Grade E, F and G topics **Page**

Place Value

1 000 000	100 000	10 000	1 000	100	10	1

1) a) Write the number forty five thousand, two hundred and seventy three in figures.

b) Write the number five thousand, one hundred and three in figures.

c) Write the number three hundred thousand, seven hundred and ninety one in figures.

d) Write the number two and a half million in figures.

e) Write the number one and three quarter million in figures.

2) Write the following numbers in words

a) 1 250

b) 3 502

c) 72 067

d) 192 040

e) 30 000 000

3) a) Write down the value of the 7 in the number 3 752.

b) Write down the value of the 6 in the number 56 025.

c) Write down the value of the 2 in the number 99 723.

d) Write down the value of the 5 in the number 258 610.

e) Write down the value of the 2 in the number 1 253 549.

Ordering Numbers

Put these numbers in order, starting with the smallest:

1) 74, 57, 38, 8, 61

2) 39, 84, 11, 128, 24

3) 76, 102, 12, 140, 73

4) 3.1, 31, 1.3, 13, 1.03

5) 0.321, 0.312, 1.04, 1.23

6) 0.34, 0.047, 0.4, 0.43, 0.403

7) 0.79, 0.709, 0.97, 0.792

8) 2.71, 2.074, 2.071, 2.701

9) 0.875, 0.88, 0.0885, 0.008, 0.11

10) 3, –2, –7, 10, –1

11) –3, –11, 1, –5, 7

12) –4, 6, 0, –6, –1

Rounding to the Nearest 10, 100, 1000

1) Round these numbers to the nearest 10:

a) 26

b) 62

c) 75

d) 231

e) 797

f) 5 842

g) 9 875

h) 13 758

2) Round these numbers to the nearest 100:

a) 78

b) 223

c) 549

d) 1 450

e) 1 382

f) 4 537

g) 9 193

h) 17 625

3) Round these numbers to the nearest 1000:

a) 850

b) 1 455

c) 3 230

d) 7 500

e) 8 455

f) 9 690

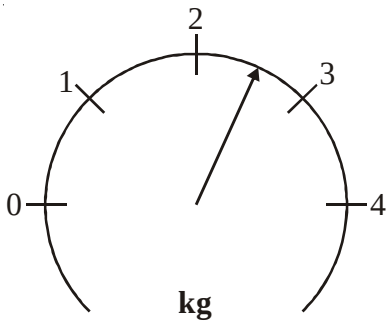
g) 12 390

h) 28 910

Reading Scales

1) What is the reading on each of these scales?

a)



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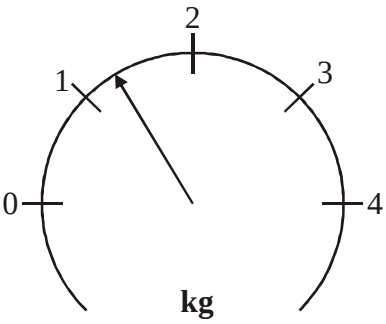

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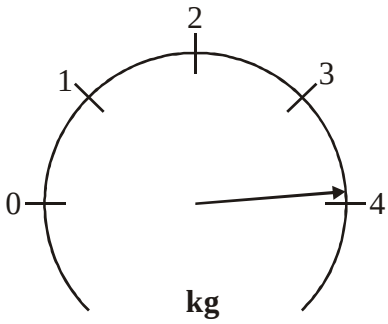

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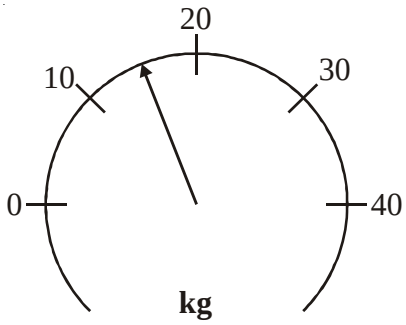
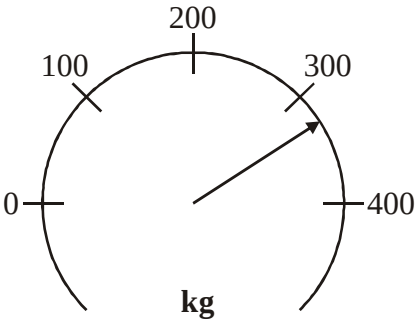
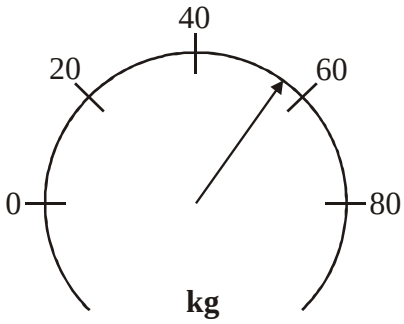


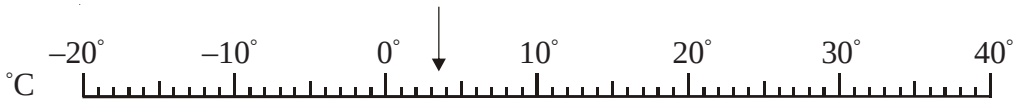
e)



f)



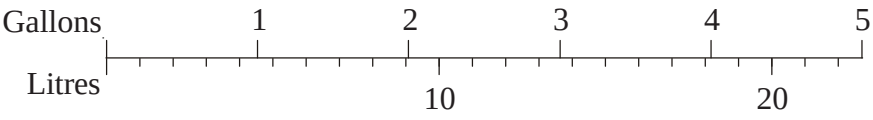
2) This scale shows degrees Centigrade.



a) What temperature is the arrow pointing to?

b) Draw an arrow which points to –17˚C

3) This is a diagram for converting gallons to litres.



Use the diagram to convert

a) 3 gallons to litres.

b) 4.5 gallons to litres.

c) 6 litres to gallons.

Multiply and Divide by Powers of 10

1) Multiply the following numbers by 10, 100 and 1000:

		×10	**×100**	**×1000**
e.g.	*21*	*210*	*2100*	*21000*
	9			
	63			
	845			
	3.65			
	0.4			
	1.324			

2) Divide the following numbers by 10, 100 and 1000:

		÷10	**÷100**	**÷1000**
e.g.	*21*	*2.1*	*0.21*	*0.021*
	9			
	63			
	845			
	3.65			
	0.4			
	1.324			

3) Work out the following:

3 × 100 =

65 × 10 =

17 ÷ 10 =

359 × 10 =

0.5 ÷ 100 =

2.3 × 1000 =

42 ÷ 100 =

3582 ÷ 100 =

0.9 × 10 =

3.645 × 100 =

88 ÷ 1000 =

39.62 × 1000 =

Negatives in Real Life

1) At midnight, the temperature was -7°C.

By 7am the next morning, the temperature had increased by 6°C.

a) Work out the temperature at 7am the next morning.

At midday, the temperature was 3°C.

b) Work out the difference between the temperature at midday and the temperature at midnight.

c) Work out the temperature which is halfway between -7°C and 3°C.

2) The table below gives the temperature recorded on 25th December in 7 cities across the world.

City	Edinburgh	London	New York	Moscow	Paris	Rome	Cairo
Temperature	-6 °C	0 °C	-15 °C	-23 °C	3 °C	5 °C	18 °C

a) Which city recorded the lowest temperature?

b) What is the difference in temperature between New York and Paris?

c) What is the difference in temperature between Cairo and Edinburgh?

d) The temperature in Madrid was 9°C lower than in Rome.
What was the temperature in Madrid?

e) The temperature in Mexico City was 6°C higher than in New York.
What was the temperature in Mexico City?

3) The table shows the temperature on the surface of each of five planets.

Planet	**Temperature**
Venus	210 °C
Jupiter	-150 °C
Saturn	-180 °C
Neptune	-210 °C
Pluto	-230 °C

a) Work out the difference in temperature between Jupiter and Pluto.

b) Work out the difference in temperature between Venus and Saturn.

c) Which planet has a temperature 30°C lower than Saturn?

The temperature on Mars is 90°C higher than the temperature on Jupiter.

d) Work out the temperature on Mars.

Multiplication & Division with Negatives

Work out the following:  all questions

1) -3 × 6 =

2) 4 × 2 =

3) 10 ÷ -2 =

4) -6 ÷ -3 =

5) -5 × -7 =

6) 7 × -3 =

7) 12 ÷ 4 =

8) -24 ÷ 6 =

9) -8 × 2 =

10) -9 ÷ 3 =

11) 4 ÷ -1 =

12) -3 × -9 =

13) -70 ÷ -7 =

14) 11 × -6 =

15) 4 × -3 × 2 =

16) -5 × 2 × -4 =

17) 4 × 5 ÷ -2 =

18) -8 ÷ -2 × -6 =

19) -2 × -3 × -4 =

20) 8 ÷ -2 × -6 =

Fraction of an Amount

1) Work out the following:

a) $\frac{1}{2}$ of £10 b) $\frac{1}{3}$ of £9 c) $\frac{1}{5}$ of £25 d) $\frac{1}{2}$ of 24kg

e) $\frac{1}{4}$ of 36cm f) $\frac{1}{6}$ of 42kg g) $\frac{1}{8}$ of 48kg h) $\frac{1}{11}$ of £66

i) $\frac{1}{9}$ of 90km j) $\frac{1}{7}$ of £28 k) $\frac{1}{5}$ of 125kg l) $\frac{1}{6}$ of 240km

2) Work out the following:

a) $\frac{1}{4}$ of 20 b) $\frac{3}{4}$ of 20 c) $\frac{1}{3}$ of 21 d) $\frac{2}{3}$ of 21 e) $\frac{3}{4}$ of 44

f) $\frac{2}{3}$ of 24 g) $\frac{3}{5}$ of 15 h) $\frac{3}{4}$ of 36 i) $\frac{7}{9}$ of 81 j) $\frac{5}{7}$ of 56

k) $\frac{3}{10}$ of 50 l) $\frac{6}{11}$ of 33 m) $\frac{1}{4}$ of 14 n) $\frac{3}{4}$ of 14 o) $\frac{3}{8}$ of 20

3) The highest possible mark for a Maths test was 64.

Dora got $\frac{7}{8}$ of the full marks.

How many marks did she get?

4) At MathsWatch School there are 1500 students.

$\frac{7}{15}$ of these students are male.

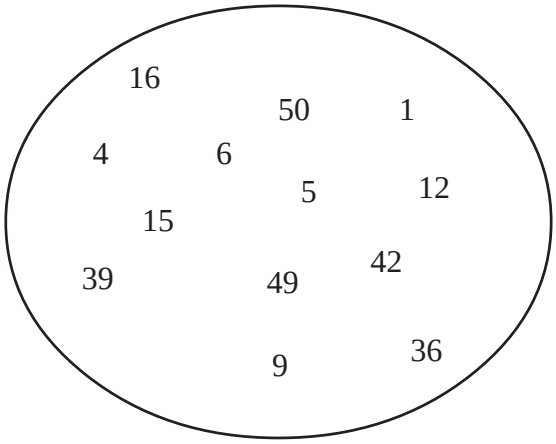
a) What fraction of students are female?

b) How many are male?

c) How many are female?

Square and Cube Numbers

1)



a) In the numbers, above, find six of the first seven square numbers.

b) Which of the first seven square numbers is missing?

2) Work out the following:

a) 10^2 b) 9^2 c) $7^2 + 3^2$ d) $8^2 - 2^2$

3) For each pair of numbers, below, there is just one square number that lies between them. In each case, write the square number:

a) 7 15 b) 21 29 c) 72 96 d) 130 156

4) Work out the following:

a) $\sqrt{25}$ b) $\sqrt{81}$ c) $\sqrt{16} + 6^2$

5) The first cube number is $1^3 = 1$

Write out the 2nd, 3rd, 4th and 10th cube numbers.

6) Work out the following:

a) $1^3 + 3^3$ b) $10^3 + 5^3$

7) Work out the following:

a) $3^3 + 6^2$ b) $10^3 + \sqrt{100}$

8) Work out what should go in the boxes:

a) $\sqrt{\square} = 6$ b) $\sqrt{\square} = 8$

Fractions, Decimals and Percentages

1) Write the following fractions as decimals and percentages:

eg. $\frac{1}{10} \xrightarrow{1 \div 10} 0{\cdot}1 \xrightarrow{0.1 \times 100} 10\%$

a) $\frac{3}{10}$ =

b) $\frac{1}{5}$ =

c) $\frac{2}{5}$ =

d) $\frac{1}{4}$ =

e) $\frac{3}{4}$ =

f) $\frac{1}{2}$ =

g) $\frac{1}{3}$ =

2) Fill in the blanks in the table below:

Fraction	Decimal	Percentage
$\frac{6}{10}$		
	0.2	
	0.9	
		40%
		25%
$\frac{4}{5}$		
$\frac{12}{100}$		
	$0.\dot{3}$	
		70%

Money Questions

1) Bill buys 3 melons at £1.09 each.

a) How much does he spend?

b) How much change does he get from £5?

2) Jenny is taking her family to the cinema.
Jenny pays for 1 adult and 3 children.

a) How much does she spend?

b) How much change does she get from £20?

Cinema

Adult: £6.50

Child: £4.00

3) Bob is paid £7 per hour.

a) Last monday Bob worked for 8 hours
Work out his pay for that day.

b) Yesterday Bob was paid £42.
Work out how many hours Bob worked.

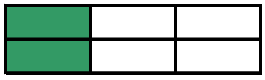
4) Complete this bill.

1½ kg of carrots at 40p per kg	= £.....
3 kg of potatoes at 52p per kg	= £.....
..... boxes of tea bags at 90p each	= £1.80
4 packs of yogurts at ..... each	= £4.80
Total	= £.....

Shading Fractions

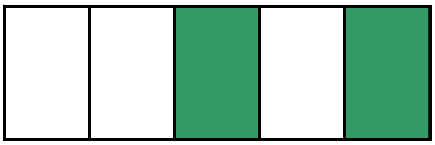
1) What fraction of each of the following shapes is shaded?

a)

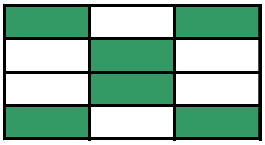


b)

c)

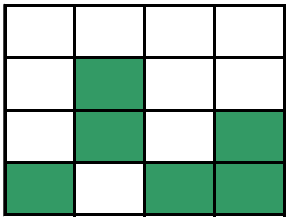


d)



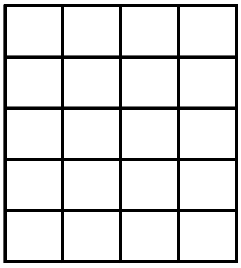
e)

f)

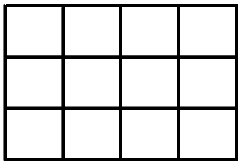


2) Shade the given fraction in the following grids.

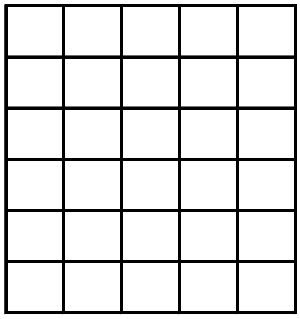
$\frac{3}{5}$



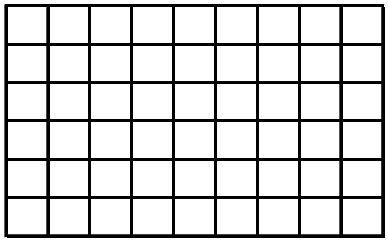
$\frac{1}{4}$

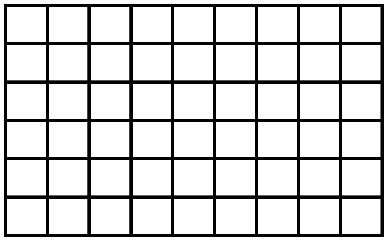


$\frac{4}{6}$

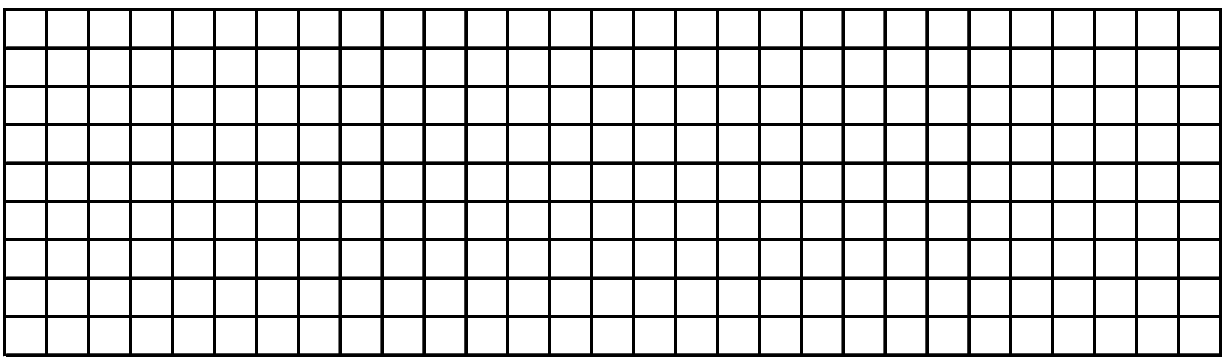


3) Which of these fractions is the smallest? $\frac{5}{6}$ *or* $\frac{7}{9}$ *(use the grids to help)*





4) Which of these fractions is the largest? $\frac{2}{7}$ *or* $\frac{1}{3}$ *(you must show your working)*



Ordering Fractions, Decimals & Percentages

1) Change these fractions to decimals

eg. $\frac{1}{5} \xrightarrow{1\div5} 0.2$

a) $\frac{3}{5}$ b) $\frac{4}{5}$ c) $\frac{1}{4}$ d) $\frac{3}{4}$ e) $\frac{1}{3}$ f) $\frac{2}{3}$

2) Change these percentages to decimals

eg. 52% $\xrightarrow{52\div100}$ 0.52

a) 63% b) 8% c) 59% d) 81% e) 28.5% f) 6.5%

3) Write the following numbers in order of size (smallest to largest)

a) 0.61 $\frac{2}{3}$ 59% 0.55 $\frac{3}{5}$

b) 81% 0.78 $\frac{4}{5}$ $\frac{3}{4}$ 0.805

c) $\frac{1}{3}$ 0.3 $\frac{1}{4}$ 28.5% 0.32

d) 0.23 21% $\frac{1}{5}$ $\frac{22}{100}$ 19.2%

e) 1% 0.012 $\frac{3}{100}$ 0.021 $\frac{1}{40}$

Estimation

1) Work out an estimate
eg. 17 × 193 ⟶ 20 × 200 = 4000

a) 12 × 304

b) 38 × 72

c) 231 × 56

d) 773 × 13

2) Work out an estimate
eg. 4.7 × 54 ⟶ 5 × 50 = 250

a) 3.8 × 52

b) 7.9 × 103

c) 9.6 × 265

d) 512 × 2.4

3) Work out an estimate
eg. 37 ÷ 12 ⟶ 40 ÷ 10 = 4

a) 122 ÷ 53

b) 372 ÷ 44

c) $\frac{341}{28}$

d) $\frac{109}{96}$

4) Work out an estimate
eg. 37 ÷ 1.2 ⟶ 40 ÷ 1 = 40

a) 68 ÷ 1.7

b) 37 ÷ 7.9

c) $\frac{253}{4.6}$

d) $\frac{96}{10.4}$

5) Work out an estimate

eg. $\frac{62 \times 28}{89} \longrightarrow \frac{60 \times 30}{90} = \frac{1800}{90} = 20$

a) $\frac{45 \times 21}{14}$

b) $\frac{76 \times 17}{42}$

c) $\frac{42 \times 53}{2.2}$

d) $\frac{33 \times 61}{8.7}$

Place Value when Multiplying

1) Using the information that $23 \times 68 = 1564$
work out the value of:

a) 2.3×68

b) 2.3×6.8

c) 0.23×68

d) 2.3×0.68

e) 230×68

f) 230×6.8

g) 2300×680

h) $1564 \div 23$

i) $1564 \div 2.3$

j) $15640 \div 23$

2) Using the information that $416 \times 35 = 14560$
work out the value of:

a) 4.16×35

b) 41.6×0.35

c) 41600×350

d) 0.416×350

e) 4160×0.035

f) 41.6×350000

g) 0.00416×0.0035

h) $14560 \div 3.5$

i) $145.6 \div 4.16$

j) $1.456 \div 0.35$

3) If $78 \div 2.5 = 31.2$, what do you have to divide 78 by to get an answer of 0.312?

4) If $812 \times 2.9 = 2354.8$, what do you have to multiply 8.12 by to get an answer of 23548?

Addition and Subtraction

1) a) $\begin{array}{r} 42 \\ +26 \\ \hline \end{array}$ b) $\begin{array}{r} 57 \\ +38 \\ \hline \end{array}$ c) $\begin{array}{r} 96 \\ +75 \\ \hline \end{array}$

2) a) $\begin{array}{r} 637 \\ +961 \\ \hline \end{array}$ b) $\begin{array}{r} 983 \\ +442 \\ \hline \end{array}$ c) $\begin{array}{r} 969 \\ +758 \\ \hline \end{array}$

3) a) 452 + 38 b) 147 + 763 c) 813 + 431 + 38

4) There were two exhibitions at the NEC one Sunday.
3816 people went to one of the exhibitions and 13427 people went to the other exhibition.
How many people went to the NEC, in total, on the Sunday?

5) a) 2.6 + 1.2 b) 2.74 + 6.81 c) 45.36 + 6.81

6) a) 23 + 1.5 b) 13.6 + 38 c) 13.2 + 17.82

7) a) $\begin{array}{r} 78 \\ -42 \\ \hline \end{array}$ b) $\begin{array}{r} 74 \\ -26 \\ \hline \end{array}$ c) $\begin{array}{r} 62 \\ -39 \\ \hline \end{array}$

8) a) $\begin{array}{r} 485 \\ -291 \\ \hline \end{array}$ b) $\begin{array}{r} 773 \\ -486 \\ \hline \end{array}$ c) $\begin{array}{r} 100 \\ -\ 34 \\ \hline \end{array}$

9) a) 653 – 48 b) 362 – 183 c) 2000 – 461

10) There were two films showing at a cinema one Saturday.
One of the films was shown in a large room and the other was in a smaller room.
The film in the larger room was watched by a total of 3562 people.
The film in the smaller room was watched by 1671 people.
How many more people saw the film in the larger room?

11) a) 782 + 426 – 278 b) 8162 + 1149 – 799

Long Multiplication

1) Work out

a) 13 × 18

b) 135 × 27

c) 116 × 41

d) 264 × 43

e) 326 × 24

f) 281 × 59

g) 286 × 48

h) 428 × 34

i) 461 × 45

2) "MathsWatch Travel" has 36 coaches.
Each of these coaches can carry 53 passengers.
How many passengers in total can all the coaches carry?

3) "MathsWatch Tours" has a plane that will carry 47 passengers.
To fly from Manchester to Lyon, each passenger pays £65
Work out the total amount that the passengers pay.

4) A Science textbook costs £13.
Mr Jones buys a class set of 34 books.
How much do they cost him?

5) A graphical calculator costs £18.
How much would 43 calculators cost?

Long Division

1) Work out

a) 325 ÷ 5

b) 448 ÷ 8

c) 221 ÷ 13

d) 377 ÷ 29

e) 27 ÷ 6

f) 123 ÷ 15

g) 75 ÷ 4

h) 135 ÷ 20

i) 381 ÷ 12

2) A box can hold 19 books.
Work out how many boxes will be needed to hold 646 books.

3) The distance from Glasgow to Paris is 1290 km.
A flight from Glasgow to Paris lasts 3 hours.
Given that

$$\textit{Average speed} = \frac{\textit{Distance}}{\textit{Time}}$$

Work out the average speed of the aeroplane in km/h.

4) Pencils cost 25p each.
Mr Smith spends £15 on pencils.
Work out the number of pencils he gets.

5) Yesterday, Gino was paid £19.61 for delivering pizzas.
He is paid 53p for each pizza he delivers.
Work out how many pizzas Gino delivered yesterday.

6) Emma sold 38 teddy bears for a total of £513
She sold each teddy bear for the same price.
Work out the price at which Emma sold each teddy bear.

7)

Canal boat for hire
£1855.00
for 14 days

Work out the cost per day of hiring the canal boat.

8) A teacher has £539 to spend on books.
Each book costs £26
How many books can the teacher buy?

9) John delivers large wooden crates with his van.
The weight of each crate is 68 kg.
The greatest weight the van can hold is 980 kg.
Work out the greatest number of crates that the van can hold.

10) Rulers costs 17p each.
MathsWatch High School has £120 to spend on rulers.
Work out the number of rulers bought.

Multiplication and Division with Decimals

1) Work out

a) 6×0.2

b) 0.2×0.3

c) 0.4×7

d) 0.2×0.8

e) 0.03×0.9

f) 1.5×0.2

2) A box contains 7 books, each weighing 2.5 kg.
Work out the total weight of the box.

3) John takes 13 boxes out of his van.
The weight of each box is 25.5 kg
Work out the total weight of the 13 boxes.

4) Work out

a) $9 \div 0.3$

b) $6 \div 0.1$

c) $12 \div 0.4$

d) $25 \div 0.5$

e) $21 \div 0.3$

f) $15 \div 0.2$

5) Work out

a) $3.6 \div 0.4$

b) $0.8 \div 0.2$

c) $2.4 \div 0.4$

d) $0.56 \div 0.08$

e) $5.5 \div 0.05$

f) $8.1 \div 0.09$

6) John takes boxes out of his van.
The total weight of the boxes is 4.9 kg
The weight of each box is 0.7 kg
Work out the number of boxes in John's van.

7) Mr Rogers bought a bag of elastic bands for £6
Each elastic band costs 12p.
Work out the number of elastic bands in the bag.

Rounding to Decimal Places

1) Round the following numbers to 1 decimal place

a) 13.681 b) 344.7234 c) 0.76133

2) Round the following numbers to 2 decimal places

a) 58.8136 b) 14.22731 c) 203.86884

3) Round the following numbers to 1 decimal place

a) 48.9732 b) 163.9299 c) 19.952

4) Round the following numbers to 2 decimal places

a) 10.697 b) 8.993 c) 14.9964

5) Work out the answer to 2.6882×14.71728 and give your answer correct to 2 decimal places.

6) Work out the answer to $64.2 \div 5.7$ and give your answer correct to 1 decimal place.

7) Work out the answer to 4.74^2 giving your answer correct to 2 decimal places.

8) Find the answer to $\sqrt{17.3}$ giving your answer correct to 1 decimal place.

Half-Way Values

1) Write down the number which is in the middle of:

a) 3 and 9

b) 12 and 28

c) 11 and 22

d) 17 and 32

e) 72 and 108

f) 1 and 100

g) –6 and 2

2) Write down the number which is in the middle of:

a) 2.4 and 6.8

b) 5.9 and 12.5

c) -5 and 7.8

3) a) 7 is in the middle of 3 and which other number?

b) 16 is in the middle of 9 and which other number?

c) 2.4 is in the middle of 1.1 and which other number?

Reciprocals

1) Write down the reciprocal of

a) 8

b) 3

c) 1

d) 12

2) Write down the reciprocal of

a) $\frac{1}{2}$

b) $\frac{1}{3}$

c) $\frac{1}{4}$

d) $\frac{1}{8}$

3) Write down the reciprocal of

a) 0.1

b) 0.5

c) 0.2

4) Why can't we have a reciprocal of 0?

Proportion

1) 8 bananas cost £4
Work out the cost of 5 bananas.

2) Emily bought 4 identical pairs of sock for £3.60
Work out the cost of 9 pairs of these socks.

3) The price of 36 chocolates is £7.20
Work out the cost of 8 chocolates.

4) Theresa bought 5 theatre tickets for £60
Work out the cost of 9 theatre tickets.

5) Jenny buys 4 folders.
The total cost of these 4 folders is £6.40
Work out the total cost of 7 of these folders.

6) The cost of 15 litres of petrol is £12
Work out the cost of 20 litres of petrol.

7) 3 maths books cost £7.47
Work out the cost of 5 of these.

8) Five 1 litre tins of paint cost a total of £48.75
Work out the cost of seven of these 1 litre tins of paint.

9) William earns £9.30 for $1\frac{1}{2}$ hours of work.
Work out how much he would earn for:
a) 30 minutes
b) 5 hours

10) It took 3 hours for Emyr to lay 450 bricks.
He always works at the same speed.
How long will it take Emyr to lay 750 bricks?

Distance Tables

1) The table shows the distances in kilometres between some cities in the USA.

San Francisco	New York	Miami	Los Angeles	Chicago
4827				
4990	2132			
668	4541	4375		
3493	1352	2183	3366	

a) Write down the distance between San Francisco and Miami.

One of the cities in the table is 4541 km from Los Angeles.

b) Write down the name of this city.

c) Write down the name of the city which is furthest from Chicago.

2) The table shows the distances in miles between four cities.

London	Cardiff	York	Edinburgh
155			
212	245		
413	400	193	

a) Write down the distance between London and York.

b) Write down the distance between Edinburgh and Cardiff.

c) Which two cities are the furthest apart?

Tom travels from London to York.
He then travels from York to Edinburgh.
He finally travels back to London from Edinburgh.

d) Work out the total distance travelled by Tom.

Peter and Jessica both drive to York.
Peter travels from London whilst Jessica travels from Cardiff.

e) Who travels the furthest out of Peter and Jessica and by how much?

Timetables

1) Change the following to the 24 hour clock

a) 4.30 pm
b) 5 am
c) 10.26 am
d) 7.15 pm
e) Quarter past midnight
f) Half past noon

2) Change the following to the 12 hour clock

a) 06 35
b) 14 30
c) 12 45
d) 19 15
e) 00 50
f) Half past midnight

3) What is the difference in hours and minutes between the following

a) 10.15 pm and 11.30 pm?

b) 14 20 and 17 10?

c) 11.50 pm and 3.20 am?

d) 22 45 and 01 00?

4) Here is part of a train timetable

Manchester	05 15	06 06	06 45	07 05	07 15	07 46
Stockport	05 26	06 16	06 55	07 15	07 25	07 55
Macclesfield	05 39	06 29	07 08		07 38	08 08
Stoke	05 54	06 45	07 24		07 54	08 24
Stafford	06 12		07 41		08 11	
Euston	08 09	08 26	09 06	09 11	09 50	10 08

a) Tim catches the 06 06 train from Manchester.
At what time should he expect to arrive at Euston?

b) Jenny arrives at the Stockport train station at 07 00

(i) How long should she expect to wait for a train to Stoke?

(ii) How long should her train journey take?

c) Sarah needs to travel to Euston from Macclesfield.
She has to arrive at Euston before 09 30.
What is the departure time of the latest train she can catch to get there on time?

Powers

1) Write the following using indices:
eg. $3 \times 3 \times 3 \times 3 = 3^4$

a) $2 \times 2 \times 2 \times 2$

b) $4 \times 4 \times 4$

c) $5 \times 5 \times 5 \times 5 \times 5 \times 5$

d) $12 \times 12 \times 12 \times 12 \times 12$

e) 3.6×3.6

f) $5.2 \times 5.2 \times 5.2$

2) Write each of the following as a single power:
eg. $5^2 \times 5^4 = 5^6$

a) $6^2 \times 6^3$

b) $7^4 \times 7^2$

c) $9^3 \times 9^6$

d) $5^3 \times 5$

e) $2^9 \times 2^3$

f) $7.2^3 \times 7.2^2$

3) Write each of the following as a single power:
eg. $7^5 \div 7^2 = 7^3$

a) $9^5 \div 9^3$

b) $6^9 \div 6^5$

c) $11^7 \div 11^2$

d) $\dfrac{7^8}{7^3}$

e) $\dfrac{3^6}{3}$

f) $\dfrac{8^{15}}{8^4}$

4) Write each of the following as a single power:

eg. $\dfrac{7^3 \times 7^8}{7^6} = \dfrac{7^{11}}{7^6} = 7^5$

a) $\dfrac{4^7 \times 4^3}{4^6}$

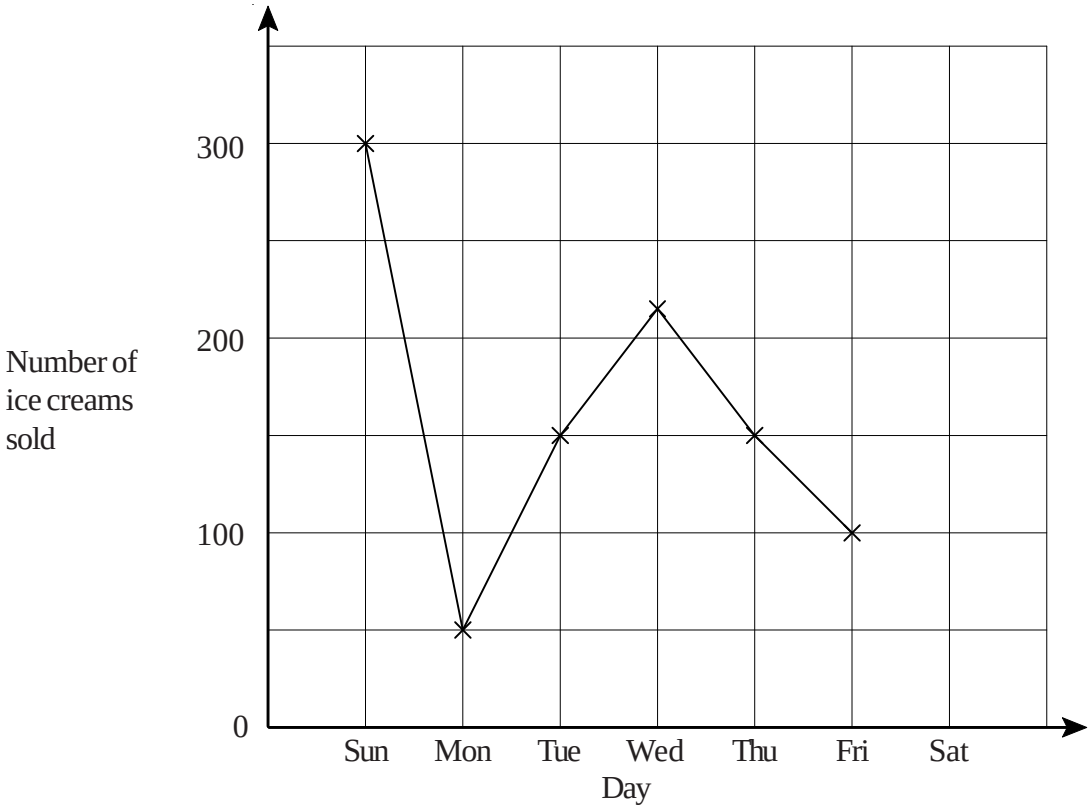
b) $\dfrac{9^2 \times 9^6}{9^4}$

5) Match together cards with the same answer

5^7	$5^{10} \div 5^6$	$5^6 \times 5^2$	5^3	5^2
5^8	5×5	$\dfrac{5^2 \times 5^4}{5^3}$	$5^2 \times 5^5$	5^4

Line Graphs

1) The graph shows the number of ice creams sold each day during one week.



a) How many more ice creams were sold on Sunday than on Friday?

b) Explain what might have happened on Monday.

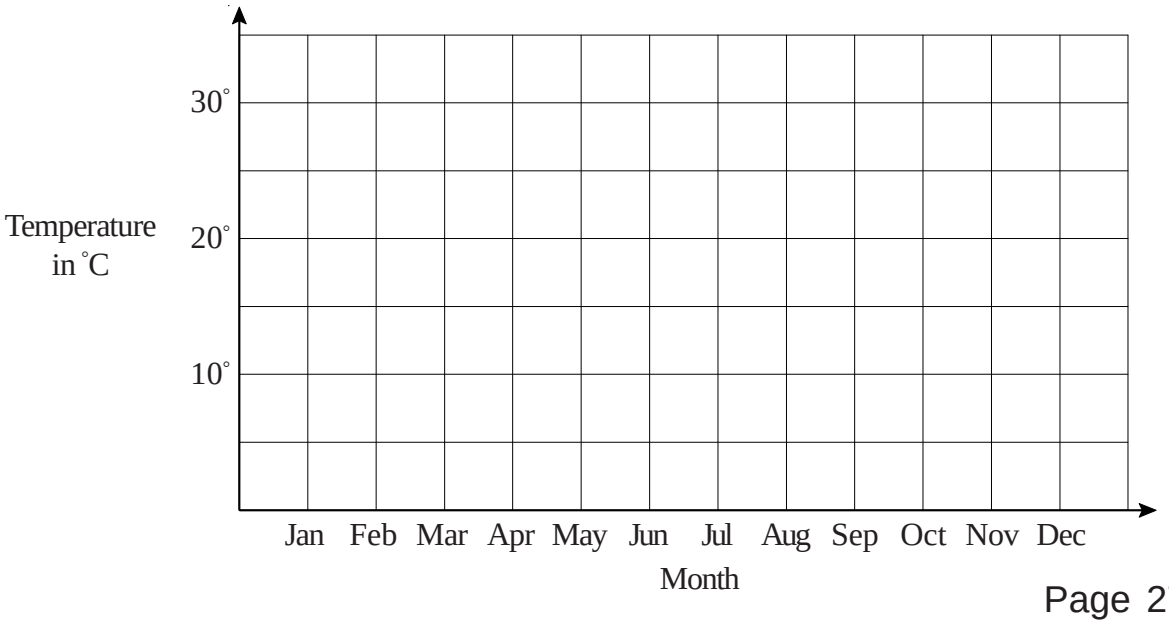
c) On Saturday, 250 ice creams were sold.
Update the graph with this information.

d) About how many ice creams were sold on Wednesday?

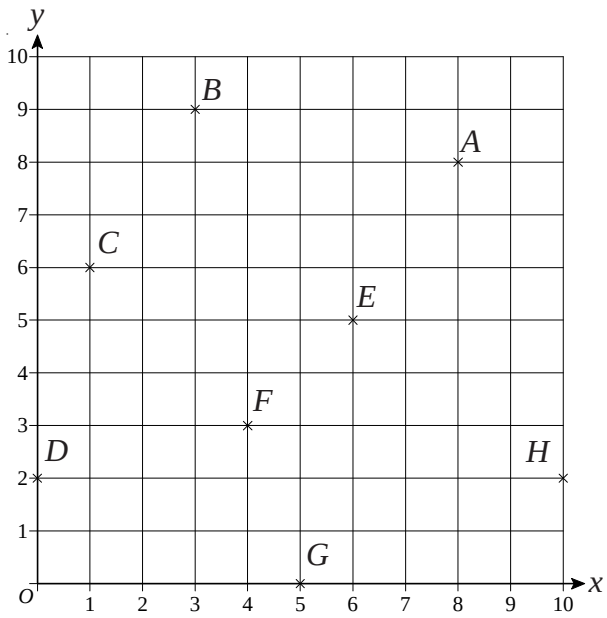
2) The average temperature, in degrees Centigrade, was recorded for each month.
The results are as follows:

January 5˚C February 3˚C March 8˚C April 13˚C May 15˚C June 21˚C
July 34˚C August 29˚C September 20˚C October 12˚C November 8˚C December 6˚C

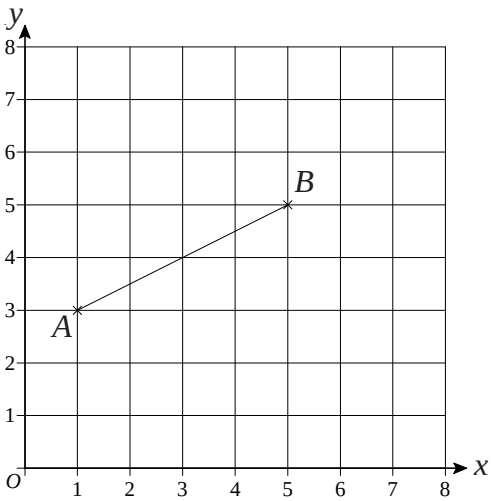
Draw a line graph to show these results.



Coordinates



1) Write down the coordinates of the points *A* to *H*.



2) a) Write down the coordinates of: (i) *A* (ii) *B*

b) Write down the coordinates of the midpoint of the line *AB*.

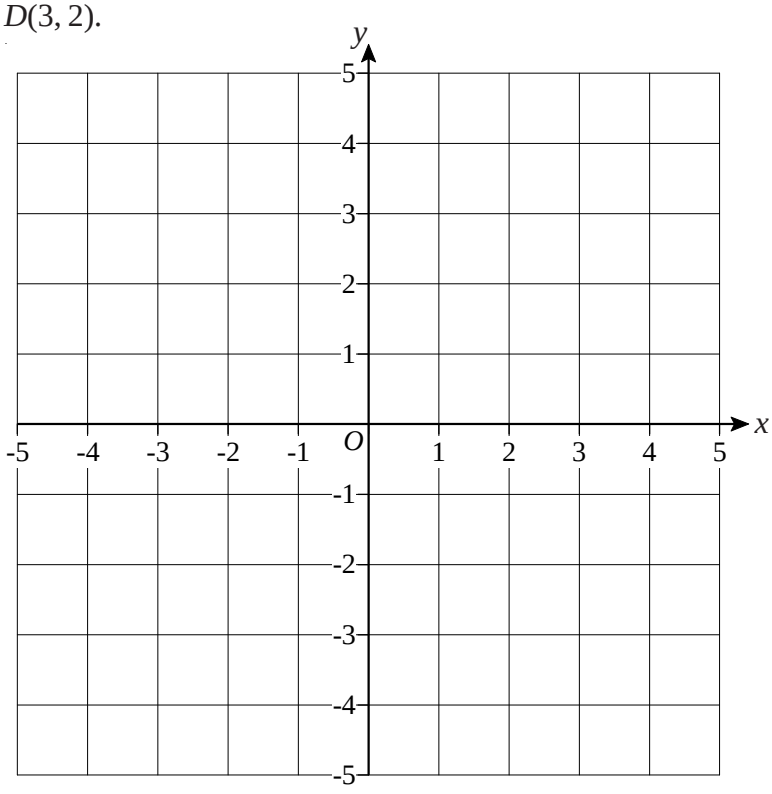
3) Using the pair of axes,

a) Plot the points *A*(2, 0), *B*(4, 0), *C*(5, 2) and *D*(3, 2).

b) Join the points in order, to form a shape and name the shape.

M is the midpoint of the line segment *AC*.

c) Find the coordinates of *M*.



4) Using the same pair of axes,

a) Plot the points *R*(-1, -2), *S*(1, 1) and *T*(-1, 2).

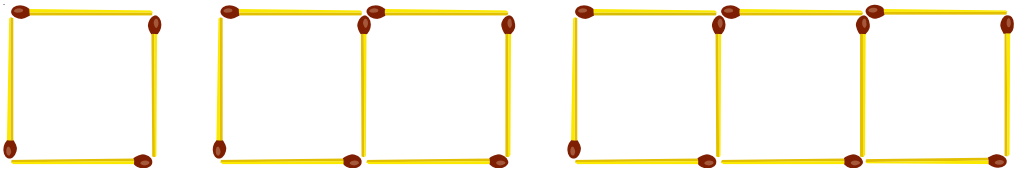
b) Join *R* to *S* and *S* to *T*.

RSTU is a kite.

c) Write the coordinates of point *U*.

Number Sequences

1) Here are some patterns made from matchsticks



Pattern 1 Pattern 2 Pattern 3

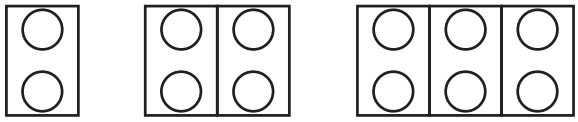
a) Draw pattern 4.

b) How many matchsticks are used in
(i) Pattern 5?

(ii) Pattern 10?

c) Which pattern will have 46 matchsticks?

2) A pattern is made of rectangles and circles



Pattern 1 Pattern 2 Pattern 3

a) Draw pattern 4.

b) Complete the table below.

Pattern number	1	2	3	4	5	10
Number of rectangles	1	2				
Number of circles	2	4				
Total rectangles + circles	3	6				

c) Which pattern will have 64 circles?

d) Which pattern will have a total (rectangles + circles) of 90?

3) For each of the following sequences write down the next two terms.

a) 5, 10, 15, 20...

b) 9, 16, 23, 30...

c) 27, 23, 19, 15...

d) 12, 7, 2, –3...

4) Look at this number sequence: 4, 10, 16, 22...
The 50th term of the sequence is 298.

a) Write down the 51st term.

b) Will 643 be a term in this sequence?
Explain your answer.

Number Machines

1) Here is a table for the rule ×3 then –1

×3 then –1	
Input	**Output**
1	2
2	
3	
5	
	20
	35

Complete the table.

2) Here is the table for the rule +5 then ÷2

+5 then ÷2	
Input	**Output**
1	3
2	3.5
3	
4	
	7
	10

Complete the table.

3) Here is the table for the rule ×4 then –3 then ×2

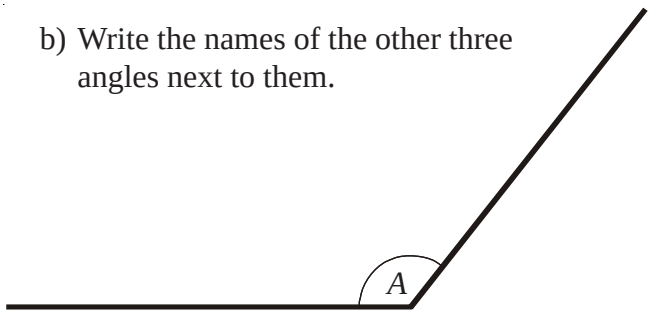
×4 then –3 then ×2	
Input	**Output**
1	2
2	10
3	
5	
7	
	74
	82

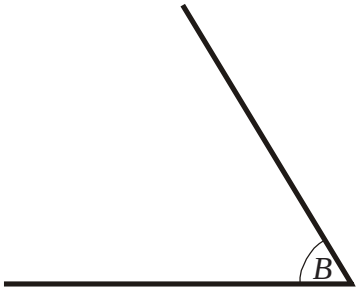
Complete the table.

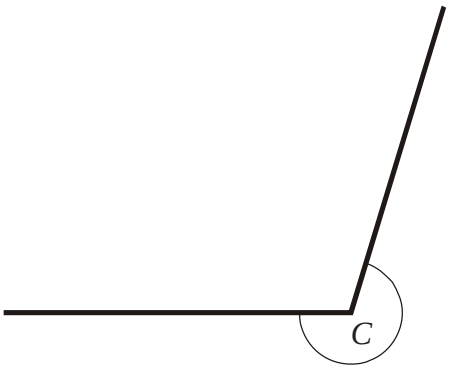
Angles

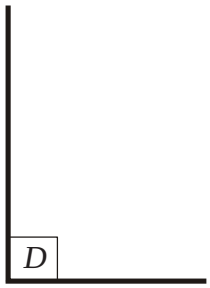
1) a) One of these angles is an acute angle.
Which one?

b) Write the names of the other three angles next to them.









2) a) Sketch a triangle which has three internal (inside) acute angles.

b) Sketch a right-angled triangle.

c) Sketch a triangle with one internal obtuse angle.

3) Debbie says she is going to draw a triangle with two internal obtuse angles.

Harry says that this is impossible.

Is Harry correct? Explain why.

4) Draw a quadrilateral with

a) Two internal acute angles, one reflex angle and one obtuse angle.

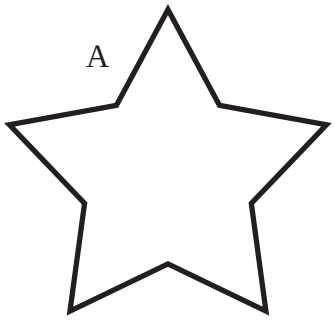
b) Three internal acute angles and one reflex angle.

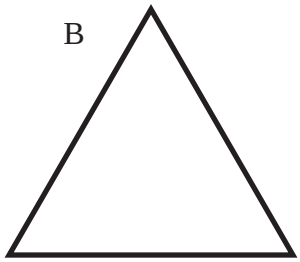
Congruent and Similar Shapes

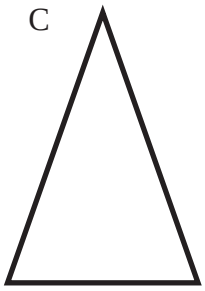
Shape	Congruent to	Similar to
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		

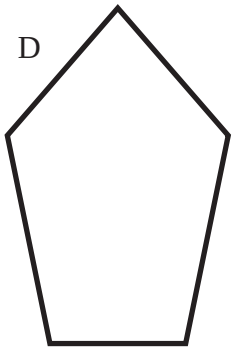
Fill in the table on the left where possible.

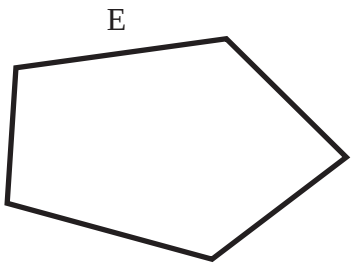
You are allowed to use tracing paper to help get the correct answers.

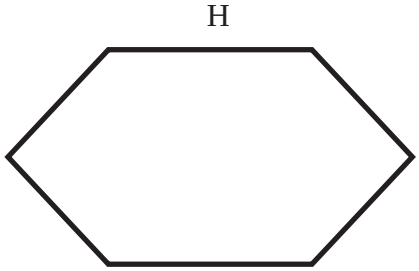


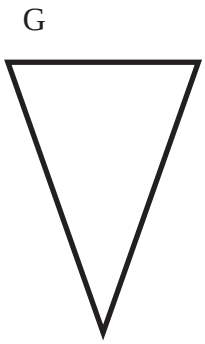


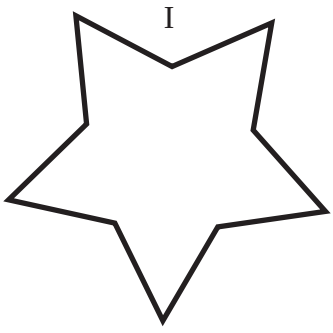


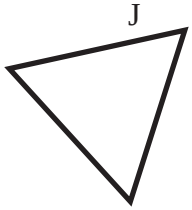






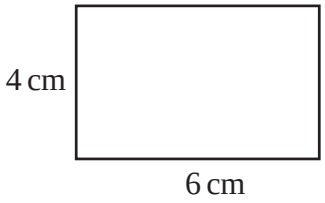


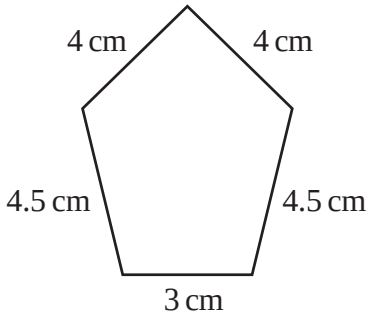




Perimeters and Areas

1) Find the perimeter of the following rectangle and pentagon:





2) A rectangle has a perimeter of 40 cm.
The length of the longest side is 12 cm.
Sketch the rectangle, and find the length of the shorter side.

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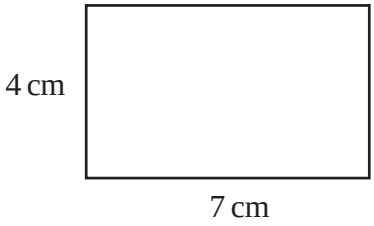
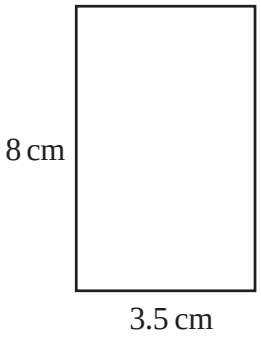
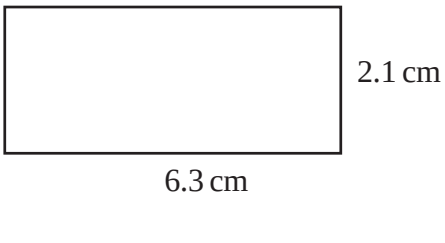
3) Find the area of the following rectangles:







4) A rectangle has an area of 40cm^2 and a length of 8 cm.
Sketch the rectangle and find the width.

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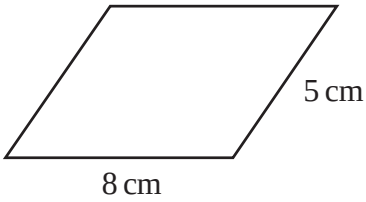
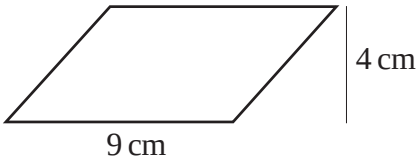
5) Why can't we find the area of this parallelogram?



6) What is the area of the parallelogram, below?



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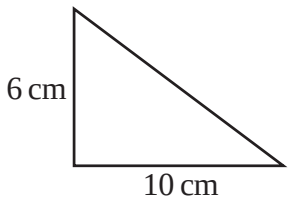
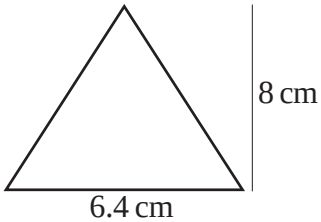
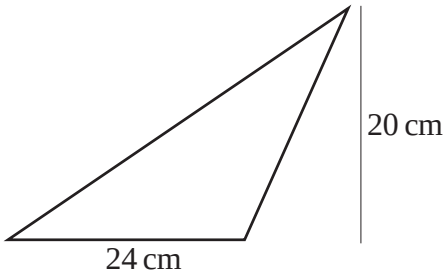
7) Find the area of the following triangles:



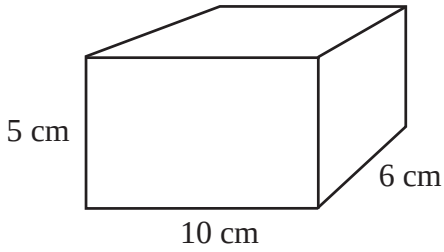




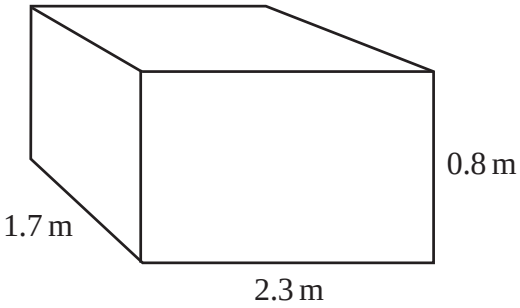
8) The area of a triangle is 60 cm^2
The base of the triangle is 12 cm long.
Sketch a triangle with this area and base and work out the height of the triangle.

Volume of Cuboids

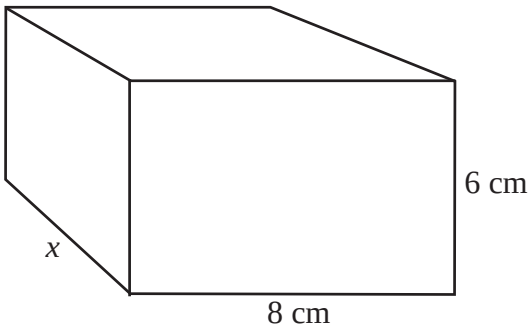
1) Find the volume of this cuboid.



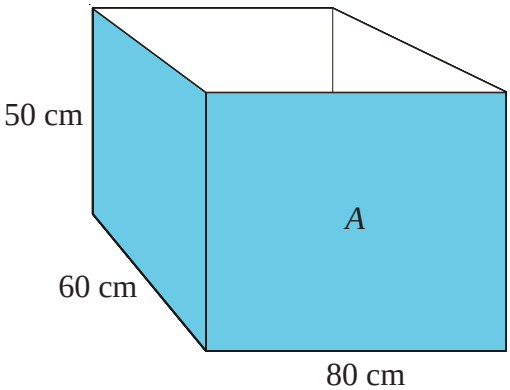
2) Find the volume of this cuboid.

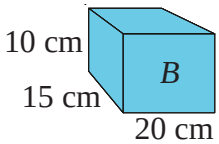


3) The volume of this cuboid is 480 cm^3.
Find the length of the side marked *x*.



4) Boxes *A* and *B* are both cuboids.
How many of box *B* could be packed into box *A*?





Converting Metric Measures

1) Complete this table by writing down a sensible unit for each measurement.
Four have been done for you.

	Metric	**Imperial**
The distance between London and Manchester		miles
The length of a pen	cm	
The weight of your Maths Teacher		pounds
The amount of petrol in a car		gallons
The length of an ant		

2) Change the following measurements:

a) 4 cm to mm

b) 7 m to cm

c) 5 m to mm

d) 10 cm to mm

e) 25 m to mm

f) 34 m to cm

g) 1 km to m

h) 1 km to cm

i) 23 km to m

3) Change the following measurements:

a) 300 cm to m

b) 4 mm to cm

c) 7425 mm to m

d) 6 cm to m

e) 412 cm to m

f) 1500 m to km

g) 4386 cm to m

h) 549 mm to cm

i) 0.3 km to m

4) Change the following measurements:

a) 5 m^2 to cm^2

b) 8 cm^2 to mm^2

c) 250 cm^2 to m^2

d) 8.2 m^2 to cm^2

e) 7320 mm^2 to cm^2

f) 8 m^3 to cm^3

g) 5.1 m^3 to cm^3

h) 53478 mm^3 to cm^3

i) 183000 cm^3 to m^3

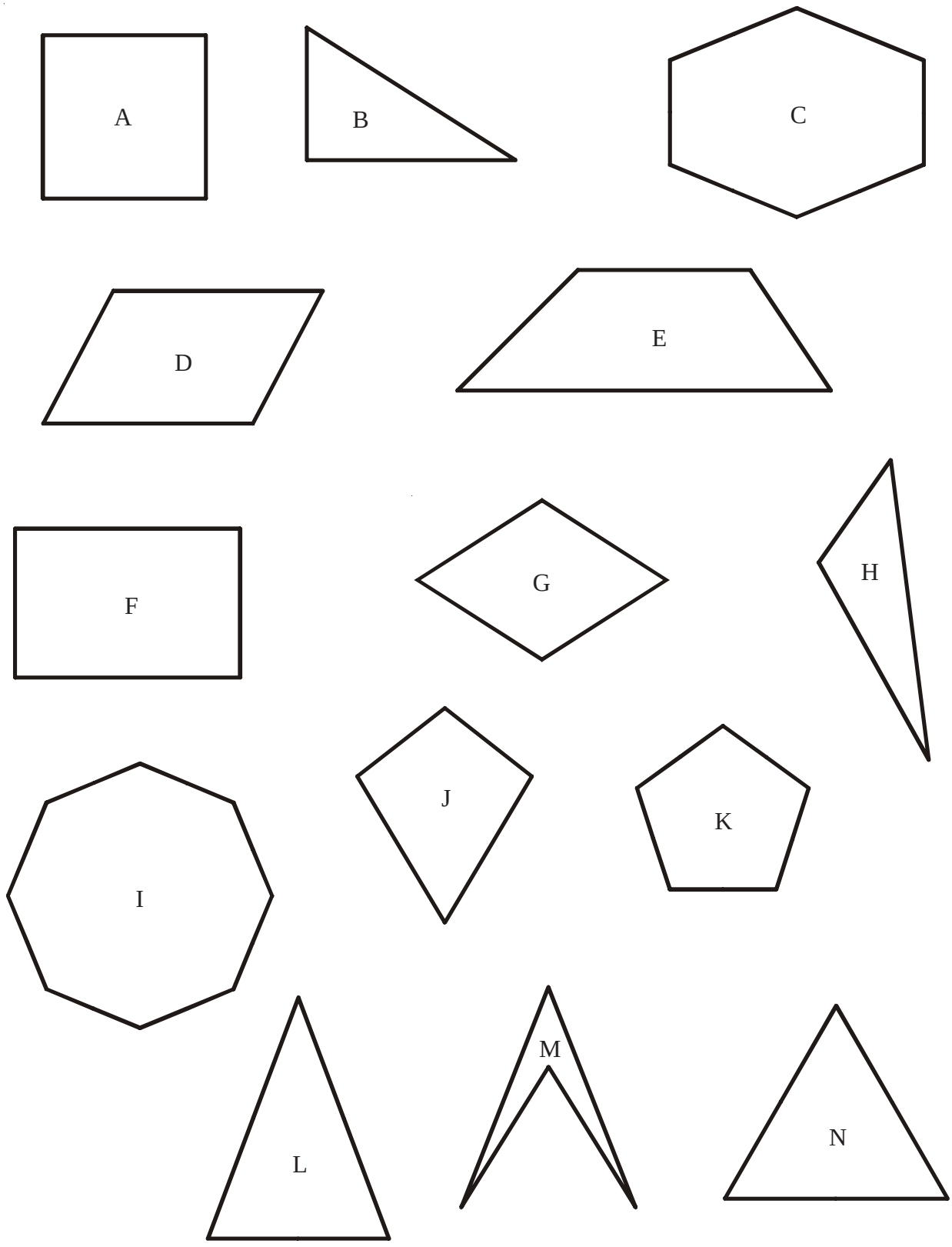
Triangles, Quadrilaterals and Other Polygons

For each of the shapes A to N, below:

a) Name the shape.

b) Mark on the shape, or write in words, the features that make it special.

eg) Shape A is a **square** because it has four equal sides and four right angles.



Names of Solids

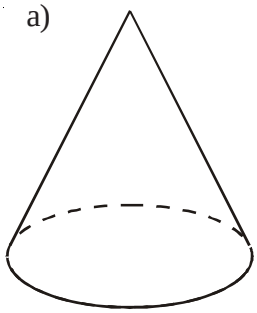
1) Draw a sketch of each of the following solids:

a) A cube.

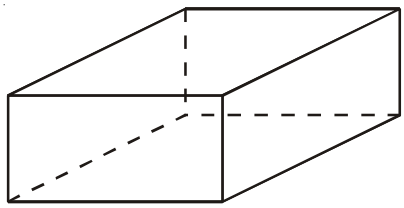
b) A cylinder.

2) Write down the mathematical name of each of these 3-D shapes.

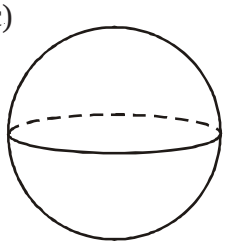
a)



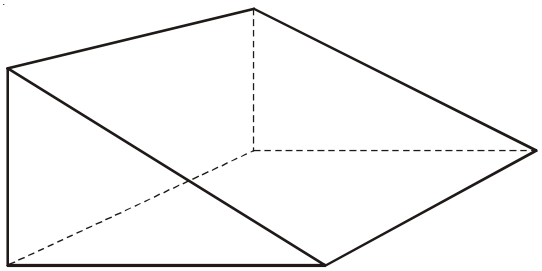
b)



c)



3) Look at this solid.



a) What is its name?

b) How many vertices does it have?

c) How many edges are there?

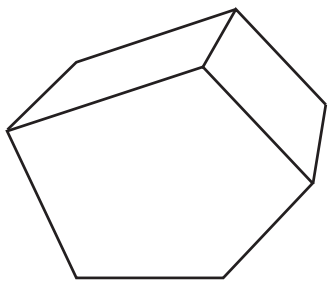
d) How many faces does it have?

4) This is a picture of a pentagonal prism.

a) How many faces does it have?

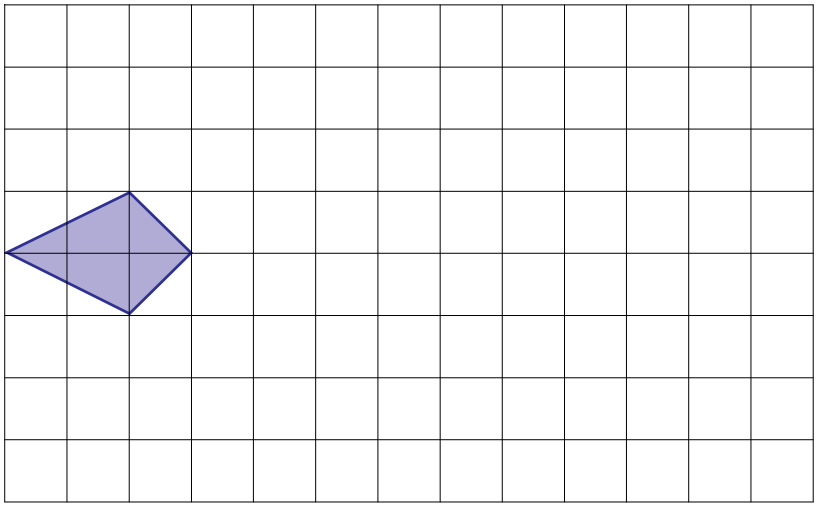
b) How many edges does it have?

c) How many vertices does it have?

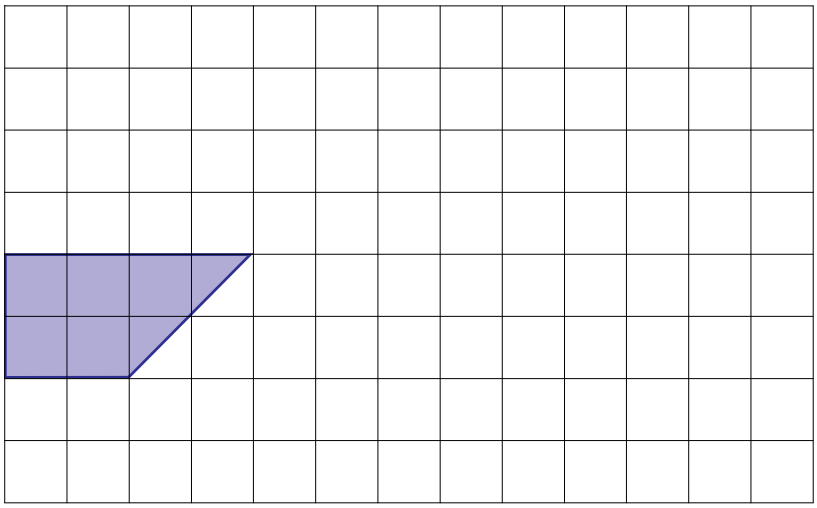


Tessellations

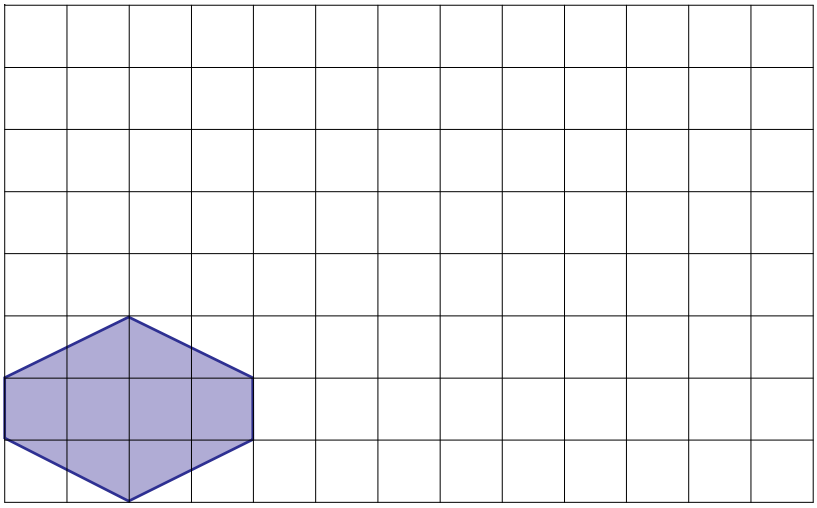
1) On the grid below, show how the shaded shape will tessellate.
You should draw at least six shapes.



2) On the grid below, show how the shaded shape will tessellate.
You should draw at least six shapes.

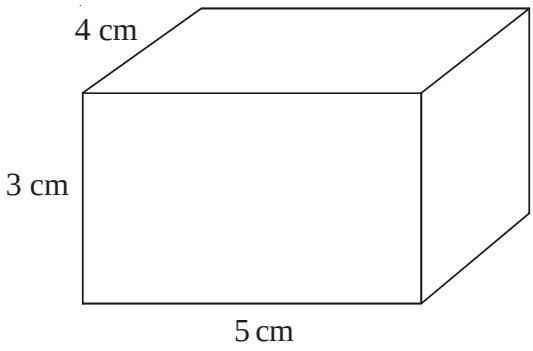


3) On the grid below, show how the shaded shape will tessellate.
You should draw at least six shapes.



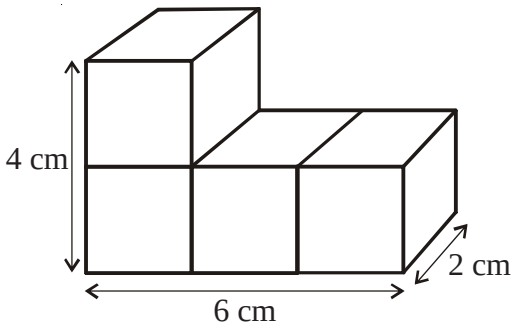
Isometric Drawing

1) Copy the shape below onto the isometric grid.



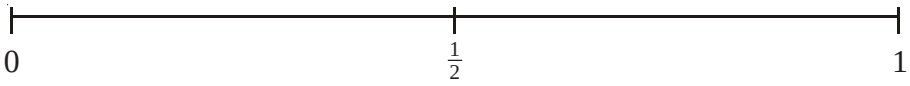
2) The shape below is made out of 2 cm by 2 cm by 2 cm cubes.

Copy the shape onto the isometric grid.

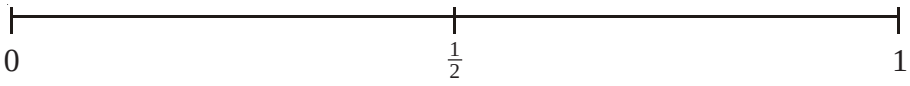


The Probability Scale

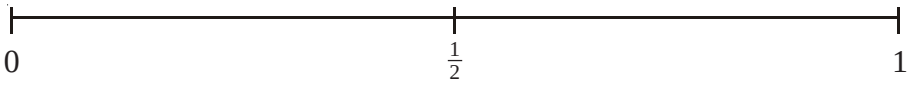
1) a) On the probability scale below, mark with a cross (×) the probability that it will snow in Birmingham in July.



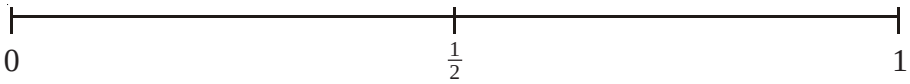
b) On the probability scale below, mark with a cross (×) the probability that it will rain in Wales next year.



c) On the probability scale below, mark with a cross (×) the probability that you will get a tail when you flip a fair coin.



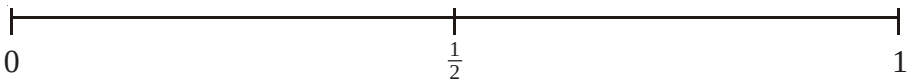
d) On the probability scale below, mark with a cross (×) the probability that you will get a number bigger than 4 when you roll an ordinary dice.



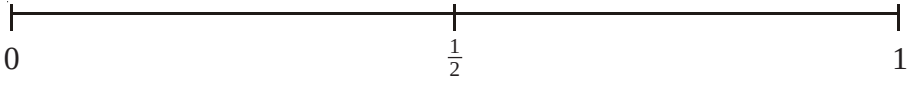
2) 4 jelly babies are in a bag.
2 are red, 1 is green and 1 is black.

Without looking in the bag, a jelly baby is taken out.

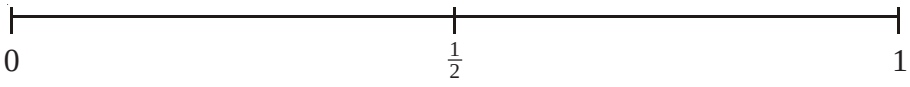
a) On the probability scale below, mark with a cross (×) the probability that the jelly baby taken from the bag is green.



b) On the probability scale below, mark with a cross (×) the probability that the jelly baby taken from the bag is green or black.



c) On the probability scale below, mark with a cross (×) the probability that the jelly baby taken from the bag is red or black.



The Averages

1) Kaya made a list of his homework marks.

3 2 3 4 1 4 5 4

a) Write down the mode of Kaya's marks.

b) Work out his mean homework mark.

2) Lydia rolled an 8-sided dice ten times.
Here are her scores.

5 1 2 5 3 8 6 6 3 2

a) Work out Lydia's median score.

b) Work out the mean of her scores.

3) In a two-week period, a train was this many minutes late each day:

3 0 0 0 7 4 5 2 0 1 14 0 5 1

a) What was the mean average number of minutes late?

b) What was the median average number of minutes late?

4) Two small Year 10 classes, Set A and Set B, sat the same Science test.

Set A had these scores for the test:

63%, 71%, 48%, 95%, 46%, 82%, 77%, 36%, 73%

Set B had these scores:

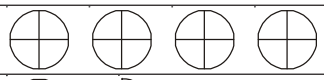
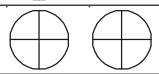
58%, 63%, 85%, 61%, 59% 38%, 90%, 84%, 75%, 48%

How much bigger was Set B's mean average score than Set A's mean average score?
Give your answer correct to 1 decimal place.

5) A rugby team played six games.
The mean score for the six games is 15
The rugby team played one more game.
The mean score for all seven games is 16
Work out the number of points the team scored in the seventh game.

Pictograms

1) The pictogram shows the number of watches sold by a shop in January, February and March.

January	
February	
March	
April	
May	

Key  represents 4 watches.

a) How many watches were sold in January?

b) How many **more** watches were sold in March than in February?

19 watches were sold in April.
14 watches were sold in May.

c) Use this information to complete the pictogram.

2) The pictogram shows the number of DVDs borrowed from a shop on Monday and Tuesday.

Monday	
Tuesday	
Wednesday	
Thursday	

Key  represents 10 DVDs.

a) How many DVDs were borrowed on
   (i) Monday?
   (ii) Tuesday?

On Wednesday, 50 DVDs were borrowed.
On Thursday, 15 DVDs were borrowed.

b) Show this information in the pictogram.

Conversion Graphs

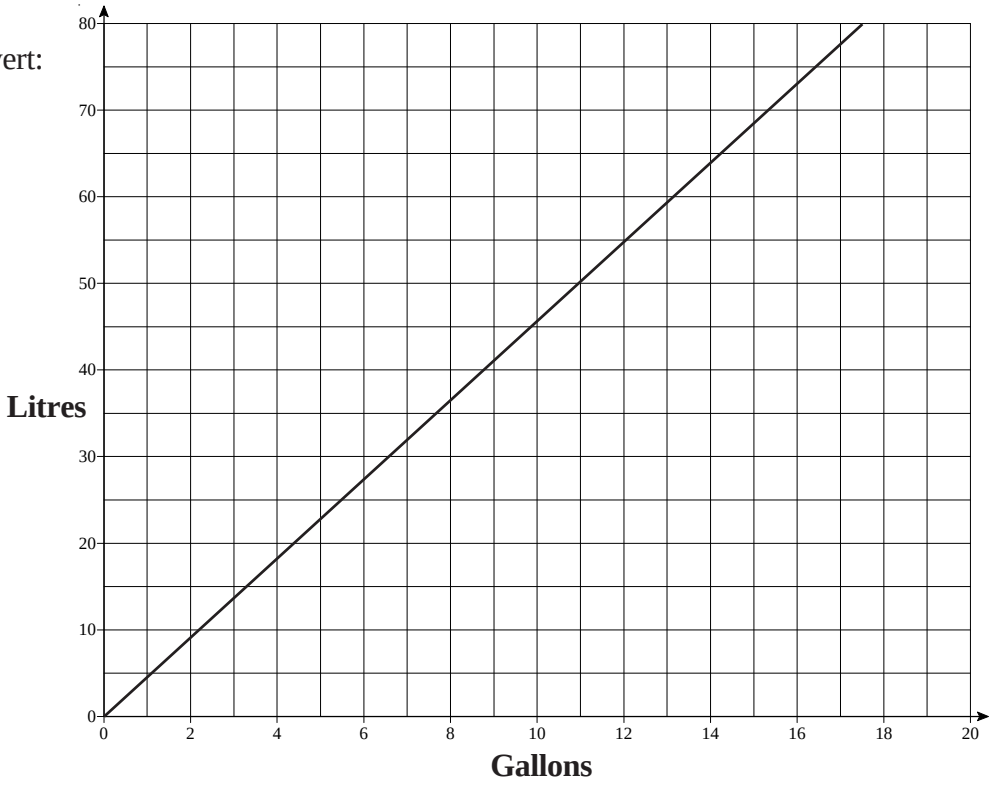
1) Use the graph to convert:

a) 11 gallons to litres

b) 40 litres to gallons

c) 15 gallons to litres

d) 25 litres to gallons



2) The conversion graph below converts between kilometres and miles.

a) Bob travels 50 miles.
What is this distance in kilometres?

b) Terry travels 100 kilometres.
What is this distance in miles?

c) The distance between the surgery and the hospital is 25 kilometres.
What is this distance in miles?

d) Bill completes a 10 mile run.
How far is this in kilometres?