{7}$ b) $\frac{3}{23}<\frac{\triangle}{23}<\frac{8}{23}$ c) $\frac{9}{5}-\frac{\cap}{10}>1$

$\bigcirc$: 4, 3, 2, 1 $\triangle$: 4, 5, 6, 7 $\frac{18}{10}-\frac{\cap}{10}>\frac{10}{10}$

$\cap$: 1, 2, 3, 4, 5, 6, 7

3 Solve the equations and inequality. Check your solutions.

a) $x\times 3=\frac{2}{5}$ b) $y+3\times y=\frac{20}{3}$ c) $5\times z-z<\frac{4}{7}$

$x=\frac{2}{15}$ $y=1\frac{2}{3}$ $z<\frac{1}{7}$

4 Answer each question by writing a division. Use the diagram to help you.

a) half of a quarter $=\frac{1}{4}\div 2=\frac{1}{8}$

b) a quarter of a half $=\frac{1}{2}\div 4=\frac{1}{8}$

c) a quarter of a quarter $\frac{1}{4}\div 4=\frac{1}{16}$

d) a third of 9 sixteenths $=\frac{9}{16}\div 3=\frac{3}{16}$

5 a) The perimeter of a square flower-pot is 3 quarters of a metre in length.

What is the length of each side: i) $\frac{3}{16}$ m ii) $18\frac{3}{4}$ cm

b) Sally poured 2 thirds of a litre of fruit juice equally into 4 cups.
How much fruit juice was in each cup?

i) $\frac{1}{6}$ litre ii) $18\frac{2}{3}$ cl

1

Write the sums as decimals in the place-value table, then add them up.

a) $18 + \frac{7}{10} + \frac{3}{1000} = 18 + \frac{703}{1000} = 18.703$

b) $\frac{8}{100} + \frac{7}{1000} = \frac{87}{1000} = 0.087$

c) $70 + \frac{3}{10} + \frac{8}{1000} = 70 + \frac{308}{1000} = 70.308$

d) $8 + \frac{1}{100} + \frac{37}{1000} = 8 + \frac{47}{1000} = 8.047$

	T	U	t	h	th
a)	1	8	7	0	3
b)		0	0	8	7
c)	7	0	3	0	8
d)		8	0	4	7
Total	9	7	1	4	5
	1	1	1	2	

2

Compare the decimal numbers. Fill in the missing signs. (<, > or =)

a) 5.89 [<] 5.98 b) 0.03 [<] 0.3 c) 3.087 [<] 3.1 d) 1.45 [>] 1.145

e) 4.0 [=] 4 f) 0.699 [<] 0.7 g) 8.1 [=] 8.10 h) 7.099 [<] 7.1

3

Write these numbers in increasing order.

a) 0.008, 0.09, 0.08, 0.009, 0.89 — 0.008, 0.009, 0.08, 0.09, 0.89

b) 3.25, 3.205, 3.025, 3.502, 3.52 — 3.025, 3.205, 3.25, 3.502, 3.52

c) 4.386, 4.683, 4.638, 4.9, 4.099 — 4.099, 4.386, 4.638, 4.683, 4.9

4

Practise addition and subtraction. Check the subtractions in your exercise book.

a)
$$\begin{array}{r} 273 \\ 675 \\ +\ 083 \\ \hline 3488 \end{array}$$

b)
$$\begin{array}{r} 270 \\ 627 \\ +\ 89 \\ \hline 1217 \end{array}$$

c)
$$\begin{array}{r} 007 \\ 101 \\ +\ 385 \\ \hline 1402 \end{array}$$

d)
$$\begin{array}{r} 200 \\ 099 \\ +\ 455 \\ \hline 2554 \end{array}$$

e)
$$\begin{array}{r} 3763 \\ -\ 2331 \\ \hline 1432 \end{array}$$

f)
$$\begin{array}{r} {\scriptstyle 10\ \ 10} \\ 1421.5 \\ -\ 31.6 \\ \hline 1385.5 \end{array}$$

g)
$$\begin{array}{r} {\scriptstyle 10\ \ 10} \\ 861 \\ -\ 51.25 \\ \hline 805.5 \end{array}$$

h)
$$\begin{array}{r} {\scriptstyle 10\ \ 10\ \ 10} \\ 700 \\ -\ 31.41.29 \\ \hline 35.71 \end{array}$$

5

Fill in the missing numbers.

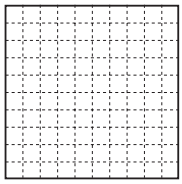
a) 7.2 litres = [7] litres [20] cl = [720] cl = [7] litres [200] ml = [7200] ml

b) [2.803] km = [2] km [803] m = 2803 m = [280 300] cm

c) [2.047] kg = 2 kg 47 g = [2047] g

d) [11 700] sec = [195] min = [3] hours [15] min = 3.25 hours

1 Use the diagram to help you do this addition in different ways.



$$0.2 + \frac{1}{10} + \frac{37}{100} + 0.17 + \frac{3}{100}$$

a) fractions: $0.2 + \frac{1}{10} + \frac{37}{100} + 0.17 + \frac{3}{100}$

$$= \frac{2}{10} + \frac{1}{10} + \frac{37}{100} + \frac{17}{100} + \frac{3}{100}$$

$$= \frac{20 + 10 + 37 + 17 + 3}{100} = \frac{87}{100}$$

b) decimals: $0.2 + 0.1 + 0.37 + 0.17 + 0.03 = 0.87$

c) percentages: $20\% + 10\% + 37\% + 17\% + 3\% = 87\%$

2 Practise calculation.

a)	$0.4 \times 100 = 40$	b)	$5.62 \times 10 = 56.2$	c)	$684 \div 10 = 68.4$
d)	$68.4 \div 10 = 6.84$	e)	$0.09 \times 10 = 0.9$	f)	$0.37 \times 100 = 37$
g)	$14.3 \div 10 = 1.43$	h)	$20.5 \div 10 = 2.05$	i)	$0.49 \div 10 = 0.049$
j)	$0.06 \times 100 = 6$	k)	$4.274 \times 10 = 42.74$	l)	$0.037 \times 100 = 3.7$

3 a) Calculate $\frac{2}{5}$ of 760 km. 304 km

b) Calculate 20% of 760 km. 152 km

c) Calculate 0.6 of 760 km. 456 km

4 Find a rule and complete the table. Write the rule in different ways.

x	0.2	3	$\frac{2}{5}$	2	$\frac{3}{5}$	$\frac{1}{6}$	$\frac{1}{7}$	**0.7**	9.2	0.5	$-\frac{1}{20}$	**0.15**
y	1.0	15	2	**10**	**3**	$\frac{5}{6}$	$\frac{5}{7}$	3.5	**46**	**2.5**	$-\frac{1}{4}$	0.75

Rule: $x = y \div 5$, $y = 5 \times x$, $y \div x = 5$, $x \div y = \frac{1}{5}$

5 Compare each pair of numbers. Fill in the missing signs. (<, > or =)

a)	$\frac{47}{100}$ [>]	0.047	b)	0.205 [>]	$\frac{25}{1000}$	c)	$3\frac{3}{5}$ [<]	3.69
d)	$\frac{3}{5}$ [>]	0.065	e)	0.35 [=]	$\frac{35}{100}$	f)	0.87 [>]	$\frac{78}{100}$

6 Alan mixed 2.4 litres of *white* paint with 7 litres of *red* paint to make *pink* paint.
He used all the *pink* paint to paint 4 **identical** rooms.

How many litres of paint did he use for each room? [2.35] litres

1 Practise mental division.

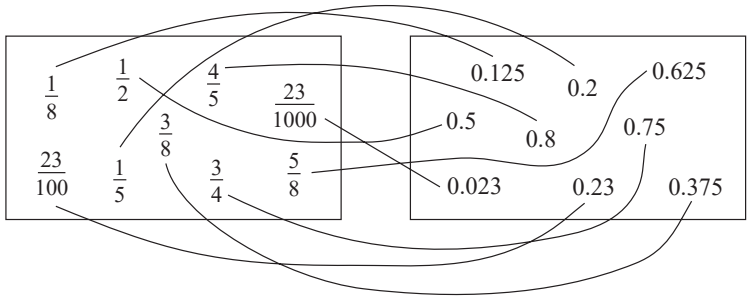
a) i) $72 \div 8 = 9$ ii) $7.2 \div 8 = 0.9$ iii) $0.72 \div 8 = 0.09$

b) i) $49 \div 7 = 7$ ii) $4.9 \div 7 = 0.7$ iii) $0.49 \div 7 = 0.07$

c) i) $55 \div 5 = 11$ ii) $5.5 \div 5 = 1.1$ iii) $0.55 \div 5 = 0.11$

d) i) $63 \div 9 = 7$ ii) $6.3 \div 9 = 0.7$ iii) $0.063 \div 9 = 0.007$

2 Join up the fractions and decimals which have the same value.



List the numbers in decimal form in decreasing order.

0.8 > 0.75 > 0.625 > 0.5 > 0.375 > 0.23 > 0.2 > 0.125 > 0.023

3 One side of a rectangle is 2.35 m in length.

The **adjacent** side is twice as long.

What is the length of:

a) the adjacent side 4.7 m

b) the perimeter? 14.1 m

4 Solve these problems in your exercise book.

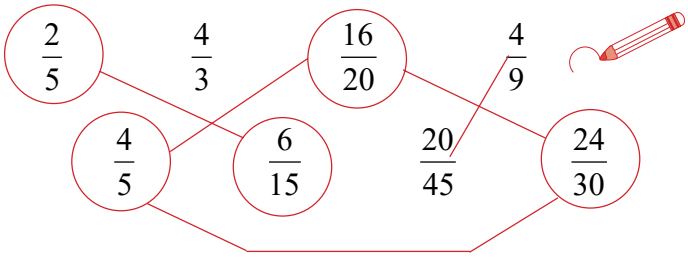
a) At 16:30 hours, Ben's temperature was 36.9 °C. It rose by 0.4 °C every hour. What was Ben's temperature at 20:00 hours? 38.3 °C

b) Suzy bought 10 apples and 8 pears. The apples cost £0.35 each and a pear cost twice as much as an apple. How much did Suzy pay altogether? £ 9.10

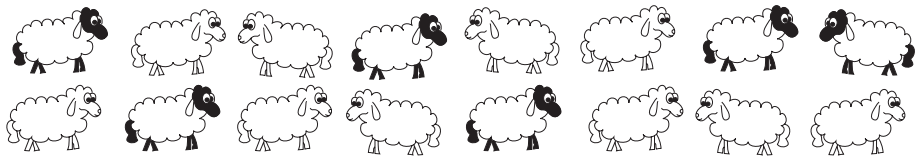
c) A 2.5 m length was cut from a ball of string of total length 13 m. The remaining string was cut into 6 equal pieces. How long was each piece? 1.75 m

5 Circle the fractions which have **finite** decimal form.

Join up any equal fractions.



1 There are 6 *black*-faced and 10 *white*-faced sheep in a field. Write the parts and ratios required.



a) What is the ratio of *black*-faced to *white*-faced sheep? B : W = 6 : 10

b) What is the ratio of *white-faced* to *black-faced* sheep? W : B = 10 : 6

c) What fraction of the sheep have:

i) *white* faces $\frac{5}{8}$ ii) *black* faces? $\frac{3}{8}$

2 How certain are you of these outcomes occurring? Write **C** for **certain**, **P** for **possible but not certain** or **I** for **impossible**.

a) The final of the next *Football World Cup* will be in 2025. I

b) The next time I toss a coin I will get a *Head* or a *Tail*. C

c) The next time I throw two dice the total will be more than 6. P

d) The next time I throw two dice the total will be more than 12. I

e) It will rain next week in my home town. P

3 In a bag there are 40 marbles altogether. The marbles are either *red* or *blue*. The ratio of *red* marbles to *blue* marbles is 1 : 3.

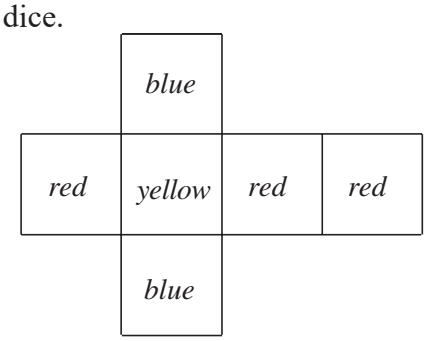
a) How many marbles are there of each colour? *red* 10 *blue* 30

b) If you take a marble out of the bag with your eyes shut, what is the **probability** that it will be:

i) *blue* $\frac{3}{4}$ ii) not *blue*? $\frac{1}{4}$

4 Imagine this net folded to make a cube and used as a dice.

If the dice is rolled, what is the probability that the square facing up is:



a) *red* $\frac{1}{2}$ b) *blue* $\frac{1}{3}$

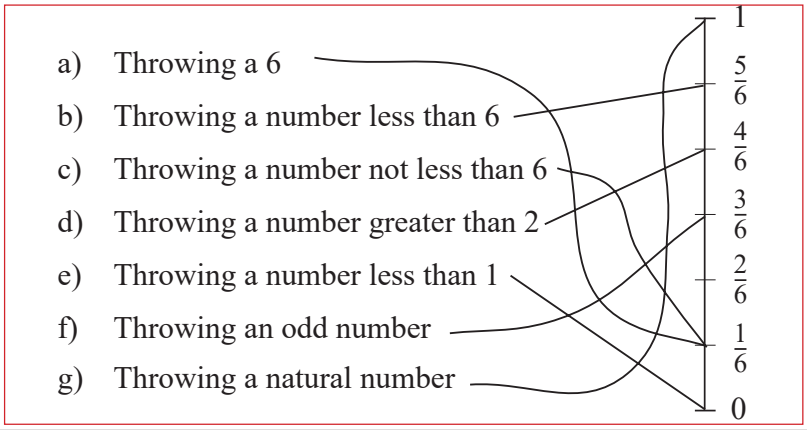
c) *yellow* $\frac{1}{6}$ d) not *red*? $\frac{1}{2}$

1

When we throw an **unbiased** dice, there are 6 equally likely outcomes:

1, 2, 3, 4, 5 or 6

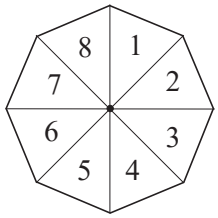
Show the probability of each of these outcomes by joining it to the correct point on the probability scale.



2

The diagram shows a spinner used in a board game.

When the spinner is spun, what is the probability that it lands on:



a) 1 $\frac{1}{8}$ b) 8 $\frac{1}{8}$

c) an even number $\frac{1}{2}$ d) a number less than 8 $\frac{7}{8}$

e) a number greater than 8 0 f) a number greater than 0? 1

3

In a lottery, 2 numbers are drawn from the numbers 1, 2, 3, 4 and 5. Each number has an equal chance of being drawn.

a) List all the possible outcomes if the order of the two numbers does not mattter.

1, 2 2, 3 3, 4 4, 5
1, 3 2, 4 3, 5
1, 4 2, 5
1, 5

(10 possible outcomes with equal probability)

b) What is the probability of each of these outcomes happening?

i) The numbers are 1 and 2. $\frac{1}{10}$ ii) One number is 1. $\frac{2}{5}$

iii) One of the numbers is either 1 **or** 2. $\frac{7}{10}$

4

In a box of 30 coloured pencils, there are *red*, *green* and *blue* pencils. The ratio of *red* to *green* to *blue* is 4 : 5 : 6. How many pencils of each colour are in the box?

red 8 *green* 10 *blue* 12

1

A bag of sweets contains 8 mints, 6 toffees and 2 boiled fruits, all wrapped in foil and all the same size and shape.

You take one sweet from the bag with your eyes closed. What is the probability that it is:

a) a mint $\frac{1}{2}$ b) a toffee $\frac{3}{8}$ c) a boiled fruit $\frac{1}{8}$

d) **not** a mint $\frac{1}{2}$ e) **not** a toffee $\frac{5}{8}$ f) a mint **or** a toffee? $\frac{7}{8}$

2

If the wheel is spun, what is the probability of each outcome? Complete the table.

Outcome	1	2	3	4	5	6	7	8	≥ 7	≤ 4	prime number
Probability	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{2}{8}$	$\frac{4}{8}$	$\frac{4}{8}$
									$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{2}$

N.B. 1 is not a prime number as it has only one factor, 1.
A prime number has 2 factors, itself and 1.

3

A dice is thrown 100 times and a tally is kept of the numbers thrown.

The table shows the number of times (**frequency**) that each number (**outcome**) is thrown.

Outcome	1	2	3	4	5	**6**
Frequency	12	11	14	13	26	24
Relative frequency	$\frac{12}{100}$	$\frac{11}{100}$	$\frac{14}{100}$	$\frac{13}{100}$	$\frac{26}{100}$	$\frac{24}{100}$

a) Fill in the bottom row of the table to show the relative frequency.

b) Do you think that the dice is **biased** or **unbiased**? Biased

Give a reason for your answer.

If it was a fair dice we would expect each outcome to have the same frequency but 5 and 6 were thrown almost twice as often as other numbers.

4

A bag contains 100 balls, each marked with a natural number from 1 to 100.
You take out a ball with your eyes closed. What is the probability that it is:

a) an even number $\frac{1}{2}$ b) a multiple of 3 $\frac{33}{100}$

c) **not** a multiple of 3 $\frac{67}{100}$ d) a multiple of 10 $\frac{10}{100} = \frac{1}{10}$

e) **not** a multiple of 10 $\frac{9}{10}$ f) a square number? $\frac{10}{100} = \frac{1}{10}$

1 Mike is growing two different varieties of tomato plants in his greenhouse.

During one week, he keeps a record of the number of tomatoes he picks from each type of plant and notes the data in a table.

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Variety A	5	5	4	1	0	2	5
Variety B	5	3	3	3	7	9	6

a) For **Variety A**, what is the:

i) Mode: 5 ii) Median: 4 iii) Mean: $\frac{22}{7} = 3\frac{1}{7}$

b) For **Variety B**, what is the:

i) Mode: 3 ii) Median: 5 iii) Mean: $\frac{36}{7} = 5\frac{1}{7}$

c) Compare the two sets of data. Which variety do you think is best and why?

Variety B is best, as it produces more tomatoes per day on average.

2 A group of pupils took tests in 4 subjects: English, Mathematics, History and Geography. Each test was out of 10 marks. The teacher wrote the results in this table.

	English	Mathematics	History	Geography	Mean mark per pupil
Anne	7	8	6	7	**7**
Brenda	8	8	7	5	**7**
Claire	9	10	9	8	**9**
Darren	7	9	9	7	**8**
Ella	10	9	5	8	**8**
Freddy	8	10	6	5	**7.25**
Graham	7	9	7	9	**8**
Mean mark per subject	**8**	**9**	**7**	**7**	

a) Complete the table by calculating: i) the mean mark per **pupil**

ii) the mean mark per **subject**.

b) Which pupil did best overall? Claire

c) Which subject did the pupils find: i) easiest Pupils found the Mathematics test easiest.

ii) most difficult? Pupils found History and Geography equally most difficult.

1 Practise calculation.

a) $\frac{3}{5} + \frac{4}{5} + \frac{7}{10} = 2\frac{1}{10}$

b) $\frac{3}{8} + \frac{1}{7} = \frac{29}{56}$

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

d) $\frac{5}{7} - \frac{3}{7} = \frac{2}{7}$

e) $1\frac{5}{6} - \frac{2}{3} = 1\frac{1}{6}$

f) $\frac{7}{9} - \frac{1}{3} - \frac{1}{9} = \frac{1}{3}$

2 Practise calculation.

a) $\frac{2}{3} \times 4 = 2\frac{2}{3}$

b) $\frac{3}{4} \times 8 = 6$

c) $\frac{3}{8} \times 5 = 1\frac{7}{8}$

d) $\frac{1}{3} \div 2 = \frac{1}{6}$

e) $\frac{6}{7} \div 3 = \frac{2}{7}$

f) $\frac{5}{9} \div 5 = \frac{1}{9}$

3

a)

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

b)

	7	8	3	9
−	4	9	5	3
	2	8	8	6

c)

	2	7	
×	9		
2	4	3	

d)

		7	5	1
6	4	5	0	6

4 What is the largest possible, 3-digit, positive integer which fulfils **both** conditions?

- If it is muliplied by 3, the result is also a 3-digit number. $999 \div 3 = 333$ (3 digits)
- If it is multiplied by 4, the result is a 4-digit number. $333 \times 4 = 1332$ (4-digits)

Largest possible number which fulfils both conditions is 333.

5 In a school the ratio of boys to girls in Year 5 is 5 : 7. There are 12 more girls than boys in Year 5. How many pupils are in Year 5?

72 pupils

6 What is the smallest possible natural number that has a remainder of 1 when divided by 2, 3, 4, 5 or 6 but which can be divided by 7 exactly?

301

7 What are the four consecutive **odd** numbers which add up to 80?

17 19 21 23

1

Do each calculation in two different ways.

a) $720 - (320 + 150) = 720 - 320 - 150 = 400 - 150 = 250$
or $= 720 - 470 = 250$

b) $720 - (320 - 150) = 720 - 320 + 150 = 400 + 150 = 550$
or $= 720 - 170 = 550$

c) $40 \times (11 + 29) = 40 \times 11 + 40 \times 29 = 440 + 1160 = 1660$
or $= 40 \times 40 = 1660$

d) $(300 - 270) \times 7 = 300 \times 7 - 270 \times 7 = 2100 - 1890 = 210$
or $= 30 \times 7 = 210$

e) $(90 + 60) \div 15 = 90 \div 15 + 60 \div 15 = 6 + 4 = 10$
or $= 150 \div 15 = 10$

f) $500 \div (20 \times 5) = 500 \div 20 \div 5 = 25 \div 5 = 5$
or $= 500 \div 100 = 5$

2

Compare the amounts. Fill in the missing signs. (<, > or =)

a) $\frac{1}{2}$ of 60 [=] 50% of 60

b) 40% of 50 m [=] 20% of 100 m

c) $\frac{3}{4}$ of £100 [>] 70% of £100

d) 30% of 90 kg [<] 20% of 150 kg

e) 20% of 5 km [=] $\frac{2}{10}$ of 5 km

f) $\frac{3}{5}$ of £70 [<] 60% of £75

g) 75% of 2 litres [<] 1.75 litres

h) $\frac{1}{10}$ of 42 km [>] 0.42 km

i) 105% of 10 litres [<] $1\frac{1}{5}$ of 10 litres [>] 10.5 litres

3

What is the greatest 3-digit, natural number in which the product of its digits is 72?

Check:

981

4

In a **magic square**, the sum of the numbers in each row, column and diagonal is the same. Complete these magic squares.

a)

6	11	7
9	8	7
9	5	10

b)

10	3	8
5	7	9
6	11	4

c)

14	7	12
9	11	13
10	15	8

1 Decide whether the statements are *true* or *false*. Write T or F in the boxes.

a) All squares are rectangles. T

b) All squares are parallelograms. T

c) The diagonals of any parallelogram are not equal in length. F

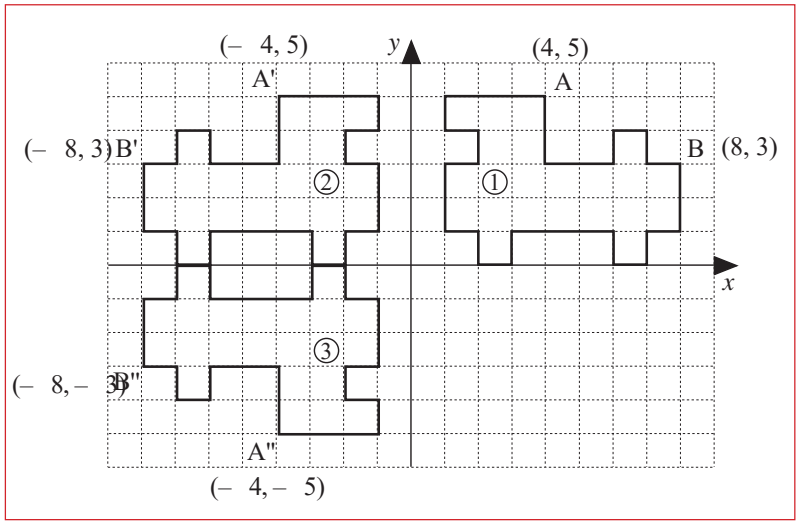
d) Every parallelogram which has perpendicular diagonals is a square. F

e) Not every parallelogram with equal sides is a square. T

f) A parallelogram with equal sides and equal angles is a square. T

2 Follow these instructions.

a) to c)



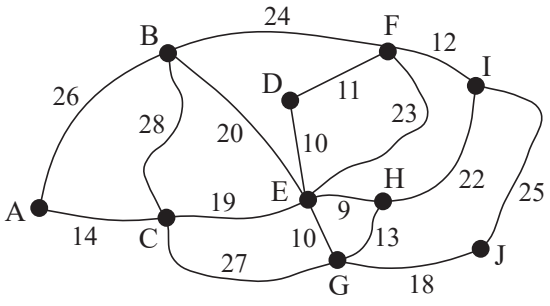
d) Which single transformation will take shape 1 to shape 3 ?

Rotation by 180° around the origin or Reflection in the origin

3 A travelling salesman is planning his weekly trip to all the towns on this map.

On the map, the letters are the towns, the lines are the roads and the numbers are the distances in km between towns.

The salesman must start and finish at **A** and must visit every town at least once.



a) Several possible routes:

e.g. visiting every town apart from A only once: ABFDEHIJGCA

Total distance:

26 + 24 + 11 + 10 + 9 + 22 + 25 + 18 + 27 + 14 = 186 km

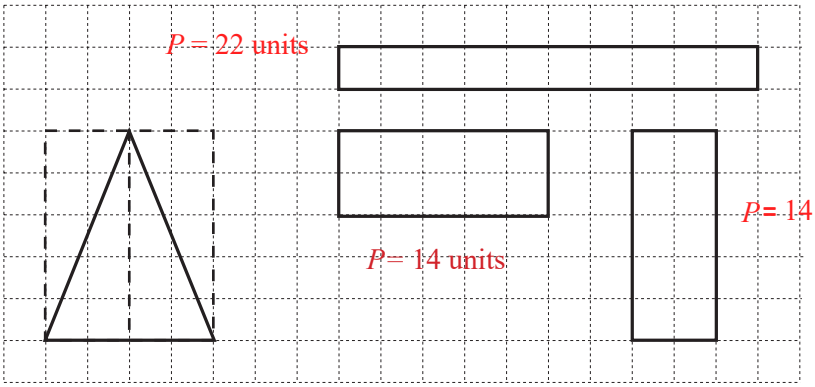
b) Shortest possible distance: ABEDFIJGHECA

Total distance:

26 + 20 + 10 + 11 + 12 + 25 + 18 + 13 + 9 + 19 + 14 = 177 km

(This route visits E twice but is valid as the salesman must visit every town at least once.)

1 On the grid, draw 3 different rectangles which have the same area as the shaded triangle. Calculate the **perimeter** of each rectangle.



What are the lengths of the sides of the rectangle which has the shortest possible perimeter?

In whole units:

a = 5 units b = 2 units

or *vice versa*

2 The numbers represented by the square must be a multiple of 3 and greater than 12.

List all the natural numbers which make the inequality true.

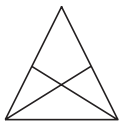
$$11 < (\square \div 3 - 4) \times 3 < 31$$

$\square$: 24, 27, 30, 33, 36, 39, 42 (multiples of 3)

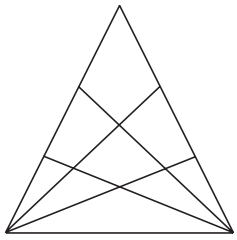
3 How many triangles can you see in each of these diagrams?

a) 

1 triangles

b) 

8 triangles

c) 

27 triangles

How many triangles do you think will be in the next triangle in the sequence? 64 triangles

4 Which of the numbers 1 to 9 should be written in each square so that the **sum** of the four 2-digit numbers formed (two across and two down) is 67? (You may repeat a digit.)

1	1
2	7

5 Continue the sequence in both directions. Write the rule.

a) 0.01, 0.05, 0.25, **1.25**, **6.25**, **31.25**, 156.25, 781.25 [*Rule*: × 5]

b) 0.01, 0.03, 0.09, **0.27**, **0.81**, **2.43**, 7.29, 21.87 [*Rule*: × 3]

1

Use each of the natural numbers from 1 to 16 only **once** to form 8 pairs of numbers so that the sum of each pair is a **square** number.

For example, (2, 14) is a possible pair, as $2 + 14 = 16 = 4 \times 4$

(19, 9), (15, 10), (14, 11), (13, 12) (8, 1), (7, 2), (6, 3), (5, 4)

2

A group of boys and girls were all brothers and sisters from the same family.

Each boy had as many sisters as he had brothers. Each girl had half as many sisters as she had brothers.

How many girls and boys were in the group? Girls 3 Boys 4

3

A school had a class reunion. Five old friends, *Amy*, *Bill*, *Carrie*, *Dan* and *Eddie* met up again for the first time since they had left school and found out that:

- they lived in different countries: Finland, Greece, Holland, Ireland and Japan;
- they had different jobs: engineer, lawyer, teacher, doctor and model;
- one had 4 children, one had 3 children, one had 2 children, one had 1 child and one had no children.

During the conversation, they also found out that:

- The lawyer was living in Japan.
- *Bill* was living in Greece and had 2 children.
- *Amy* had no children.
- The doctor lived in Finland and had some children.
- *Dan* was an engineer living in Holland.
- *Eddie* did not have 4 children.
- *Carrie* was a model and had one child.

Use the information to answer these questions.

a) How many children had the person living in Holland? 4

b) Where was *Eddie* living? Finland

c) What was the name of the lawyer? Amy

d) How many children did the doctor have? 3

e) What was *Bill*'s job? teacher

4

A lock on a safe needs a 6-letter code to open it. The code uses each of the letters A to F only once.

Jim tried to guess the code. Here are his guesses.

If we know that each of the 6 letters is in the correct place once in Jim's guesses and that the code starts with A, what is the code?

Jim's guesses

CBADFE (1 letter is correct)

AEDCBF (2 letters are correct)

EDFACB (3 letters are correct)

Code: AEFDCB