

GCSE MATHEMATICS

# Aiming for Grade 1

REVISION BOOKLET

Exam Dates:

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Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

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## Types of Number

### Things to remember:

- A factor is a whole number that divides exactly into another number
- A multiple is a number that may be divided by another a certain number of times without a remainder
- A prime number has exactly two factors – 1 and itself
- A square number is a number that results from multiplying an integer (whole number) by itself
- A cube number is a number raised to the third power which is indicated by a power of 3
- A root is the inverse operation of a square or a cube (or beyond)

### Questions:

1. Here is a list of numbers:

1      3      4      7      8      12

From the list, write down:

i) an odd number

..... 1, 3 or 7

ii) an even number

..... 4, 8 or 12

iii) a prime number

..... 3 or 7

(Total 3 marks)

2. a) Write down the value of  $4^2$

..... 16

(1)

b) Write down the value of  $3^3$

..... 27

(1)

c) Write down the value of  $\sqrt{81}$

..... 9

(1)

(Total 3 marks)

3. Here is a list of eight numbers:

2      5      8      10      11      17      20      21

From the list, write down

i) a factor of 20

..... 2, 5, 10 or 20

ii) a multiple of 10

..... 10 or 20

iii) the prime number that is greater than 15

..... 17

(Total 3 marks)

4. a) Write down the value of  $6^2$   
 .....  $36$  ..... (1)
- b) Write down the value of  $\sqrt[3]{8}$   
 .....  $2$  ..... (1)
- c) Write down the value of  $2^3 + 3^2$   
 $8 + 9$   
 .....  $17$  ..... (2)
- (Total 3 marks)

5. Here is a list of numbers:

2    3    5    8    10    16    21    24

From the numbers in the list,

- i) write down an odd number  
 .....  $3, 5 \text{ or } 21$  .....
- ii) write down the square number  
 .....  $16$  .....
- iii) write down the number which is a multiple of 6  
 .....  $24$  .....
- (Total 3 marks)

6. Here is a list of numbers:

2    3    5    7    8    9    12    13

From the list, write down

- i) a factor of 12  
 .....  $2, 3 \text{ or } 12$  .....
- ii) a multiple of 3  
 .....  $3, 9 \text{ or } 12$  .....
- iii) a square number  
 .....  $9$  .....
- iii) a prime number  
 .....  $2, 3, 5 \text{ or } 13$  .....
- (Total 4 marks)

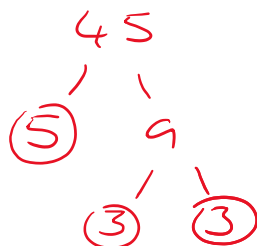
## Products of Prime Factors

### Things to remember:

- Prime numbers have exactly two factors – 1 and itself
- Split the original number into a factor pair,
  - if it's prime, circle it
  - if it's not prime, split it into a factor pair
- Product means multiply
- You can use indices (powers) to simplify your final answer

### Questions:

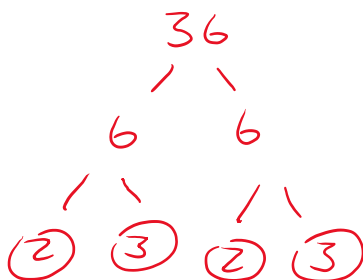
1. Express 45 as a product of its prime factors.



$$\begin{array}{l} 3^2 \times 5 \\ \dots 3 \times 3 \times 5 \dots \end{array}$$

(Total 2 marks)

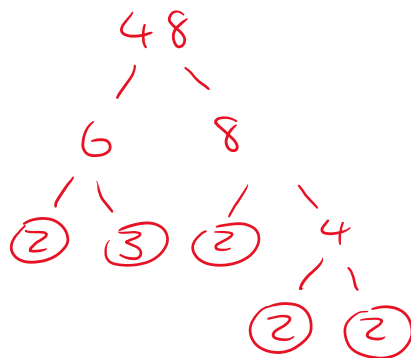
2. Express 36 as a product of its prime factors.



$$\begin{array}{l} 2^2 \times 3^2 \\ \dots 2 \times 2 \times 3 \times 3 \dots \end{array}$$

(Total 2 marks)

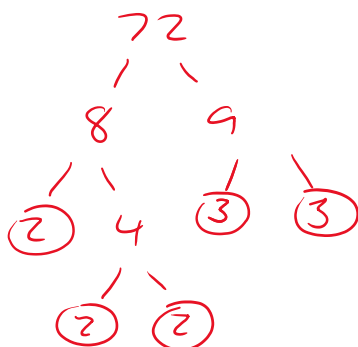
3. Express 48 as a product of its prime factors.  
Give your answer in index form.



$$\dots\dots\dots 2^4 \times 3$$

(Total 2 marks)

4. a) Express 72 as a product of its prime factors.  
Give your answer in index form.



$$\dots\dots\dots 2^3 \times 3^2$$

(2)

- b) Hence, or otherwise, express 144 as a product of its prime factors.

$$144 = 72 \times 2$$

$$\dots\dots\dots 2^4 \times 3^2$$

(1)  
(Total 3 marks)

## Place Value

Things to remember:

Millions	Hundreds of thousands	Tens of thousands	Thousands	Hundreds	Tens	Units	Tenths	Hundredths	Thousandths	Tens of thousandths	Hundreds of thousandths	Millionths

Questions:

1. Write down the value of the 3 in the number 4376

*3 hundreds*  
.....  
(Total 1 mark)

2. Write down the value of the 3 in 16.35

*3 tenths*  
.....  
(Total 1 mark)

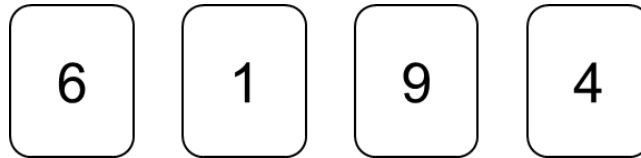
3. a) Write the number **eight thousand and thirty-seven**.

*8037*  
.....  
(1)

- b) Write the number 10672 in words.

*Ten thousand, six hundred and seventy two*  
.....  
(1)  
(Total 2 marks)

4. Here are four cards. There is a number on each card.



a) Write down the smallest 4-digit number that can be made using each card only once.

.....1469.....  
(1)

b) Write down the largest 4-digit **even** number that can be made using each card only once.

.....9614.....  
(1)

c) Write down all the 2-digit numbers that can be made using these cards.

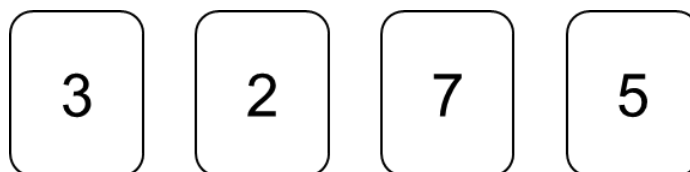
.....61, 69, 64, 16, 14, 19, 96, 91, 94, 46, 41, 49.....  
(2)  
(Total 4 marks)

5. Write these numbers in order of size. Start with the smallest number.

3007      4435      399      4011      3333

.....399, 3007, 3333, 4011, 4435.....  
(Total 1 mark)

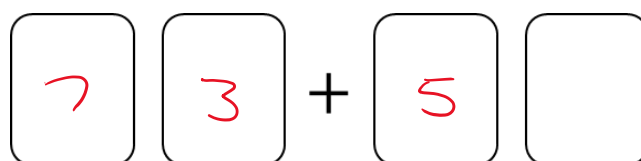
6. Here are 4 number cards.



a) Write down the smallest four digit number that can be made using these number cards.

.....2357.....  
(1)

b) Arrange the cards to give the largest possible answer to the sum.



(1)  
(Total 2 marks)



## Four operations

### Things to remember:

- Look for words that mean or imply:
  - Add (sum, total, altogether)
  - Subtract (difference, less than, more than, change)
  - Multiply (times, lots of, product)
  - Divide (share)
- You will need to use written methods to show your working

### Questions:

1. A piece of string is 350 cm long.  
Kev cuts three 40 cm lengths off the string.  
He then cuts the rest into as many 35 cm lengths as possible.  
Work out how many 35 cm lengths of string Kev cuts.

$$3 \times 40 = 120$$

$$350 - 120 = 230$$

$$230 \div 35 = 6 \text{ remainder } 20$$

6

.....  
(Total 3 marks)

2. Aurora wants to buy as many chocolate bars as she can.  
She has £5 to spend on chocolate bars.  
Each chocolate bar costs £0.52  
Work out how much change Aurora will get from £5.

$$500 \div 52 = 9 \text{ remainder } 32$$

32p

.....  
(Total 3 marks)

3. Stefan goes to a Cafe.  
He buys  
3 coffees for £2.60 each  
2 teas for £1.80 each  
5 cakes for £2.80 each  
Work out the total amount that Stefan spends

$$\begin{array}{l} \text{Coffee : } £ 7.80 \\ \text{Tea : } £ 3.60 \\ \text{Cake : } £ 14.00 + \\ \hline £ 25.40 \end{array}$$

£ ..... 25.40 .....  
(Total 3 marks)

4. Lisa buys a car.  
The total cost of the car is £6000  
Lisa pays a deposit of £900  
She then pays 12 equal monthly payments.  
How much is each monthly payment?

$$\begin{array}{l} 6000 - 900 = 5100 \\ 5100 \div 12 = 425 \end{array}$$

£ ..... 425 .....  
(Total 3 marks)

5. 2 calculators cost £22  
3 pens cost £3.54  
Mr Ward wants to buy 30 calculators and 30 pens.  
He only has £350  
Does Mr Ward have enough money to buy 30 pens and 30 calculators?  
You must show how you get your answer.

$$\begin{array}{l} 22 \times 15 = £ 330 \\ 10 \times 3.54 = £ 35.54 + \\ \hline £ 365.54 \end{array}$$

..... No .....  
(Total 3 marks)

6. Mrs Callaghan wants to buy a chocolate bar for every student in year 7.  
10

There are 210 students in year 7.

A pack of 5 chocolate bars costs £1.80

Work out how much Mrs Callaghan will have to pay for the chocolate bars.

$$210 \div 5 = 42 \text{ packs}$$

$$42 \times £1.80 = £75.60$$

£ ..... 75.60 .....  
(Total 3 marks)

7. Alice gets paid £19.20 for each hour she works from Monday to Friday.  
She gets paid £21.40 for each hour she works on Saturday.  
Last week Alice worked 18 hours from Monday to Friday and 6 hours on Saturday.  
Work out how much Alice earned last week.

$$18 \times £19.20 + 6 \times £21.40$$

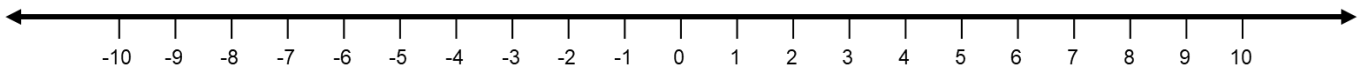
$$= £345.60 + £128.40$$

$$= £474$$

£ ..... 474 .....  
(Total 3 marks)

## Directed Numbers

### Things to remember:



### Questions:

1. Write these temperatures in order. Start with the lowest temperature.

2 °C      -6 °C      5 °C      -1 °C      8 °C

..... *-6 °C, -1 °C, 2 °C, 5 °C, 8 °C* .....  
(Total 1 mark)

2. Work out  $5 \times -2$

..... *-10* .....  
(Total 1 mark)

3. Work out  $-24 \div -6$

..... *4* .....  
(Total 1 mark)

4. Work out  $-6 + 8$

..... *2* .....  
(Total 1 mark)

5. Work out  $8 - -9$

..... *17* .....  
(Total 1 mark)

6. Work out  $-5 \times -7$

..... *35* .....  
(Total 1 mark)

7. Work out  $18 \div -3$

..... *-6* .....  
(Total 1 mark)

8. Work out  $4 + -9$

..... *-5* .....  
(Total 1 mark)

9. The temperature in Birmingham one day was  $-2\text{ }^{\circ}\text{C}$   
 The next day the temperature was  $3\text{ }^{\circ}\text{C}$  lower.  
 Work out the new temperature.

.....  $-5$  .....  $^{\circ}\text{C}$   
 (Total 1 mark)

10. The temperature in Newcastle at midnight was  $-3\text{ }^{\circ}\text{C}$   
 By 11 am, the temperature had risen by  $5\text{ }^{\circ}\text{C}$   
 Work out the temperature at 11 am

.....  $2$  .....  $^{\circ}\text{C}$   
 (Total 1 mark)

11. The temperature in Oakham at midnight was  $-2\text{ }^{\circ}\text{C}$   
 The temperature in Oakham at midday was  $8\text{ }^{\circ}\text{C}$   
 Work out the difference between the temperature in Oakham at midnight and midday

.....  $10$  .....  $^{\circ}\text{C}$   
 (Total 1 mark)

12. The table shows the temperature at midnight and midday on January 2<sup>nd</sup> 2020 in four cities.

City	Midnight temp	Midday temp
Murmansk	$-9\text{ }^{\circ}\text{C}$	$-6\text{ }^{\circ}\text{C}$
Budapest	$-3\text{ }^{\circ}\text{C}$	$4\text{ }^{\circ}\text{C}$
Paris	$4\text{ }^{\circ}\text{C}$	$8\text{ }^{\circ}\text{C}$
Prague	$-4\text{ }^{\circ}\text{C}$	$1\text{ }^{\circ}\text{C}$

- a) Write down the name of the city with the lowest midnight temperature.

..... *Murmansk* .....  
 (1)

- b) Which city had the greatest rise in temperature from midnight to midday?

..... *Budapest* .....  
 (1)

- c) At midnight, how many degrees colder was Murmansk than Paris?

.....  $13$  .....  $^{\circ}\text{C}$   
 (1)  
 (Total 3 marks)

## Next Terms in a Sequence

### Things to remember:

- If there is a pattern, look carefully at how many sticks/blocks are being added on each time
- Work out the rule (for example add 4 or multiply by 2) to help you work out the next term
- Check carefully each time as multiply rules may work for the first two terms, always check your theory takes you correctly to the third term too

### Questions:

1. Here are some patterns made from sticks.



a) In the space below, draw pattern number 4.



b) Complete the table.

Pattern number	1	2	3	4	5
Number of sticks	4	7	10	13	16

c) How many sticks make pattern number 15?

..... 46 .....  
(1)  
(Total 3 marks)

2. Here are the first five terms of a sequence.

2    4    7    11    16

Write down the next two terms in the sequence.

$$16 + 6 = 22$$

$$22 + 7 = 29$$

..... 22, 29 .....  
(Total 2 marks)

3. Here are the first four terms of a number sequence.

6      10      14      18

a) Write down the next term in this sequence.

..... 22 .....  
(1)

b) Find the 10<sup>th</sup> term in this sequence.

..... 42 .....  
(1)

c) The number 101 is not a term in this sequence. Explain why.

..... 101 is odd and all the numbers in the .....  
..... sequence are even .....  
(1)  
(Total 3 marks)

4. Here are the first five terms of a sequence.

31      27      23      19      15

a) Find the first negative term in the sequence.

..... -1 .....  
(1)

b) Is -30 a term in this sequence?  
Give a reason for your answer

..... No -30 is even and all the numbers in .....  
..... the sequence are odd .....  
(2)  
(Total 3 marks)

5. Here is a Fibonacci sequence.

1      1      2      3      5

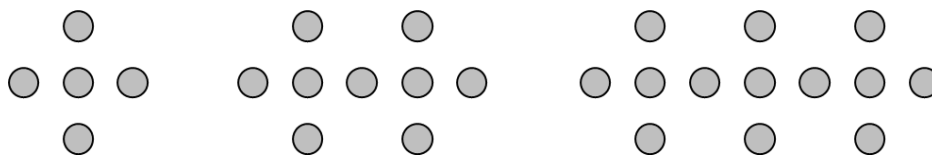
Write down the next two terms in the sequence.

$$3 + 5 = 8$$

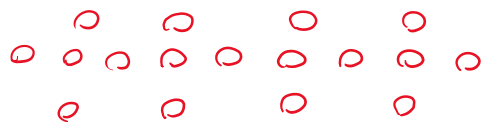
$$5 + 8 = 13$$

..... 8, 13 .....  
(Total 2 marks)

6. Here is a sequence of patterns made from grey counters.



a) In the space below, draw pattern number 4.



(1)

b) Complete the table.

Pattern number	1	2	3	4	5
Number of counters	5	9	13	17	21

(1)

c) How many sticks make pattern number 10?

..... 41 .....

(1)

b) Beth says it is possible to make a pattern that fits this sequence using 50 counters.

Beth is wrong.

Explain why

..... 50 is odd and all the numbers in the .....

..... sequence are odd. ....

(1)

(Total 4 marks)



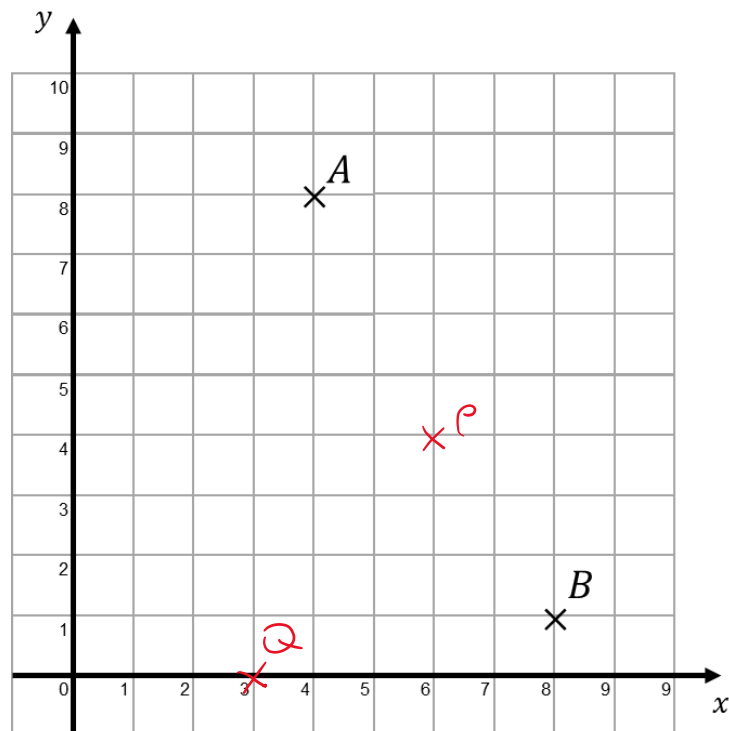
## Coordinates

### Things to remember:

- The  $x$ -axis goes horizontally across the page
- The  $y$ -axis goes vertically up the page
- “Along the corridor, up (or down) the stairs”  $\rightarrow (x, y)$

### Questions:

1. Below is a coordinate grid.



a) i) Write down the coordinates of the point  $A$

ii) Write down the coordinates of the point  $B$

$(4, 8)$

$(8, 1)$

(2)

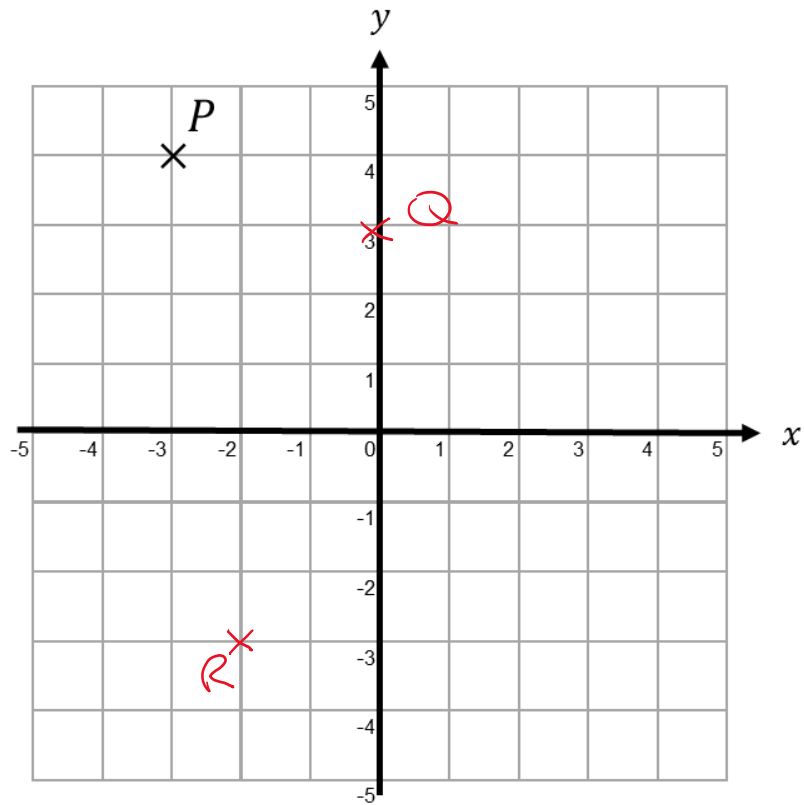
b) i) On the grid, mark the point  $(6, 4)$  with the letter  $P$

ii) On the grid, mark the point  $(3, 0)$  with the letter  $Q$

(2)

(Total 4 marks)

2. Below is a coordinate grid.



a) Write down the coordinates of the point  $P$

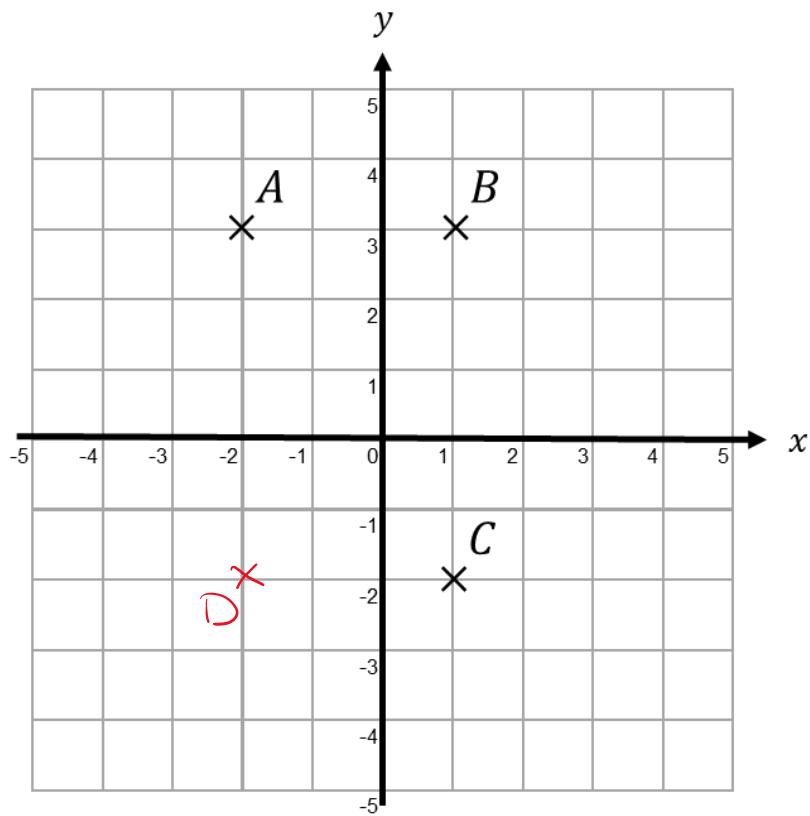
.....  $(-3, 4)$  ..... (1)

(b) i) On the grid, plot the point  $(0, 3)$ . Label the point  $Q$

ii) On the grid, plot the point  $(-2, -3)$ . Label the point  $R$

(2)  
(Total 3 marks)

3. Below is a coordinate grid.



a) Write down the coordinates of the point

i)  $A$

$(-2, 3)$

ii)  $C$

$(1, -2)$

(2)

b) i) On the grid, mark the point  $D$  so that  $ABCD$  is a rectangle.

ii) Write down the coordinates of  $D$

$(-2, -2)$

(2)

(Total 4 marks)

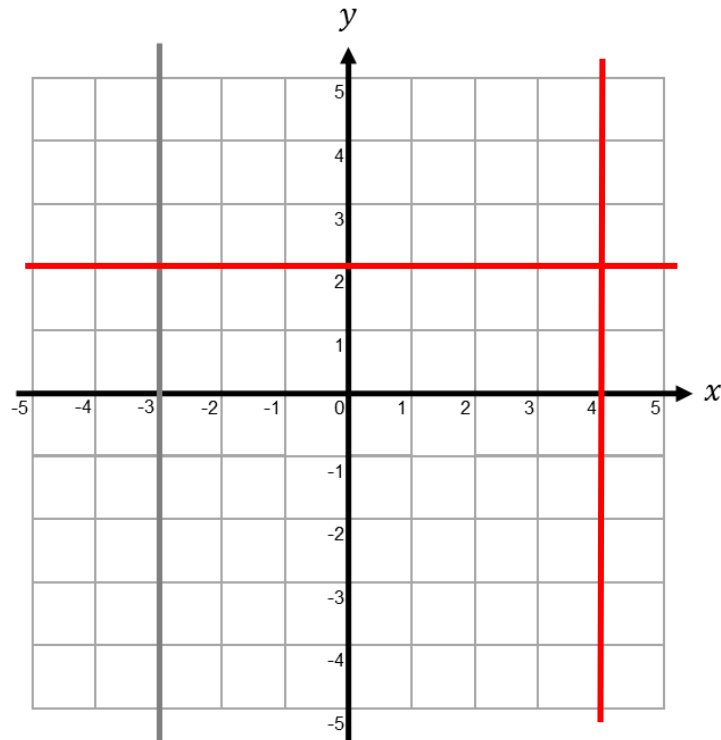
## Horizontal and Vertical Graphs

### Things to remember:

- Horizontal graphs are parallel to the  $x$ -axis and have equations  $y = c$ , where  $c$  is the  $y$ -intercept
- Vertical graphs are parallel to the  $y$ -axis and have equations  $x = c$ , where  $c$  is the  $x$ -intercept

### Questions:

1.



- a) Write down the equation of the line shown on the grid above.

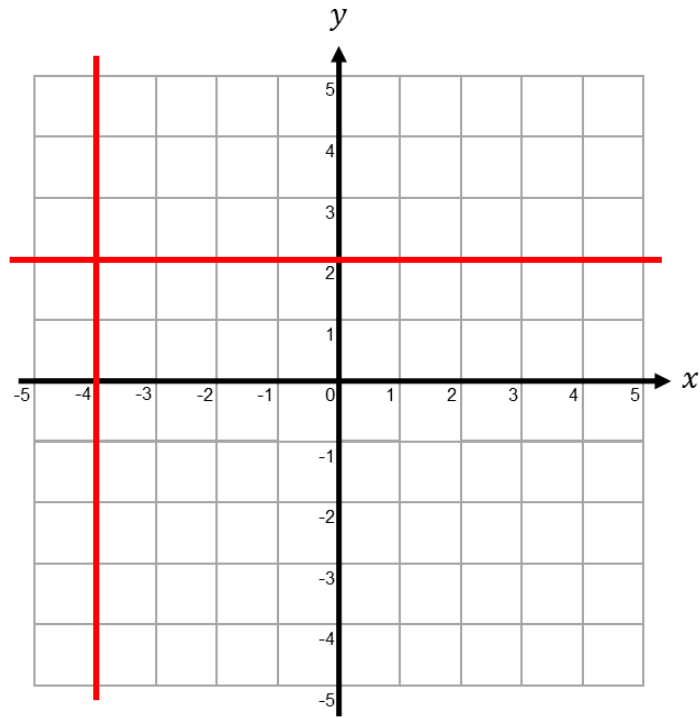
.....  $x = -3$  .....  
(1)

- b) i) Draw the line with equation  $y = 2$  on the grid above.

- ii) Draw the line with equation  $x = 4$  on the grid above.

(2)  
(Total 3 marks)

2.



a) On the grid above:

i) draw the graph of  $y = 2$

ii) draw the graph of  $x = -4$

(2)

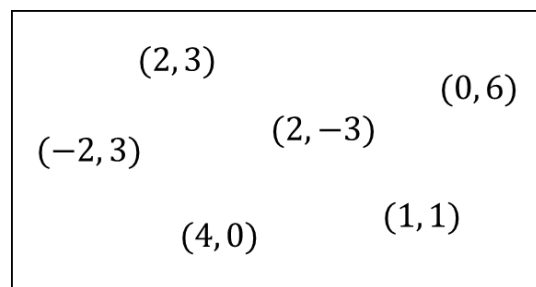
b) Write down where the two lines intersect.

.....  $(-4, 2)$  .....

(1)

(Total 3 marks)

3.



From the box above, choose any coordinates that lie on:

i) the  $x$ -axis

.....  $(0, 6)$  .....

ii)  $y = -3$

.....  $(2, -3)$  .....

iii)  $x = 4$

.....  $(4, 0)$  .....

(Total 3 marks)

## Simplifying Expressions

### Things to remember:

- $2a$  means  $a + a$  or 2 lots of  $a$
- $a^2$  means  $a \times a$
- $ab$  means  $a \times b$
- $\frac{a}{b}$  means  $a \div b$
- The sign (+ or -) belongs to the term following it. You may find it easier to identify like terms using two different highlighters.

### Questions:

1. a) Simplify  $c + c + c + c + c$

.....  
 $5c$

(1)

b) Simplify  $f + f + f - f$

.....  
 $2f$

(1)

c) Simplify  $3x + 4y + 5x + y$

.....  
 $8x + 5y$

(2)

(Total 4 marks)

2. a) Simplify  $2a \times 3b$

.....  
 $6ab$

(1)

b) Simplify  $2p \times 2p$

.....  
 $4p^2$

(1)

c) Simplify  $\frac{7x+5x}{3}$

$\frac{12x}{3}$

.....  
 $4x$

(1)

(Total 3 marks)

3. a) Simplify  $3 \times b \times 9$

.....  
 $27b$

(1)

b) Simplify  $2x - 3y - 6x - 4y$

.....  
 $-4x - 7y$

(1)

(Total 2 marks)

4. a) Simplify  $a \times b \times 3$

$3ab$

(1)

b) Simplify  $y \times y \times y$

$y^3$

(1)

c) Simplify  $\frac{10d}{d}$

$10$

(1)

(Total 3 marks)

5. Simplify  $7x^2 - 3x + 3x^2 + 6x$

$10x^2 + 3x$

(Total 2 marks)

6. a) Simplify  $4n - 3n + 5n$

$6n$

(1)

b) Simplify  $p^2 + p^2 + p^2$

$3p^2$

(1)

c) Simplify  $5 + 2a + 7b - 6a + b$

$5 - 4a + 8b$

(2)

(Total 4 marks)

7. a) Simplify  $n + n + n - n$

$4n$

(1)

b) Simplify  $3a \times 6b$

$18ab$

(1)

c) Simplify  $3xy + 2xy - xy$

$4xy$

(1)

c) Simplify  $4a + 3b - a + 3b + 6$

$3a + 6b + 6$

(2)

(Total 5 marks)

## Substitution

### Things to remember:

- There is usually 1 mark just for just substituting into the expression without doing any working out
- Your answer must be a number – don't forget to finish the calculation
- The question will usually use the words "find the value of"
- Be careful with negative numbers!

### Questions:

1.  $a = 7$  and  $b = 4$   
Work out the value of  $3a + 2b$

$$3 \times 7 + 2 \times 4 = 21 + 8$$

.....  
29

(Total 2 marks)

2.  $v = u + at$   
 $u = 3$ ,  $a = 9$  and  $t = 5$   
Work out the value of  $v$

$$3 + 9 \times 5 = 3 + 45$$

.....  
48

(Total 2 marks)

3.  $x = 6$  and  $y = 5$   
Work out the value of  $3x - y$

$$3 \times 6 - 5 = 18 - 5$$

.....  
13

(Total 2 marks)

4.  $c = 4d - 7$   
Find the value of  $c$  when  $d = 5$

$$4 \times 5 - 7 = 20 - 7$$

.....  
13

(Total 2 marks)



5.  $L = 7m + 2n$   
Work out the value of  $L$  when  $m = 3$  and  $n = -6$

$$7 \times 3 + 2 \times -6 = 21 - 12$$

9

(Total 2 marks)

6.  $q = 7p + 2r$   
 $p = 6$  and  $r = -4$   
Work out the value of  $q$

$$7 \times 6 + 2 \times -4 = 42 - 8$$

34

(Total 2 marks)

7.  $H = 3f + g$   
Work out the value of  $H$  when  $f = 5$  and  $g = -2$

$$3 \times 5 + -2 = 15 - 2$$

13

(Total 2 marks)

8.  $d = \frac{f}{g}$   
 $f = 12$  and  $g = -4$   
Work out the value of  $d$

$$\frac{12}{-4}$$

-3

(Total 2 marks)

9.  $A = \frac{1}{2}bh$   
Work out the value of  $A$  when  $b = 3$  and  $h = 8$

$$\frac{1}{2} \times 3 \times 8 = \frac{1}{2} \times 24$$

12

(Total 2 marks)

## Solving Equations

### Things to remember:

- “Solve” means to find the value of the variable (what number the letter represents)
- The inverse of + is – and the inverse of  $\times$  is  $\div$
- Work one step at a time, keeping your = signs in line on each new row of working

### Questions:

1. Solve  $x + 4 = 12$

$x = \dots\dots\dots 8 \dots\dots\dots$   
(Total 1 marks)

2. Solve  $3a = 18$

$a = \dots\dots\dots 6 \dots\dots\dots$   
(Total 1 marks)

3. Solve  $c - 5 = 2$

$c = \dots\dots\dots 7 \dots\dots\dots$   
(Total 1 marks)

4. Solve  $5d = -20$

$d = \dots\dots\dots -4 \dots\dots\dots$   
(Total 1 marks)

5. Solve  $\frac{y}{2} = 4$

$y = \dots\dots\dots 8 \dots\dots\dots$   
(Total 1 marks)

6. a) Solve  $x + 7 = 13$

$x = \dots\dots\dots 6 \dots\dots\dots$   
(1)

b) Solve  $3h - 5 = 13$

$3h = 18$

$h = \dots\dots\dots 6 \dots\dots\dots$   
(2)  
(Total 3 marks)

7. a) Solve  $4a = 20$

$a = \dots\dots\dots 5 \dots\dots\dots$   
(1)

b) Solve  $3y + 9 = 24$

$3y = 15$

$y = \dots\dots\dots 5 \dots\dots\dots$   
(2)  
(Total 3 marks)

8. Solve  $\frac{y}{3} - 5 = 4$

$\frac{y}{3} = 9$

$y = \dots\dots\dots 27 \dots\dots\dots$   
(Total 2 marks)

9. a) Solve  $3 = 9 - 4k$

$-6 = -4k$

$k = \frac{-6}{-4}$

$y = \dots\dots\dots 1.5 \dots\dots\dots$   
(2)

b) Solve  $\frac{d+3}{4} = 5$

$d+3 = 20$

$d = \dots\dots\dots 17 \dots\dots\dots$   
(2)  
(Total 4 marks)

## Using Inequality Symbols

### Things to remember:

- = means equal to
- $\neq$  means not equal to
- < means less than
- > means greater than
- $\leq$  means less than or equal to
- $\geq$  means greater than or equal to
- An integer is a whole number

### Questions:

1. Put the correct symbol in each box.  
Choose from < > =

$132 = 11 \times 12$	<input "="" type="text" value="="/>	$22 \times 6 = 132$
32	<input style="color: red;" type="text" value="&gt;"/>	23
$20 = \frac{10}{0.5}$	<input style="color: red;" type="text" value="&gt;"/>	10

(Total 3 marks)

2. Here is an inequality

$$8 > 3$$

Write in words what this inequality means.

..... Eight is greater than three .....

(Total 1 mark)

3. Here is an inequality

$$x \leq y$$

Write in words what this inequality means.

..... x is less than or equal to y .....

(Total 1 mark)

4. Match each inequality to the correct description.

$x < 3$	<del>_____</del>	$x$ is less than or equal to 3
$x > 3$	<del>_____</del>	$x$ is less than 3
$x \leq 3$	<del>_____</del>	$x$ is greater than or equal to 3
$x \geq 3$	<del>_____</del>	$x$ is greater than 3

(Total 3 marks)

5. Put the correct symbol in each box.  
Choose from  $<$   $>$   $=$

$25 = 5^2$	<input type="text" value="&gt;"/>	$5 \times 2 = 10$
0.06	<input type="text" value="&lt;"/>	0.6
$\frac{2}{3}$	<input type="text" value="&lt;"/>	$\frac{3}{2}$

(Total 3 marks)

6. Here is an inequality

$$a > 6$$

Write in words what this inequality means.

.....  $a$  is greater than six .....

(Total 1 mark)

7. Here is an inequality

$$f \neq 7$$

Write in words what this inequality means.

.....  $f$  is not equal to 7 .....

(Total 1 mark)

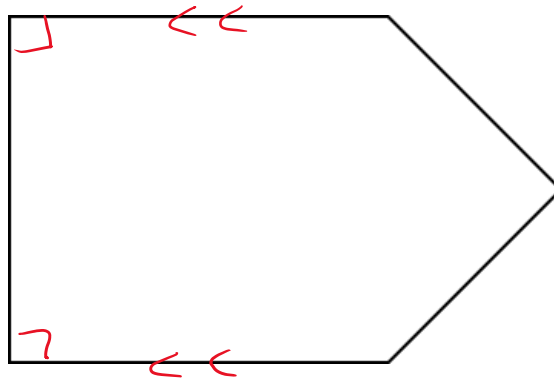
## Types of Lines, Angles and Shapes

### Things to remember:

- Lines are parallel if they'll never meet, and are perpendicular if they meet at  $90^\circ$
- Angles are acute if they're less than  $90^\circ$ , obtuse if they're between  $90^\circ$  and  $180^\circ$ , and reflex if they are greater than  $180^\circ$  and less than  $360^\circ$
- 2D shapes are 2 dimensional and flat. They have sides and vertices
- 3D shapes are 3 dimensional and solid. They have faces, edges and vertices

### Questions:

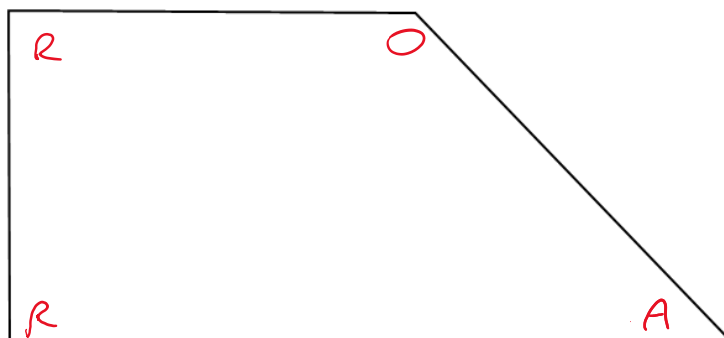
1. Below is a pentagon with two right angles.



- a) Use arrows ( $< <$ ) to show a pair of parallel lines. (1)
- b) Use a small square ( $\square$ ) to show a pair of perpendicular lines. (1)

(Total 2 marks)

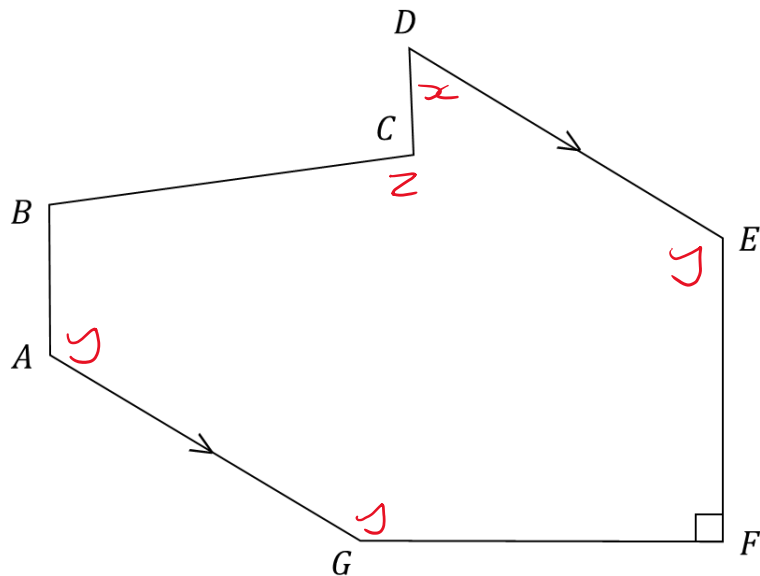
2. Here is a trapezium.



- a) Mark a right angle with a letter  $R$ . (1)
- b) Mark an acute angle with a letter  $A$ . (1)
- c) Mark an obtuse angle with a letter  $O$ . (1)

(Total 3 marks)

3. Here is a shape.



- a) a) What is the mathematical name given to ABCDEFG?  
..... *Octagon* ..... (1)
  - b) Mark, with an  $x$ , an acute angle. (1)
  - c) Mark, with an  $y$ , an obtuse angle. (1)
  - d) Mark, with an  $z$ , a reflex angle. (1)
  - e) Which line is parallel to  $AG$ ?  
..... *DE* ..... (1)
  - f) Which line is perpendicular to  $EF$ ?  
..... *FG* ..... (1)
- (Total 6 marks)

4. Here is a list of names of triangles.

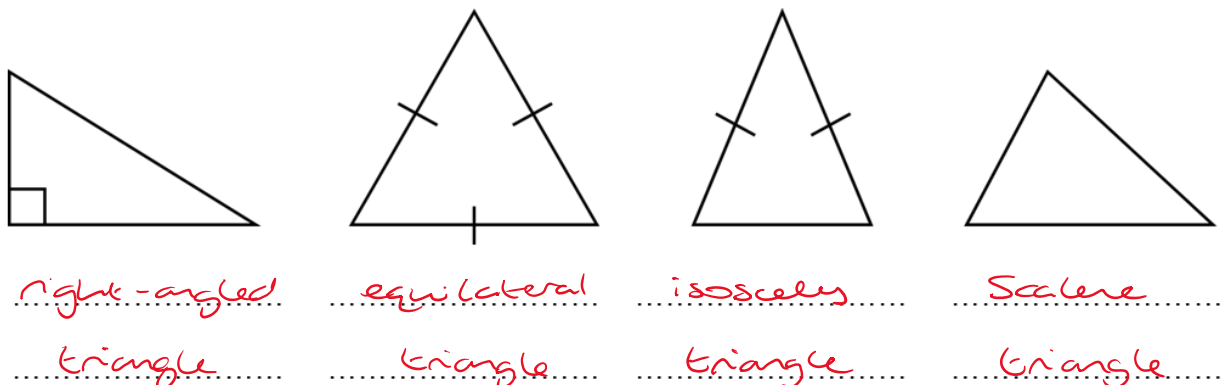
equilateral triangle

isosceles triangle

scalene triangle

right-angled triangle

Use the list to label each diagram correctly



*right-angled*  
.....  
*triangle*  
.....

*equilateral*  
.....  
*triangle*  
.....

*isosceles*  
.....  
*triangle*  
.....

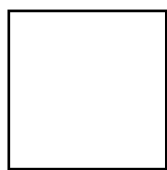
*Scalene*  
.....  
*triangle*  
.....

(Total 3 marks)

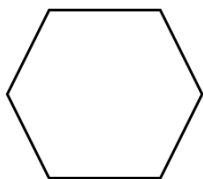
5. The names of five 2D shapes are given.

Octagon      Hexagon      Square      Pentagon      Triangle

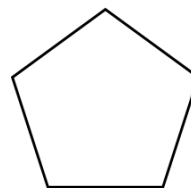
Three of them are drawn below.



Shape A



Shape B



Shape C

Complete these statements.

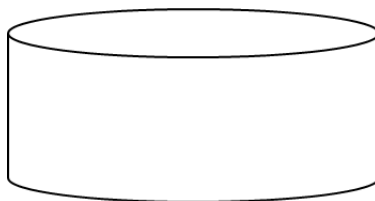
Shape A is called a ..... *Square* .....

Shape B is called a ..... *hexagon* .....

Shape C is called a ..... *pentagon* .....

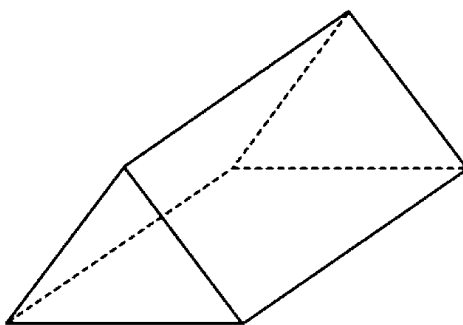
(Total 3 marks)

6. Shown is a solid shape.



a) What is the mathematical name for the shape?

..... *cylinder* ..... (1)



The shape above is a triangular prism.

b) How many faces does a triangular prism have?

..... *5* ..... (1)

c) How many edges does a triangular prism have?

..... *9* ..... (1)

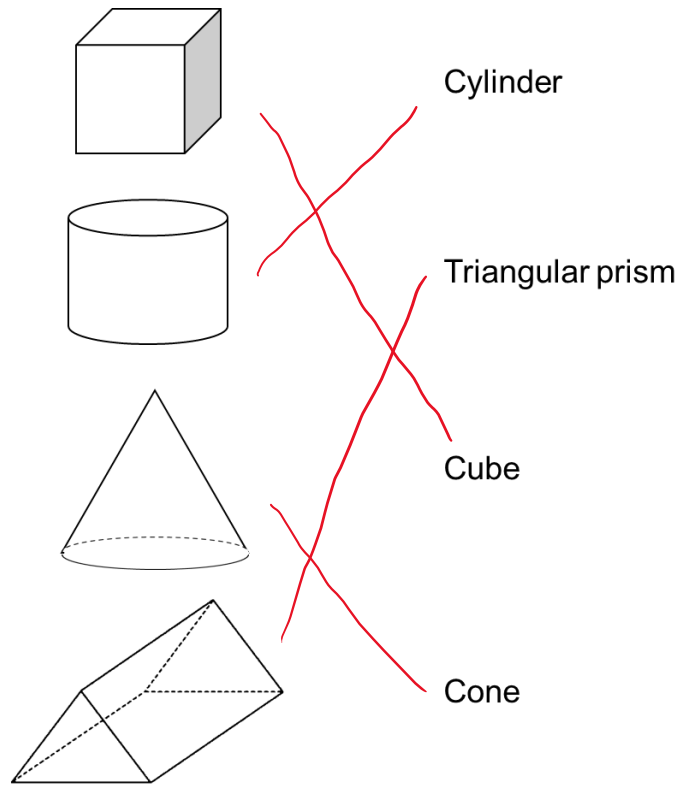
d) How many vertices does a triangular prism have?

..... *6* ..... (1)

(Total 4 marks)



7. Below is a list of solid shapes and their names.



Match each shape to the correct name.

(Total 3 marks)

8. Complete the table below.

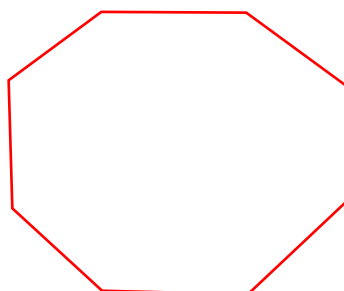
	Faces	Edges	Vertices
Cube	6	12	8
Square-based pyramid	5	8	5
Triangular prism	5	9	6

(Total 6 marks)

9. a) How many sides does a hexagon have?

.....6.....  
(1)

b) Draw an octagon.



(1)  
(Total 2 marks)

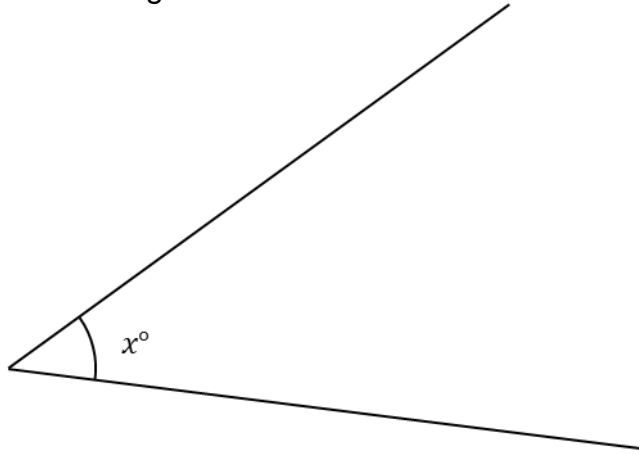
## Drawing and Measuring Angles

### Things to remember:

- Make sure the centre of the protractor is on the vertex of the angle
- Look carefully at the protractor – always measure from  $0^\circ$ , not  $180^\circ$

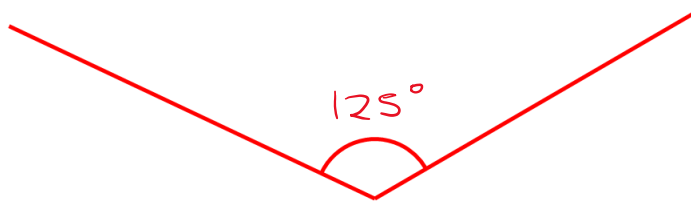
### Questions:

1. a) Measure the size of angle  $x$



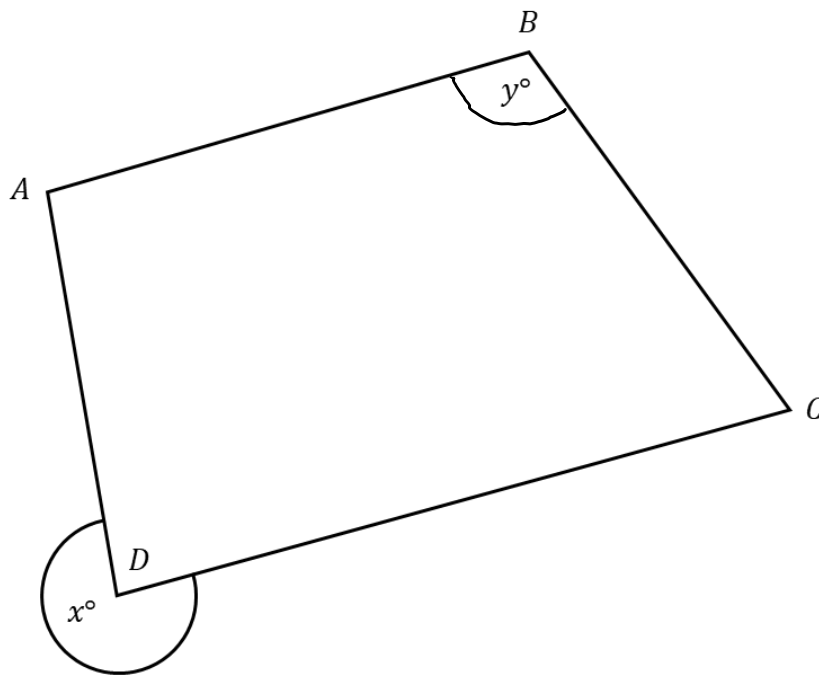
42°  
(1)

- b) Draw and label an angle of  $125^\circ$



(1)  
(Total 2 marks)

2.



a) Measure the length of the line  $AB$

..... 6.7 ..... cm  
(1)

b) What type of angle is  $x$ ?

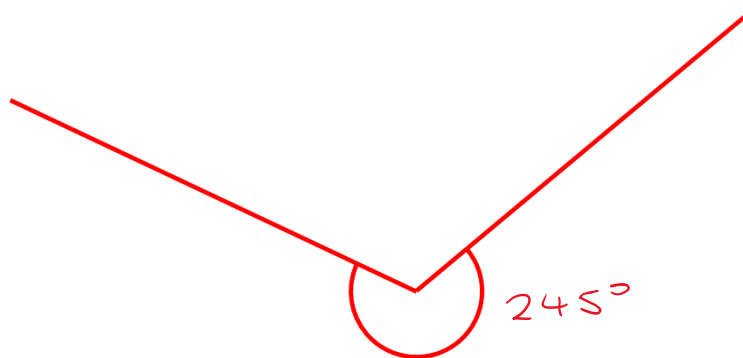
..... reflex .....  
(1)

c) Measure the size of angle  $y$

..... 110 .....  
(1)

(Total 3 marks)

3. In the space below, draw an angle of  $245^\circ$



(Total 1 mark)

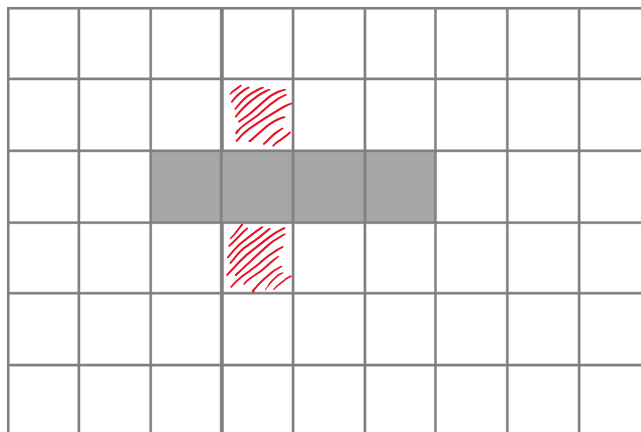
## Nets

### Things to remember:

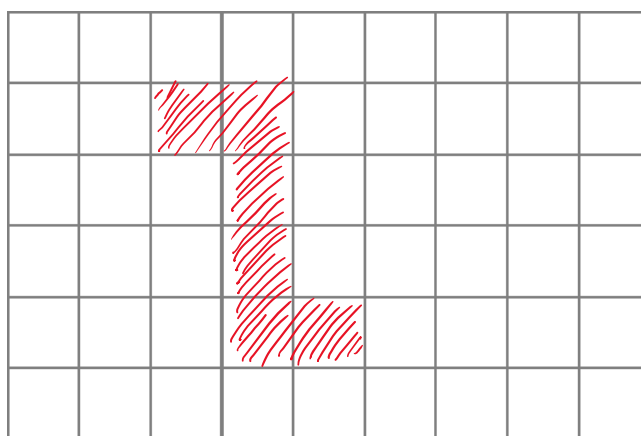
- The net of a 3D shape is what it looks like if it is opened out flat. A net can be folded up to make a 3D shape
- There may be several possible nets for one 3D shape

### Questions:

1. a) Shade two more squares so that the shaded shape is a net of a cube.



- b) Shade six more squares to create a different net of a cube.

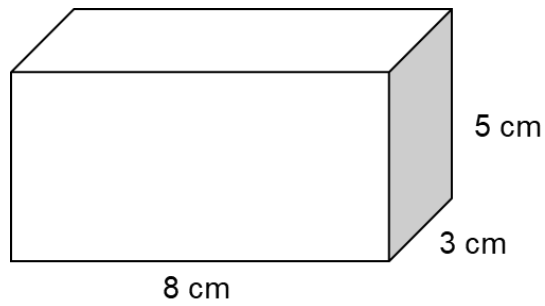


(1)

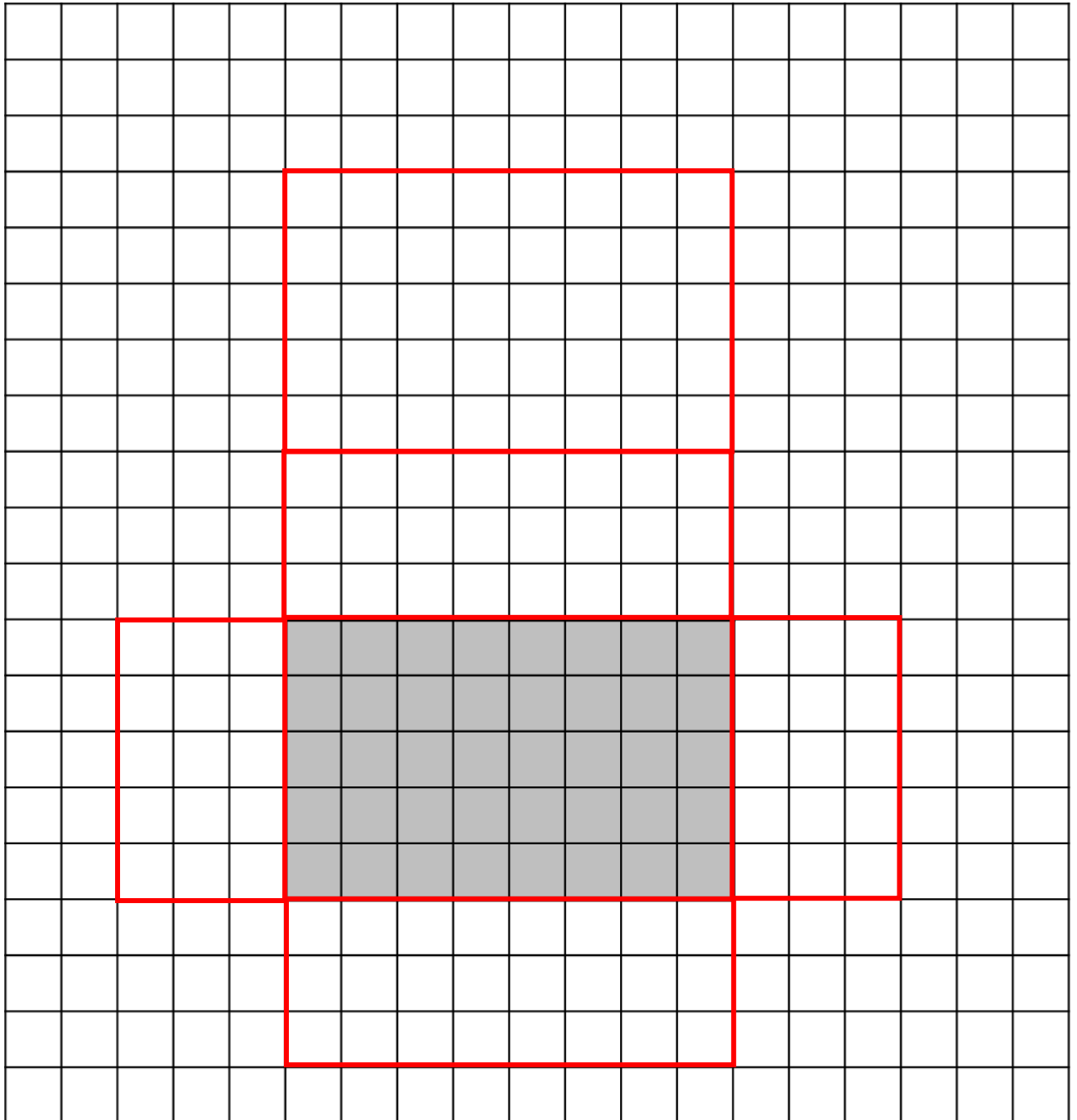
(1)

(Total 2 marks)

2. Below is a cuboid with length 8 cm, width 3 cm and height 5 cm.

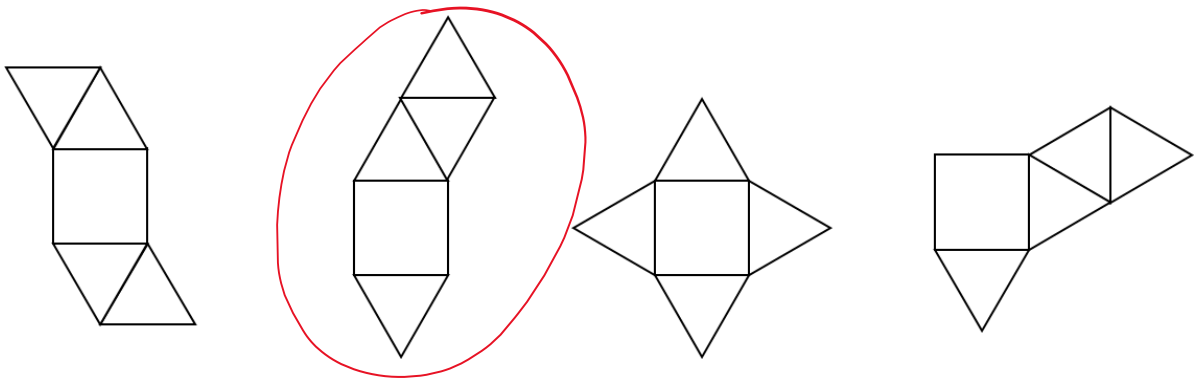


Complete an accurate net of the cuboid.  
Each square represents 1 cm<sup>2</sup>



(Total 3 marks)

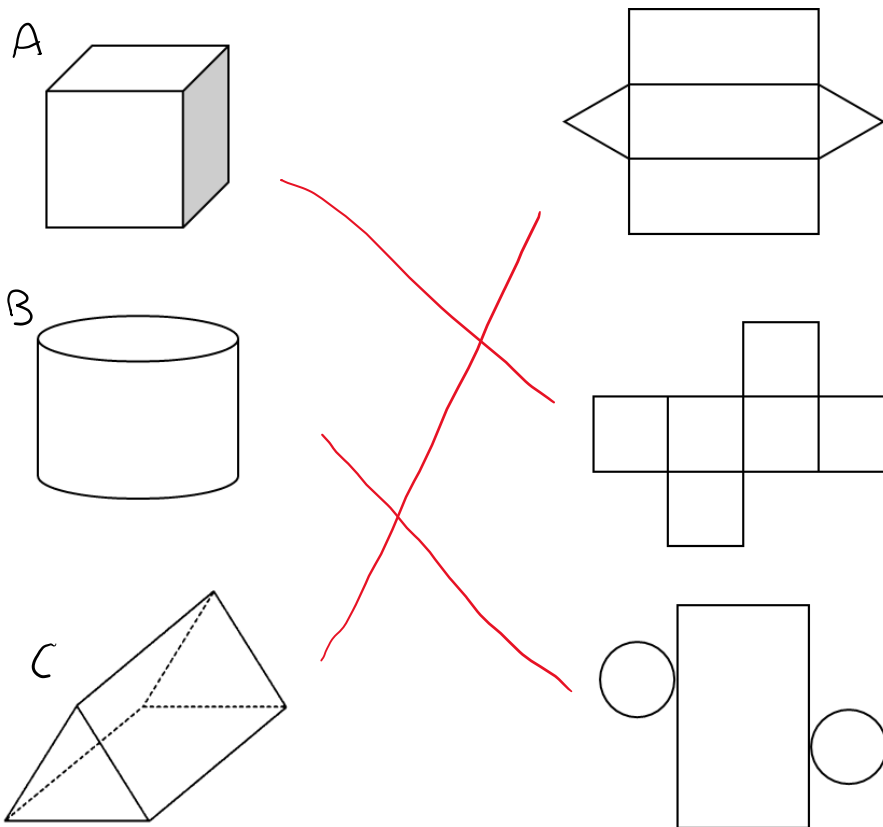
3. Here are 4 diagrams.



Three of these diagrams show a net for a square-based pyramid.  
Circle the diagram which is not a net for a square-based pyramid.

(Total 1 mark)

4. The diagram below shows three 3D solid shapes and their nets.



a) Match each solid shape to the correct net. (3)

b) Name shape C (1)

*Triangular prism*

c) Write down the number of faces of shape A (1)

*6*

d) Write down the number of vertices of shape B (1)

*0*

(Total 6 marks)

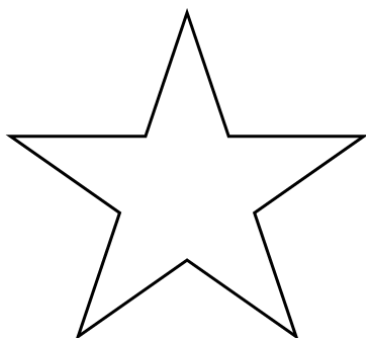
## Reflective and Rotational Symmetry

### Things to remember:

- A reflection is where the shape is flipped in a mirror line
- The number of lines of symmetry a shape has is how many different places it is possible to draw a mirror line
- A rotation is where the shape is turned around a point
- The order of rotational symmetry is how many times you can turn the shape so it looks the same

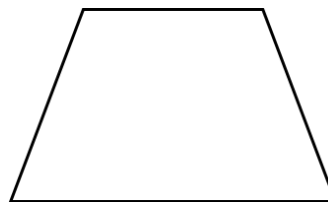
### Questions:

1. For each shape write down the number of lines of symmetry and the order of rotational symmetry



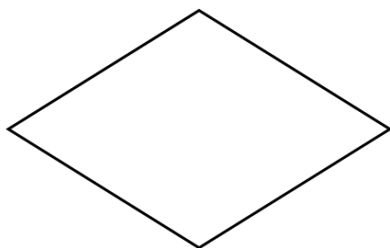
Lines of symmetry ..... 5 .....

Rotational symmetry order ..... 5 .....



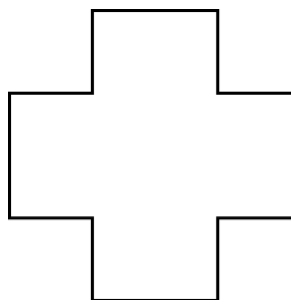
Lines of symmetry ..... 1 .....

Rotational symmetry order ..... 0 .....



Lines of symmetry ..... 2 .....

Rotational symmetry order ..... 2 .....

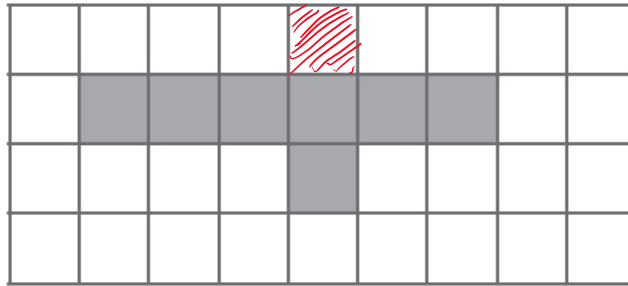


Lines of symmetry ..... 4 .....

Rotational symmetry order ..... 4 .....

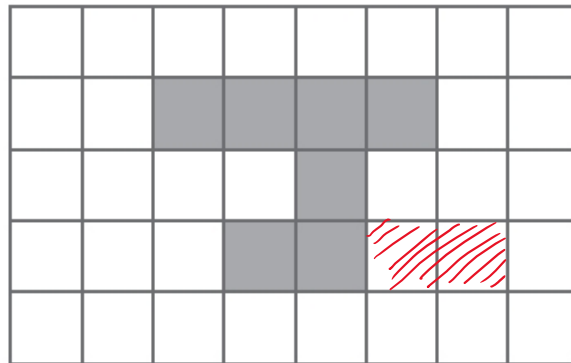
(Total 8 marks)

2. a) On the grid, shade in one more square so that the completed shape has one line of symmetry.



(1)

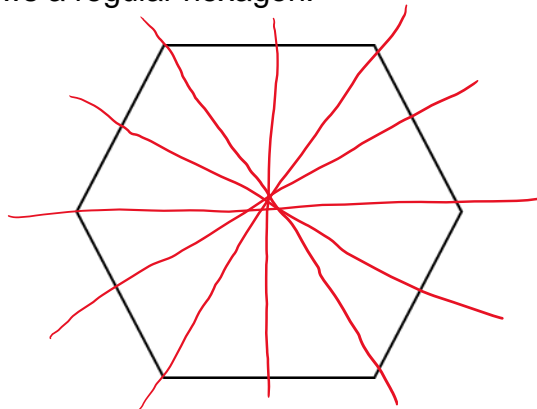
- b) On the grid below, shade in two more squares so that the completed shape has rotational symmetry of order 2



(1)

(Total 2 marks)

3. The diagram below shows a regular hexagon.



- a) Write down the order of rotational symmetry of the hexagon.

6

(1)

- b) On the diagram draw in all the lines of symmetry.

(2)

(Total 3 marks)



4. Complete the table below to show the symmetry properties of quadrilaterals

	Exactly 1 line of symmetry	Rotational symmetry of order 2
Rectangle	×	✓
Square	×	×
Kite	✓	×
Rhombus	×	✓

(Total 6 marks)

5. For each shape write down the number of lines of symmetry and the order of rotational symmetry



Lines of symmetry ..... 2 .....

Rotational symmetry order ..... 2 .....



Lines of symmetry ..... 0 .....

Rotational symmetry order ..... 3 .....



Lines of symmetry ..... 1 .....

Rotational symmetry order ..... 0 .....



Lines of symmetry ..... 1 .....

Rotational symmetry order ..... 0 .....

(Total 8 marks)

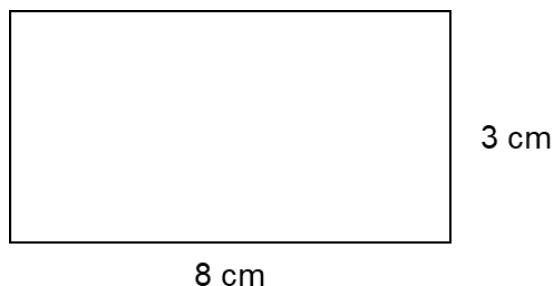
## Area and Perimeter of Squares and Rectangles

### Things to remember:

- The area is the 2D space inside the shape and units are usually  $\text{cm}^2$ ,  $\text{m}^2$  or  $\text{mm}^2$
- Area of a rectangle = base  $\times$  height
- The perimeter is the distance around the edge of the shape and units are usually cm, m or mm

### Questions:

1. Here is a rectangle.



a) Work out the area of this rectangle.

$$8 \times 3$$

..... 24 .....  $\text{cm}^2$   
(2)

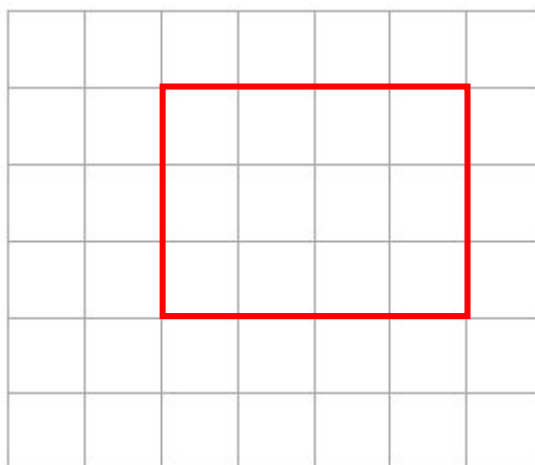
b) Work out the perimeter of this rectangle.

$$8 + 3 + 8 + 3$$

..... 22 .....  $\text{cm}^2$   
(2)

(Total 4 marks)

2. On the centimetre grid, draw a rectangle with an area of  $12 \text{ cm}^2$



(Total 1 marks)

3. A square has a perimeter of 36 cm.  
Find the area of the square.

$$36 \div 4 = 9$$
$$9^2 = 81$$

..... 81 ..... cm<sup>2</sup>  
(Total 2 marks)

4. The diagram shows a rectangle and a square.

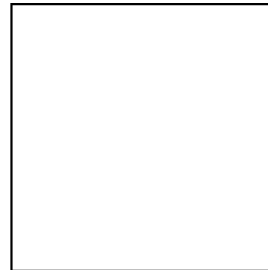
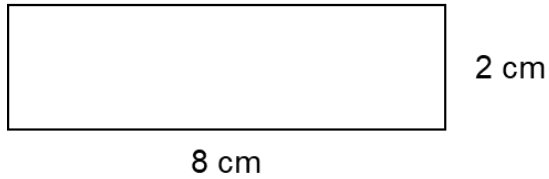


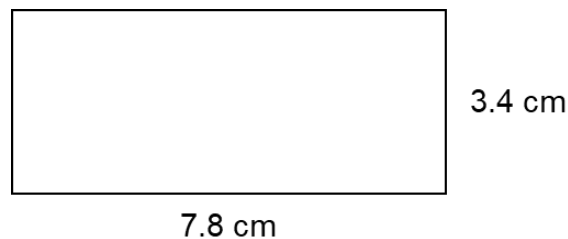
Diagram NOT  
drawn accurately

The perimeter of the rectangle is the same as the perimeter of the square.  
Work out the length of one side of the square.

$$8 + 2 + 8 + 2 = 20$$
$$20 \div 4 = 5$$

..... 5 ..... cm  
(Total 4 marks)

5. Here is a rectangle.



Work out the area of this rectangle.  
Include the units with your answer.

$$3.4 \times 7.8$$

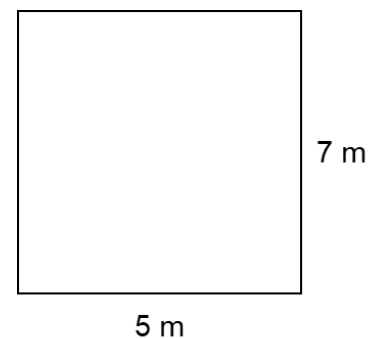
..... 26.52 cm<sup>2</sup> .....  
(Total 3 marks)

6. A rectangle has an area of  $27 \text{ cm}^2$  and a length of  $3 \text{ cm}$ . Calculate its perimeter.

$$27 \div 3 = 9$$
$$9 + 3 + 9 + 3 = 24$$

.....  $24$  ..... cm  
(Total 3 marks)

7. Sarah buys a new house. She wants to have a lawn in the back garden. The lawn is going to be in the shape of a rectangle. The lawn will have a length of  $7 \text{ m}$  and a width of  $5 \text{ m}$ . Sarah wants to buy edging strip for her lawn. The length of the edging strip needs to be equal to the perimeter of her lawn. Edging strip costs  $\text{£}1.50$  per metre. What is the total cost of the edging strip?



$$7 + 5 + 7 + 5 = 24 \text{ m}$$
$$24 \times 1.5 = \text{£}36$$

£ .....  $36$  .....  
(Total 4 marks)

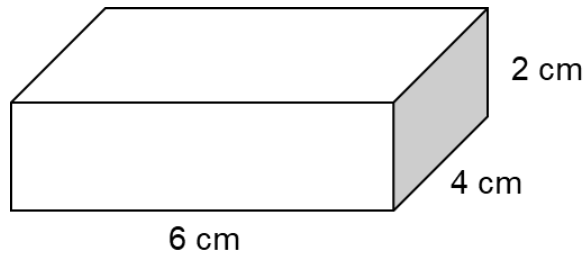
## Volume and Surface Area of Cubes and Cuboids

### Things to remember:

- Volume is the 3D space inside a space
- The volume of a cube or cuboid is given by length  $\times$  width  $\times$  height
- The surface area is the area of the surface
- To work out the surface area, calculate the area of each face then add them all together

### Questions:

1. Here is a cuboid.



a) Work out the volume of the cuboid.

$$2 \times 4 \times 6$$

..... 48 .....  $\text{cm}^3$   
(2)

b) Work out the surface area of the cuboid.

$$\begin{aligned} 6 \times 4 \times 2 &= 48 \\ 6 \times 2 \times 2 &= 24 \\ 4 \times 2 \times 4 &= 16 + \\ &\underline{\quad\quad} \\ &88 \end{aligned}$$

..... 88 .....  $\text{cm}^2$   
(3)  
(Total 5 marks)

2. Calculate the volume of a cube with side length 4 cm.

$$4 \times 4 \times 4$$

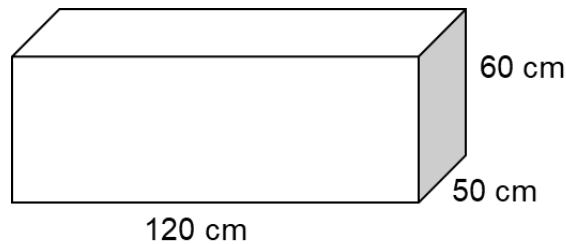
..... 64 .....  $\text{cm}^3$   
(Total 2 marks)

3. Calculate the total surface area of a cube with side length 7 cm.

$$7 \times 7 \times 6$$

..... 294 ..... cm<sup>2</sup>  
(Total 2 marks)

4. The diagram shows an empty water container.



The container is going to be filled using a hose pipe.  
The water will flow into the container at a rate of 2 litres per second.  
How long will it take for the container to be filled completely?  
You must include units with your answer.

1 cm<sup>3</sup> = 1 ml  
1000 ml = 1 litre

$$120 \times 60 \times 50 = 360\,000 \text{ cm}^3$$
$$= 360 \text{ L}$$

$$360 \div 2 = 180 \text{ seconds}$$

..... 3 minutes .....  
(Total 5 marks)

5. The total surface area of a cube is 150 cm<sup>2</sup>  
Work out the volume of the cube.

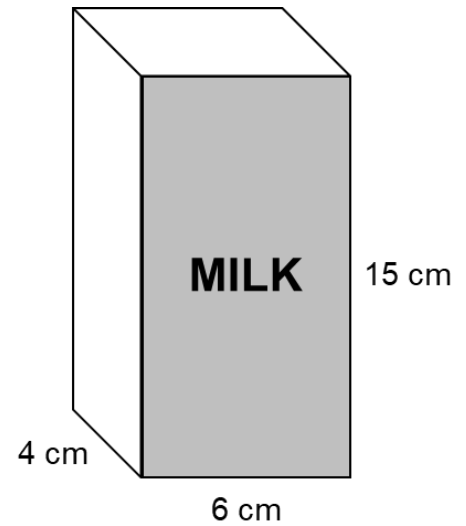
$$150 \div 6 = 25$$

$$\sqrt{25} = 5$$

$$5 \times 5 \times 5 = 125$$

..... 125 ..... cm<sup>3</sup>  
(Total 4 marks)

6. A carton of milk is shown below.  
 The carton is in the shape of a cuboid.  
 The depth of the milk in the carton is 12 cm.  
 The carton is turned so that it stands on the shaded face.  
 Work out the new depth of the milk.



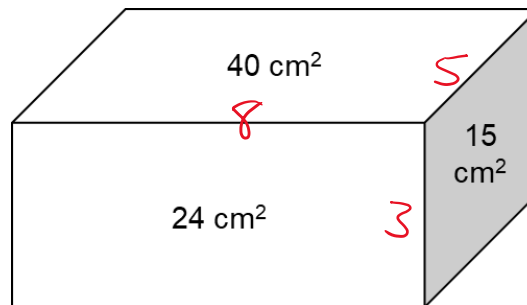
$$4 \times 6 \times 12 = 288$$

$$6 \times 15 = 90$$

$$288 \div 90 = 3.2$$

..... 3.2 ..... cm  
 (Total 3 marks)

7. The diagram shows the area of each of three faces of a cuboid.  
 The length of each edge of the cuboid is a whole number of centimetres.  
 Work out the volume of the cuboid.



$$8 \times 5 \times 3$$

..... 120 ..... cm<sup>3</sup>  
 (Total 4 marks)

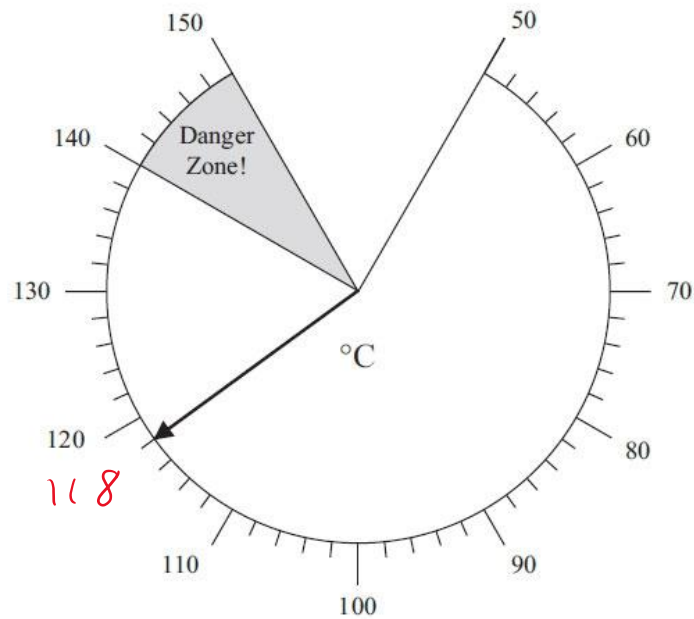
## Reading and Interpreting Scales

### Things to remember:

- Divide the interval by the number of notches to work out what each space between the notch is worth
- Be careful when reading scales – continue to count on until you reach the next written value to check you have calculated correctly

### Questions:

1. The diagram shows a temperature gauge.



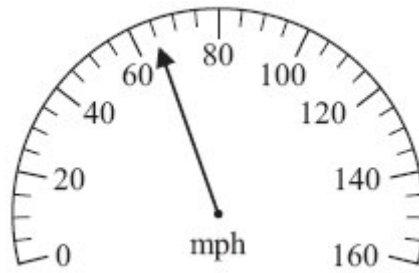
How many degrees does the temperature have to rise to get to the danger zone?

$$140 - 118$$

..... 22 ..... °C  
(Total 2 marks)



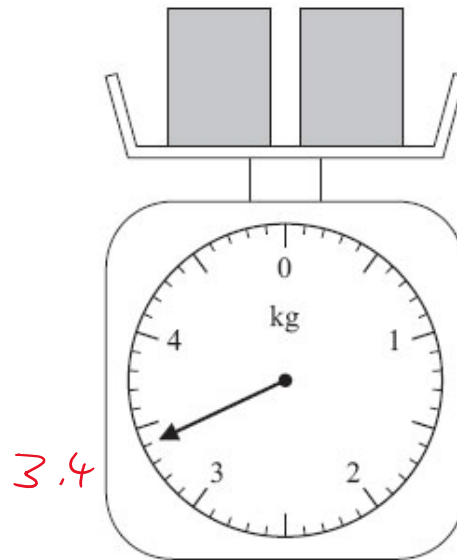
2. The diagram shows the speed of a car.



a) Write down the speed.

..... 64 ..... mph  
(1)

The diagram shows two boxes on some scales.



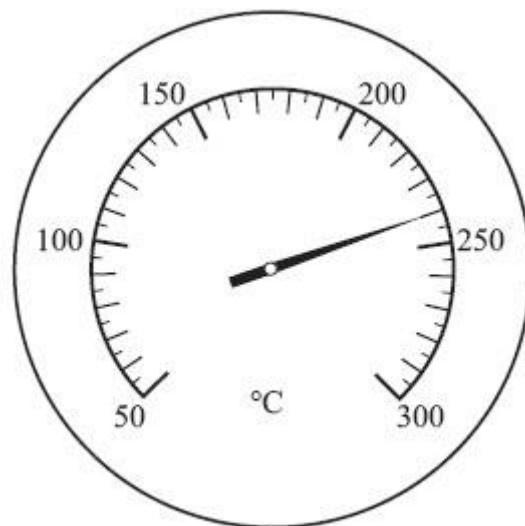
Each box has the same weight.

b) Work out the weight of each box.

$$\frac{3.4}{2}$$

..... 1.7 ..... kg  
(2)  
(Total 3 marks)

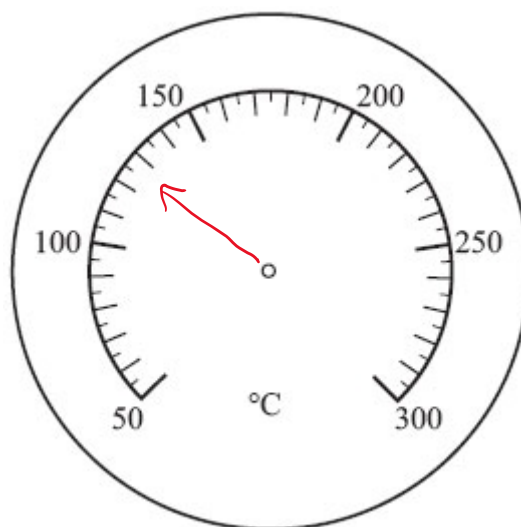
3. The diagram shows the temperature in an oven.



- a) Write down the temperature.

..... 240 ..... °C  
(1)

- b) On the diagram below, draw an arrow to show a temperature of 125 °C.



(1)

Lorna switches her oven on at 5.50 pm.

She sets the temperature at 180 °C

It takes 15 minutes for the oven to reach a temperature of 180°C.

- c) What time will the oven reach a temperature of 180°C?

..... 6:05 pm .....  
(1)  
(Total 3 marks)

## Real-Life Tables

### Things to remember:

- Tables can provide a concise way of showing information about times or distances
- Make sure you are definitely reading the right value – use a highlighter to help you focus on the right information in the table

### Questions:

1. The table shows the distances in miles by road between some towns.

Leicester			
19	Melton		
20	10	Oakham	
41	36	26	Peterborough

- a) Write down the distance between Oakham and Leicester

.....20..... miles  
(1)

- b) Write down the names of the two towns which are the least distance apart.

.....Melton..... and .....Oakham.....  
(1)

Martin lives in Leicester.

He works in Peterborough.

Martin drives to work in the morning and back home in the evening.

He works Monday to Friday.

- c) Work out how many miles Martin drives each week.

$$41 \times 5 \times 2$$

.....410..... miles  
(3)  
(Total 5 marks)

2. Here is part of a bus timetable.

Oakham	06 45	07 55	09 05	09 58
Manton	06 54	08 04	09 14	10 07
Wing	-	08 05	-	10 08
Preston	06 57	08 07	09 17	10 10
Uppingham	07 02	08 12	09 22	09 15

Martha wants to travel from Oakham to Uppingham.  
She gets to the bus stop at 9:45 am to catch the next bus to Uppingham.

a) How long does this bus journey take?

..... 17 ..... minutes  
(2)

Emily lives in Wing and has an interview in Uppingham.  
She lives a 4 minute walk from the bus stop.  
Her potential new workplace is a 7 minute walk from the Uppingham bus stop.  
Emily needs to be at the interview for a 9:30 am start.

b) Plan Emily's journey.

Leave home at 8am  
Arrive at bus stop to catch 8:05am bus  
Arrive in Uppingham at 8:12am  
Get a coffee then arrive at interview in  
plenty of time!

(3)  
(Total 5 marks)

3. This timetable shows the times of trains between London and Paris.

London	04 21	05 19	06 39	07 59
Paris	07 11	08 09	09 29	10 49
Paris	14 40	15 28	17 00	18 49
London	17 30	18 18	19 50	21 39

a) At what time does the 05:19 from London arrive in Paris?

..... 08 09 ..... (1)

b) How long does each journey take?

..... 2 ..... hours..... 50 ..... minutes (1)

c) Tom arrives in Paris at 09:29.  
He spends the next 7 hours visiting tourist attractions in Paris.  
What is the time of the next train he can catch back to London?

..... 17 00 ..... (1)  
(Total 3 marks)

4. The table shows the distances in miles by road between some towns.

Liverpool			
35	Manchester		
38	36	Preston	
74	45	69	Leeds

a) Write down the distance between Manchester and Leeds.

..... 45 ..... miles (1)

b) Write down the names of the two places which are the greatest distance apart.

..... Liverpool ..... and ..... Leeds ..... (1)  
(Total 2 marks)

## Choosing Appropriate Units of Measure

Things to remember:

	<b>Metric</b>	<b>Imperial</b>
Length	Millimetres, centimetres, metres, kilometres	Inches, feet, yards, miles
Capacity	Millilitres, centilitres, litres	Ounces, pints, gallons
Mass	Grams, kilograms, tonnes	Ounces, pounds, stone

Questions:

1. Complete this table.  
Write a sensible unit for each measurement.

	<b>Metric</b>	<b>Imperial</b>
The length of a pencil	centimetres	<i>inches</i>
The weight of a tomato	<i>grams</i>	ounces
The amount of milk in a bottle	<i>litres</i>	pints

(Total 3 marks)

2. Complete this table.  
Write a sensible unit for each measurement.

	<b>Metric</b>	<b>Imperial</b>
Diameter of a football	<i>cm</i>	inches
Amount of fuel in a car	litres	<i>gallons</i>

(Total 2 marks)

3. Complete this table.  
Write a sensible unit for each measurement.

	<b>Metric</b>	<b>Imperial</b>
Length of a room	<i>metres</i>	feet
Weight of a baby	<i>kg</i>	pounds
Amount of water in a bath	litres	<i>gallons</i>

(Total 3 marks)

## Averages

### Things to remember:

- Mode is most frequent – the number that occurs the most often
- Median is middle – put the numbers in order then identify the middle number by crossing data off from both ends
- Mean is mean to work out – add all the numbers together and divide by the quantity in the list
- Range is the difference between the biggest and the smallest pieces of data

### Questions:

1. Chloe made a list of her homework marks.

4    5    5    5    4    3    2    1    4    5

a) Write down the mode of her homework marks.

.....5.....  
(1)

b) Work out her mean homework mark.

$$38 \div 10$$

.....3.8.....  
(2)  
(Total 3 marks)

2. Peter rolled a 6-sided dice ten times.  
Here are his scores.

~~3~~   ~~2~~   ~~4~~   ~~6~~   ~~3~~   ~~3~~   ~~4~~   ~~2~~   ~~5~~   ~~4~~

a) Work out the median of his scores.

~~2~~   ~~2~~   ~~3~~   ~~3~~   3   4   4   4   ~~5~~   ~~6~~

.....3.5.....  
(2)

b) Work out the mean of his scores.

$$\frac{36}{10}$$

.....3.6.....  
(2)

(c) Work out the range of his scores.

$$6 - 2$$

.....4.....  
(1)

(Total 5 marks)

3. Mr Smith kept a record of the number of absences for each student in his class for one term.  
Here are his results.

0 0 0 8 4 5 5 3 2 1

- a) Write down the mode.

..... 0 .....  
(1)

- b) Work out the mean.

$$\frac{28}{10}$$

..... 2.8 .....  
(2)  
(Total 3 marks)

4. Here are ten numbers.

7 6 8 4 5 9 7 3 6 7

- a) Work out the range.

$$9 - 3$$

..... 6 .....  
(1)

- b) Work out the mean.

$$\frac{62}{10}$$

..... 6.2 .....  
(2)  
(Total 4 marks)

5. Here is a list of seven numbers.  
One of the numbers is hidden.

11 6 7 10 7 9 ?

The mean of the numbers is 9.  
Find the value of the hidden number.

$$\frac{50 + ?}{7} = 9$$

$$50 + ? = 63$$

..... 13 .....  
(Total 2 marks)



6. Here is a list of numbers.

14 19 15 20 11 14 19

a) Find the range

$$20 - 11$$

9

(1)

b) Calculate the mean

$$\frac{112}{7}$$

16

(2)

Joe says, "The median is the middle number, so the median is 20"

c) Joe is incorrect, explain why.

..... Joe needs to put the numbers in order .....

..... first. ....

.....

(2)

(Total 5 marks)

7. The mean of eight numbers is 41.  
The mean of two of the numbers is 29.  
Work out the mean of the other six numbers.

$$41 \times 8 - 2 \times 29 = 328 - 58 = 270$$

$$270 \div 6 = 45$$

45

(Total 3 marks)

## Tally and Bar Charts

### Things to remember:

- The fifth tally mark should make a gate – this makes it easier to count the tally as you can count up in 5s
- Frequency means total
- When drawing a bar chart, the axes must be labelled

### Questions:

1. Matty carried out a survey of his friends' favourite flavour of crisps. Here are his results.

<del>Plain</del>	<del>Chicken</del>	<del>Cheese &amp; onion</del>	<del>Salt &amp; vinegar</del>	<del>Plain</del>
<del>Salt &amp; vinegar</del>	<del>Plain</del>	<del>Chicken</del>	<del>Plain</del>	<del>Cheese &amp; onion</del>
<del>Plain</del>	<del>Chicken</del>	<del>Cheese &amp; onion</del>	<del>Salt &amp; vinegar</del>	<del>Cheese &amp; onion</del>
<del>Cheese &amp; onion</del>	<del>Plain</del>	<del>Plain</del>	<del>Salt &amp; vinegar</del>	<del>Plain</del>

- a) Complete the table to show Matty's results.

Flavour of crisps	Tally	Frequency
Plain		8
Chicken		3
Cheese & onion		5
Salt & Vinegar		4

- b) How many friends did Matty ask?

20  
.....  
(1)

- c) Write down the number of Matty's friends whose favourite flavour was salt & vinegar.

4  
.....  
(1)

- d) Which was the favourite flavour of most of Daniel's friends?

Plain  
.....  
(1)

(Total 6 marks)

2. Hannah carried out a survey about her friends' pets. Here are her results.

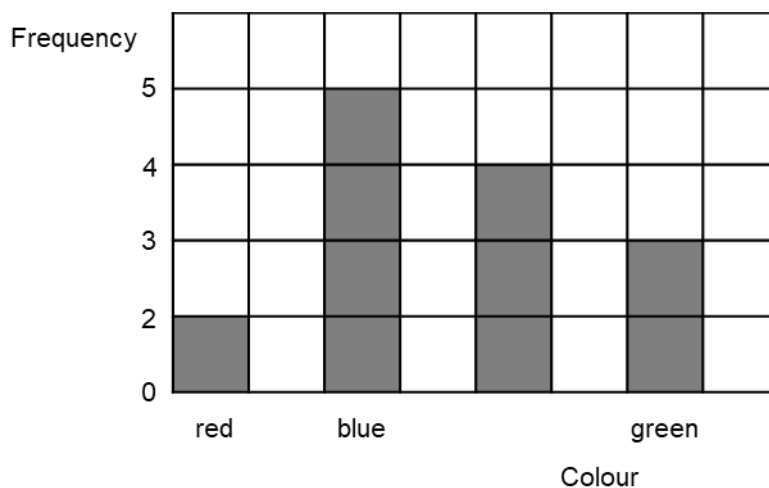
~~Cat~~      ~~Cat~~      ~~Dog~~      ~~Hamster~~      ~~Cat~~  
~~Dog~~      ~~Hamster~~      ~~Cat~~      ~~Cat~~      ~~Dog~~  
~~Hamster~~      ~~Dog~~      ~~Hamster~~      ~~Dog~~      ~~Fish~~  
~~Cat~~      ~~Dog~~      ~~Fish~~      ~~Cat~~      ~~Cat~~

Complete the table to show Hannah's results.

Pet	Tally	Frequency
Cat	<del>    </del>	8
Dog	<del>    </del>	6
Fish		2
Hamster		4

(Total 3 marks)

3. Alex and Bronwyn are pupils at different schools. They each did an investigation into their teachers' favourite colours. Here is Alex's bar chart of his teachers' favourite colours.

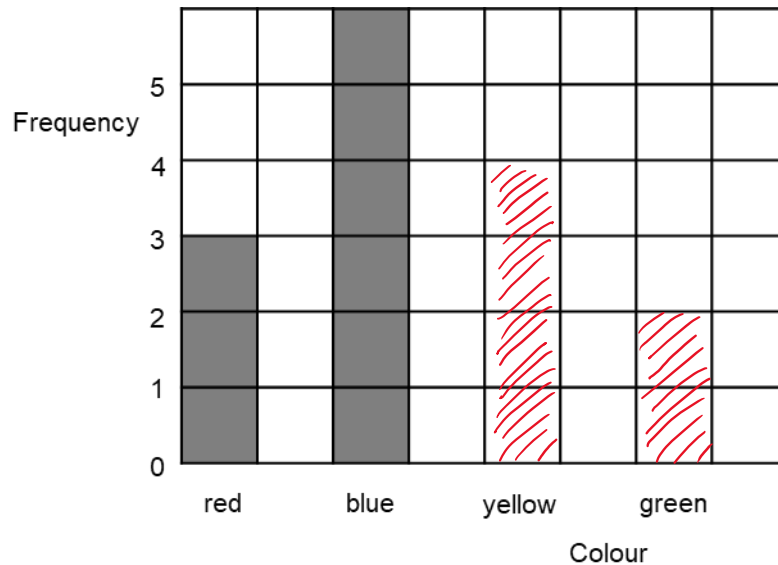


a) Write down two things that are wrong with Alex's bar chart.

0-2 scale incorrect  
 Third label missing

(2)

Bronwyn drew a bar chart of her teachers' favourite colours. Part of her bar chart is shown below.



4 teachers said that yellow was their favourite colour.  
2 teachers said that green was their favourite colour.

- b) Complete Bronwyn's bar chart. (2)
- c) Which colour was the mode for the teachers that Bronwyn asked? (2)

..... *blue* ..... (1)

- d) Work out the number of teachers Bronwyn asked. (1)

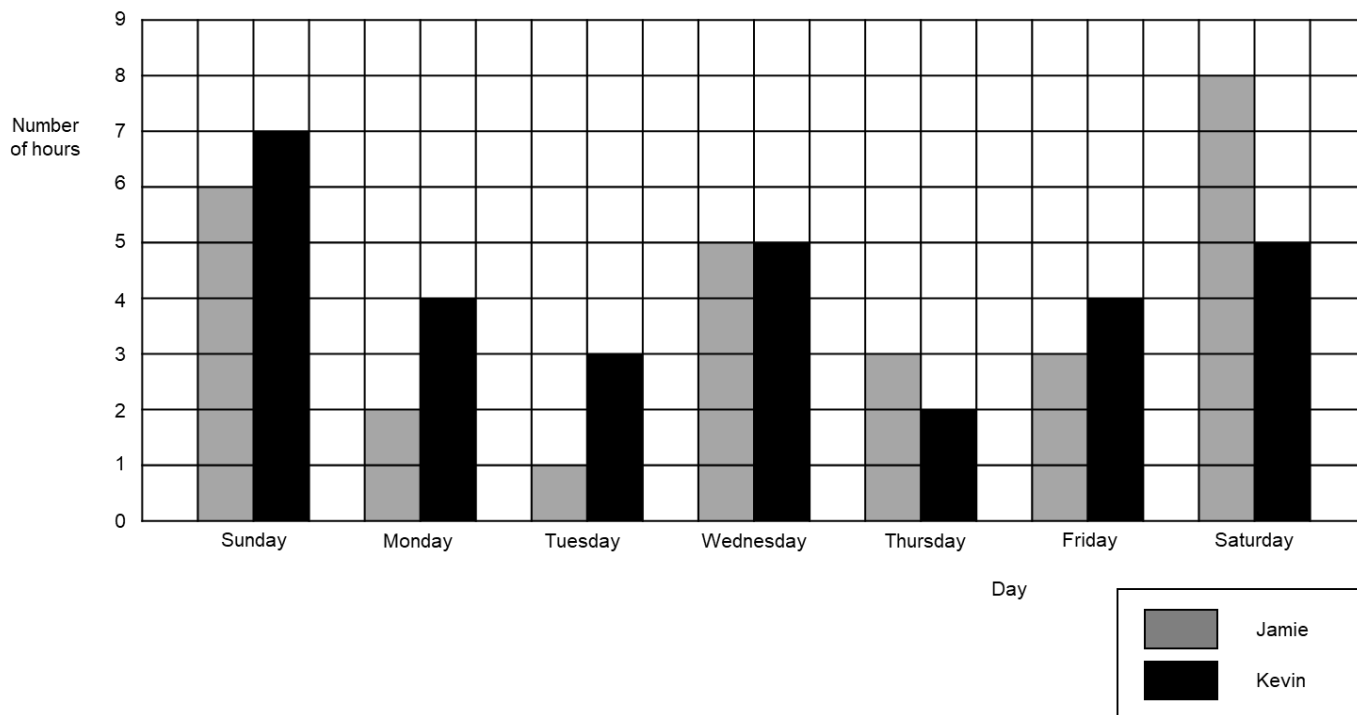
..... *15* ..... (1)

- e) Write down the fraction of the number of teachers that Bronwyn asked who said red was their favourite colour. (1)

.....  $\frac{3}{15} = \frac{1}{5}$  ..... (1)

(Total 7 marks)

4. Here is a bar chart showing the number of hours of TV that Jamie and Kevin watched last week.



- a) Write down the number of hours of TV that Jamie watched on Monday.

.....<sup>2</sup>..... hours  
(1)

- b) On which day did Jamie and Kevin watch the same number of hours of TV?

.....<sup>Wednesday</sup>.....  
(1)

- c) i) Work out the total number of hours of TV that Kevin watched on Friday and Saturday.

.....<sup>9</sup>..... hours

- ii) Who watched the greater number of hours of TV on Friday and Saturday?  
Show your working.

Jamie:  $3 + 8 = 11$   
Kevin:  $4 + 5 = 9$

.....<sup>Jamie</sup>.....  
(3)  
(Total 5 marks)





## Pictograms

### Things to remember:

- Use the key!
- Once you have the number the whole symbol represents you can work out what fraction of the symbol would represent 1 or 2 etc

### Questions:

1. The pictogram gives information about the number of goals scored in a local football league in each of 3 weeks.

Week 1	
Week 2	
Week 3	
Week 4	
Week 5	

Key: 
represents 4 goals

- a) Find the number of goals scored in the first week.

..... 12 .....  
(1)

- b) Find the number of goals scored in the third week.





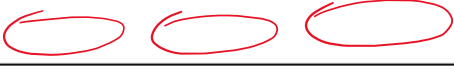

..... 6 .....  
(1)

8 goals were scored in the fourth week.  
5 goals were scored in the fifth week.

- c) Complete the pictogram.

(2)  
(Total 4 marks)

2. The pictogram shows the numbers of loaves of bread made by Miss Smith, Mr Jones and Mrs Gray.

Miss Smith		Key:  represents 20 loaves
Mr Jones		
Mrs Gray		
Ms Shah		
Mr Khan		

- a) Write down the number of loaves of bread made by Mr Jones.

..... 40 .....  
(1)

- b) Write down the number of loaves of bread made by Mrs Gray.

..... 50 .....  
(1)

Ms Shah made 60 loaves of bread.  
Mr Khan made 90 loaves of bread.

- c) Use this information to complete the pictogram.

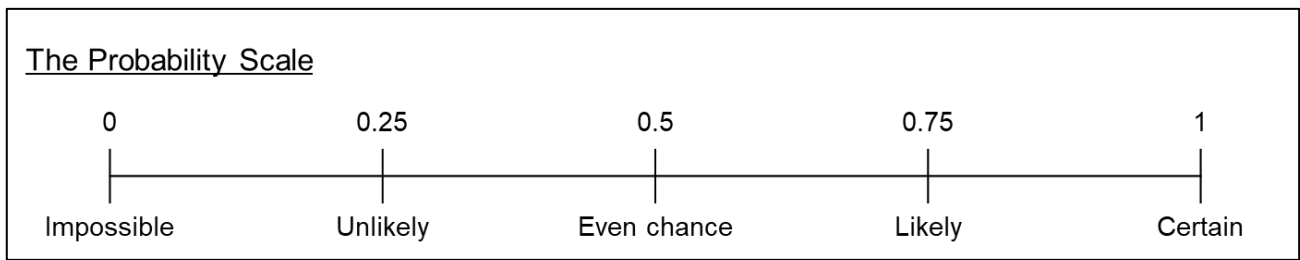
(2)

- d) How many loaves of bread were made altogether?

..... 320 .....  
(1)  
(Total 5 marks)

## Basic Probability

### Things to remember:



- Probability can be expressed as a fraction, decimal or percentage
- As a fraction:  $\frac{\text{desired outcome}}{\text{total number of possible outcomes}}$
- Do not write probability as a ratio!
- The probabilities of all possible outcomes of an event will add up to 1

### Questions:

1. On the probability scale below, mark:

- with the letter *A*, the probability that it will snow in London in June
- with the letter *B*, the probability that when a fair coin is thrown once it comes down heads
- with the letter *C*, the probability that it will rain in Manchester next year



(Total 3 marks)

2. Draw a circle around the word, or words, which best describe the following possibilities.

a) It will rain in Leicester next October

impossible    unlikely    even chance    likely    certain

(1)

b) The next baby to be born in Peterborough will be a girl

impossible    unlikely    even chance    likely    certain

(1)

c) Rolling a six on a fair die

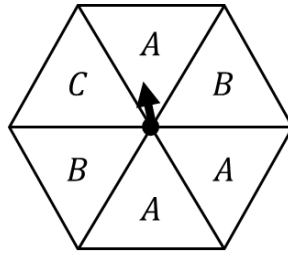
impossible    unlikely    even chance    likely    certain

(1)

(Total 3 marks)



3. The diagram shows a fair spinner in the shape of a rectangular hexagon.



The spinner can land on  $A$  or  $B$  or  $C$ . Owen spins the spinner.  
Write down the probability that the spinner will land on  $A$

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

.....  
(Total 2 marks)

4. Ashley buys one raffle ticket.  
A total of 168 raffle tickets are sold.  
One of these tickets will win the raffle.  
Each ticket has an equal chance of winning the raffle.  
Write down the probability that Ashley's ticket will win the raffle.

$$\frac{1}{168}$$

.....  
(Total 1 mark)

5. A bag contains some beads which are red or green or blue or yellow.  
The table shows the number of beads of each colour.

Colour	Red	Green	Blue	Yellow
Number of beads	4	2	1	6

Sophia takes a bead at random from the bag.  
Write down the probability that she takes a blue bead.

$$\frac{1}{13}$$

.....  
(Total 2 marks)

6. Dominic has a box of toy cars.  
Each car is red or blue or white.  
3 of the cars are red. 4 of the cars are blue. 2 of the cars are white.  
Dominic chooses one car at random from the box.  
Write down the probability that Dominic will choose a blue car.

$$\frac{4}{9}$$

.....  
(Total 2 marks)

7. A company makes robots.  
A robot is chosen at random. The probability that it has a fault is 0.04  
Work out the probability that a robot, chosen at random, will **not** have a fault.

$$1 - 0.04$$

$$0.96$$

.....  
(Total 2 marks)

8. The probability of Mark winning a tennis match is 0.8  
Work out the probability that Mark does not win a tennis match.

$$1 - 0.8$$

$$0.2$$

.....  
(Total 2 marks)

9. There are 45 pens in a box.  
18 of the pens are black.  
12 of the pens are green.  
The rest of the pens are red.  
One of the pens is chosen at random.  
Find the probability that the pen is red.

$$45 - (12 + 18) = 15$$

$$\frac{15}{45} = \frac{1}{3}$$

.....  
(Total 2 marks)

## Listing Outcomes

### Things to remember:

- The outcomes for an event can be listed in an organised or systematic way to make sure that none of the possible outcomes is missed out or repeated
- Look for patterns to help find all the outcomes

### Questions:

1. Jet is going to roll a 6 sided dice and flip a coin.  
The dice can land on 1, 2, 3, 4, 5 or 6.  
The coin can land on heads or tails.  
List all the possible outcomes.

1H 2H 3H 4H 5H 6H  
1T 2T 3T 4T 5T 6T

(Total 2 marks)

2. Lily has to choose which subjects she wants to study.  
She can choose one humanity and one language from the options.

<u>Options</u>	
<u>Humanities</u>	<u>Languages</u>
History	French
Geography	Spanish
Religious Studies	German

Write down all the possible combinations Lily can choose.

HF HS HG  
GF GS GG  
RF RS RG

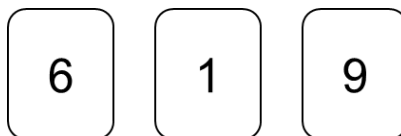
(Total 2 marks)

3. A football team plays two matches.  
They can win, draw or lose each match.  
List all the possible outcomes.

..... WW      WL      WD  
..... LW      LL      LD  
..... DW      DL      DD

(Total 2 marks)

4. Here are three number cards.



Write down all the possible **two-digit numbers** that can be made using the cards.

..... 61    69  
..... 16    19  
..... 96    91

(Total 2 marks)

5. Four teams, Lions, Dolphins, Tigers and Bears, are each going to play a match against each other in a competition.  
Each team will play every other team once.  
Write down all the matches that will take place.

..... LD    LT    LB  
..... DT    DB  
..... TB

(Total 2 marks)

## Simplifying Ratios

### Things to remember:

- Divide both (or all) parts of the ratio by the same factor until in its simplest form
- Maintain the order of the ratio; 1 : 2 is different to 2 : 1

### Questions:

1. Write the ratio 2 : 6 in its simplest form.

1 : 3

.....  
(Total 1 mark)

2. Write the ratio 4 : 18 in its simplest form.

2 : 9

.....  
(Total 1 mark)

3. Write the ratio 24 : 16 in its simplest form.

3 : 2

.....  
(Total 1 mark)

4. Write the ratio 8 : 12 : 14 in its simplest form.

4 : 6 : 7

.....  
(Total 1 mark)

5. Write down the ratio of 350 cm to 25 cm.  
Give your answer in its simplest form.

350 : 25

14 : 1

.....  
(Total 2 marks)

6. Write down the ratio of 220 kg to 5 kg.  
Give your answer in its simplest form.

220 : 5

44 : 1

.....  
(Total 2 marks)

6. Write down the ratio of £2 to 80p  
Give your answer in its simplest form.

$$200 : 80$$

$$5 : 2$$

.....  
(Total 2 marks)

7. Sam has the following coins:



Write down the ratio of the value of Sam's 20p coins to the value of Sam's 50p coins

$$40 : 100$$

$$2 : 5$$

.....  
(Total 3 marks)

8. Jesse has 48 white tiles and 16 blue tiles.
- a) Write down the ratio of the number of white tiles to the number of blue tiles.  
Give your ratio in its simplest form.

$$48 : 16$$

$$3 : 1$$

.....  
(2)

The cost of each white tile was £3  
The cost of each blue tile was £2.50

- b) Work out the ratio of the total cost of the white tiles to the total cost of the blue tiles.

$$3 \times 48 : 2.5 \times 16$$

$$144 : 40$$

$$18 : 5$$

.....  
(2)  
(Total 4 marks)

## Sharing into a Ratio

### Things to remember:

- Start by dividing the quantity by the total number of parts, then multiply by each share
- You might find it easier to use a bar model
- Don't forget to include units throughout your working

### Questions:

1. Jack and Harrison share £70 in the ratio 3 : 2  
Work out how much each of them get.

$$70 \div 5 = 14$$
$$14 \times 3 : 14 \times 2$$

$$\dots\dots\dots 42 : 28$$

(Total 3 marks)

2. Alexis, Jess and Flora share 54 sweets in the ratio 3 : 2 : 1  
Work out the number of sweets that each of them receives.

$$54 \div 6 = 9$$
$$3 \times 9 : 2 \times 9 : 1 \times 9$$

$$\dots\dots\dots 27 : 18 : 9$$

(Total 3 marks)

3. Lola and Charlie share some money in the ratio 5 : 3  
Lola gets £70 **more than** Charlie.  
Work out how much money Charlie gets.

$$70 \div 2 = 35$$
$$35 \times 3 = 105$$

$$\text{£ } \dots\dots\dots 105$$

(Total 3 marks)

4. Max and Josh share some money in the ratio 2 : 3  
Josh gets £450  
Work out how much money Max gets.

$$450 \div 3 \times 2$$

$$\text{£ } \dots\dots\dots 300$$

(Total 3 marks)

5. Evie and Poppy share some sweets in the ratio 2 : 7  
 Poppy gets 45 **more** sweets than Evie.  
 Work out how many sweets Poppy gets.

$$45 \div 5 = 9$$

$$7 \times 9 = 63$$

63

(Total 3 marks)

6. Dexter is making cookies.  
 He mixes flour, butter and sugar in the ratio 6 : 4 : 1  
 Dexter uses 200 grams of butter.  
 Work out how much flour and sugar Dexter uses.

$$200 \div 4 = 50$$

$$50 \times 6 = 300$$

Flour: .....  $\begin{matrix} 50 \\ 300 \end{matrix}$  ..... grams

Sugar: ..... grams  
 (Total 3 marks)

7. Alex and Bertie shared £360 in the ratio 4 : 5  
 Alex gave half of his share to Caspar.  
 Bertie gave a tenth of his share to Caspar.  
 What fraction of the £360 did Caspar receive?

$$360 \div 9 = 40$$

$$40 \times 4 : 40 \times 5 = 160 : 200$$

$$80 + 20 = 100$$

$$\frac{100}{360} = \frac{5}{18}$$

(Total 3 marks)



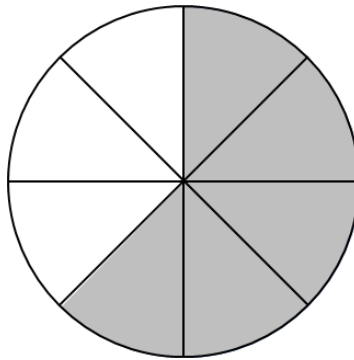
## Equivalent Fractions and Simplifying

### Things to remember:

- The denominator of a fraction is how many equal parts the whole is divided into, the numerator is how many of these are of interest
- When working with a fraction, it is much easier to use it in its simplest form
- You can simplify a fraction by dividing the numerator and denominator by the same number
- The simplified fraction and the original fraction are said to be equivalent
- Equivalent fractions represent the same proportion of the whole

### Questions:

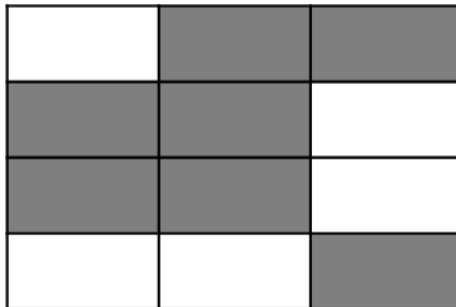
1. Write down the fraction of the shape that is shaded.



$$\frac{5}{8}$$

.....  
(Total 1 mark)

2. Write down the fraction of the shape that is shaded.



$$\frac{7}{12}$$

.....  
(Total 1 mark)

3. Write  $\frac{5}{10}$  as a fraction in its simplest form

$$\frac{1}{2}$$

.....  
(Total 1 mark)

4. Write  $\frac{2}{12}$  as a fraction in its simplest form

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

(Total 1 mark)

5. Write  $\frac{6}{18}$  as a fraction in its simplest form

$$\frac{1}{3}$$

(Total 1 mark)

6. Write  $\frac{16}{24}$  as a fraction in its simplest form

$$\frac{2}{3}$$

(Total 1 mark)

7. Write  $\frac{32}{72}$  as a fraction in its simplest form

$$\frac{4}{9}$$

(Total 1 mark)

8. Here is a list of fractions.

$$\frac{12}{16} \quad \frac{15}{20} \quad \frac{6}{8} \quad \frac{8}{12} \quad \frac{18}{24}$$

One of these fractions is not equivalent to  $\frac{3}{4}$   
Write down this fraction

$$\frac{8}{12}$$

(Total 1 mark)

9. Here is a list of fractions.

$$\frac{12}{21} \quad \frac{9}{15} \quad \frac{16}{28} \quad \frac{8}{14} \quad \frac{20}{35}$$

One of these fractions is not equivalent to  $\frac{4}{7}$   
Write down this fraction

$$\frac{9}{15}$$

(Total 1 mark)

10. There are 32 sweets in a bag.  
12 of the sweets are red.  
What fraction of the sweets are red?  
Give your answer in its simplest form.

$$\frac{12}{32}$$

$$\frac{3}{8}$$

.....  
(Total 2 marks)

11. In a class there are 12 girls and 18 boys.  
What fraction of the class are girls?  
Give your answer in its simplest form.

$$\frac{12}{30}$$

$$\frac{2}{5}$$

.....  
(Total 2 marks)

12. Express 50p as a fraction of £3  
Give your answer in its simplest form.

$$\frac{50}{300}$$

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

.....  
(Total 2 marks)

## Ordering Decimals

### Things to remember:

- Consider [place value](#) when ordering decimals
- Writing the decimals in a column may help you to compare tenths, hundredths etc

### Questions:

1. Write these numbers in order of size.  
Start with the smallest number.

5.25      5.2      5.19      5.08      5.1      5.21

..... 5.08, 5.1, 5.19, 5.2, 5.21, 5.25 .....

(Total 1 mark)

2. Write these numbers in order of size.  
Start with the smallest number.

0.24      0.3      0.125      0.2      0.199      0.18

..... 0.125, 0.18, 0.199, 0.2, 0.24, 0.3 .....

(Total 1 mark)

3. Write these numbers in order of size.  
Start with the smallest number.

10.083      10.08      10.009      10.56      10.3

..... 10.009, 10.08, 10.083, 10.3, 10.56 .....

(Total 1 mark)

4. Write these numbers in order of size.  
Start with the smallest number.

40.6

46.1

40.49

40.68

46

46.09

40.49, 40.6, 40.68, 46, 46.09, 46.1

(Total 1 mark)

5. Put the correct inequality sign in each box.  
The first box has been completed for you.

5.03

<

5.3

0.78

<

0.87

4.30

>

4.03

0.21

<

2.1

(Total 3 marks)

## Percentages of Amounts

### Things to remember:

- “Per cent” means “out of 100”
- If you don’t have a calculator, work out easier percentages (10%, 20%, 50%, 1%, etc) then add the components together
- If you do have a calculator, you can multiply the original amount by the multiplier (the equivalent decimal to the percentage)

### Questions:

1. Work out 10% of 80 ml

..... <sup>8</sup> ..... ml  
(Total 1 mark)

2. Find 50% of £140

£ ..... <sup>70</sup> .....  
(Total 1 mark)

3. Find 21% of £160

$$0.21 \times 160$$

£ ..... <sup>33.60</sup> .....  
(Total 2 marks)

4. Find 85% of £320

$$0.85 \times 320$$

£ ..... <sup>272</sup> .....  
(Total 2 marks)

5. Find 46% of 800 grams

$$0.46 \times 800$$

..... <sup>368</sup> ..... grams  
(Total 2 marks)

6. Which is greater

25% of 90 or 28% of 82

You must show your working.

$$0.25 \times 90 = 22.5$$

$$0.28 \times 82 = 22.96$$

.....  
28% of 82  
.....  
(Total 3 marks)

7. Which is greater

30% of 105 or 32% of 98

You must show your working.

$$0.3 \times 105 = 31.5$$

$$0.32 \times 98 = 31.36$$

.....  
30% of 105  
.....  
(Total 3 marks)

8. Liam gets a bonus of 20% of £1200

Kieran gets a bonus of £250

Work out the difference between the bonus Liam gets and the bonus Kieran gets.

$$0.2 \times 1200 = £240$$

$$£250 - £240 = £10$$

.....  
£10  
.....  
(Total 3 marks)

9. Oliver is paid £29 000 per year.

He is going to get a 3% increase in the amount of money he is paid.

Work out how much money Oliver will be paid per year after the increase.

$$0.03 \times 29\,000 = 870$$

$$29\,000 + 870$$

.....  
£29 870  
.....  
(Total 3 marks)

# **Useful websites:**

**www.piximaths.co.uk**

**www.mathswatchvle.com**

**www.corbettmaths.com**

**www.mymaths.co.uk**

**www.dr frost.com**

**www.bbc.co.uk/schools/gcsebitesize  
/maths**

**Remember: Do your best;  
it is all you can do 😊**