KING EDWARD VI
COMMUNITY COLLEGE

Year 11 Foundation Tier Revision Materials Booklet (1)

Year 11 Foundation PPE Contents Page

Year 11 Foundation PPE (2) Assessment Revision List

Choose the areas you need to practice and look at these on *Sparx Independent Learning*.

Remember your *Curriculum* must be set to *GCSE*.

Speak to your teacher if you have any questions.

Paper 1
Types of angles
Calculation
Negative number subtraction
Fraction to decimal
Decimal addition and subtraction & decimal multiplication
Coordinate problem
Money puzzle
Mode from line graph & probability
Factors & LCM
Proportion and rounding & multiplication
Parallelogram, trapeziums and rhombus
Percentage of an amount
Fraction bigger than 1
Volume of a cuboid
Solids
Bearings & direction and scale drawing
Simplify ratio, Ration in the form 1 : n and sharing an amount in a given ratio
Describe a population
Expressions & algebra reasoning
Standard form
Tree diagrams & probability with 2 events
Reverse percentages
Laws of indices
Inverses
Area and proportion
Inverse proportion graph
Rearrange a formula
Expand brackets

Paper 3
Place value
Equation
Mixed number to fraction
Algebraic expression
Ordering numbers
Proportion problem & assumption
Pictograms
Multiples
Best buy
Angle problem
Function machine
Triangular numbers
Prime numbers
Metric imperial conversion
Inequality notation
Rotational symmetry
Systematic listing & pie chart
Enlargement fractional scale factor
Simplification & factorisation
Positive and negative roots
Limits
Substitution & algebraic argument
Compound measures and time problem
Density
Set up & solve an equation
Compound interest
Mean and ratio
Equation of a line
Triangle properties
Trigonometry

Statistical Measures – Foundation

Knowledge		
Sparx Codes	Calculating the range	U526
	Calculating the median	U456
	Finding the mode	U260
	Calculating the mean	U291

1 Below is a list of numbers.

7 6 4 3 7 7 3 4 0 9

1 (a) What is the mode?

[1 mark]

Circle your answer.

5 7 6 9

1 (b) What is the mean?

[2 marks]

Circle your answer.

5 7 6 9

1 (c) What is the range?

[1 mark]

Circle your answer.

5 7 6 9

1 (d) What is the median?

[2 marks]

Circle your answer.

5 7 6 9

2 Here is a list of numbers

7 4 2 2 5

2 (a) Find the mean of the numbers.

[2 marks]

Answer _____

2 (b) 15 is added to each of the numbers in the list.
What will the mean be now?

[2 marks]

Answer _____

3 (a) Ten dogs attend a training class with their owners and are scored out of 10.

5 of the dogs are Alsatians and the other 5 are Labradors.
The Alsatians had a range of 8 and a mean of 4.4

Here are the results for the Labradors.

7 5 8 9 4

Use the data to investigate the hypothesis.

'Labradors score better in training than Alsatians.'

[5 marks]

3 (b) Give <u>two</u> ways you could improve the investigation to make the conclusion more reliable?

[2 marks]

First way

Second way

Collecting and representing data – Foundation

Knowledge	**Sparx Codes**	Drawing and interpreting tally charts	U653
		Drawing and interpreting pictograms	U506
		Drawing bar charts	U363
		Interpreting bar charts	U557
		Drawing pie charts	U508
		Interpreting pie charts	U172
		Drawing line graphs	U590
		Interpreting line graphs	U193

1 Here is some information about clubs at a school.

School club	Number of members
Football	40
Debating	15
Chess	20
Maths	25

Use the information to complete the pictogram.

The first two rows have been done for you.

Remember to complete the key.

[3 marks]

Key ○ represents ..... members

Football	○ ○ ○ ○
Debating	○ ◐
Chess	
Math	

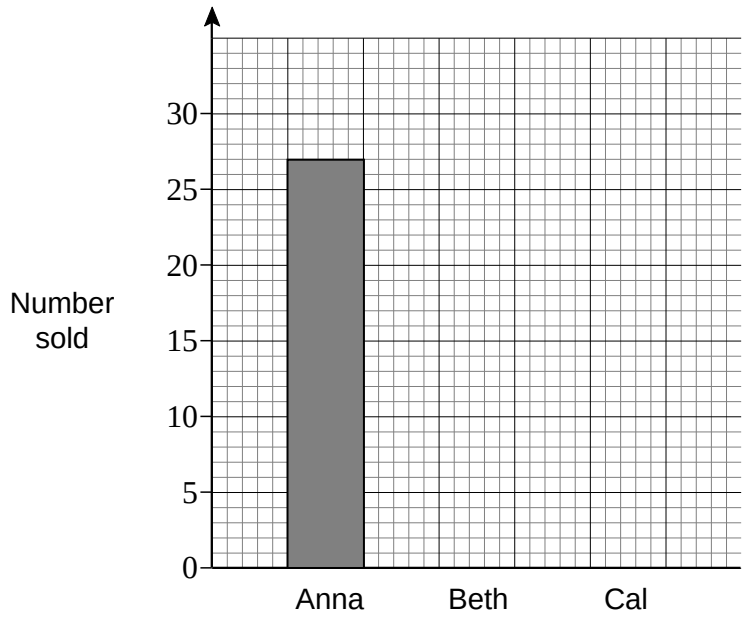
2 Anna, Beth and Cal bake and sell cakes.

Beth and Cal sell 50 cakes **in total**.

Beth sells 6 **more** than Cal.

2 (a) Draw the bars for Beth and Cal on the bar chart.

[2 marks]



2 (b) It costs Anna £1.50 to bake a cake.

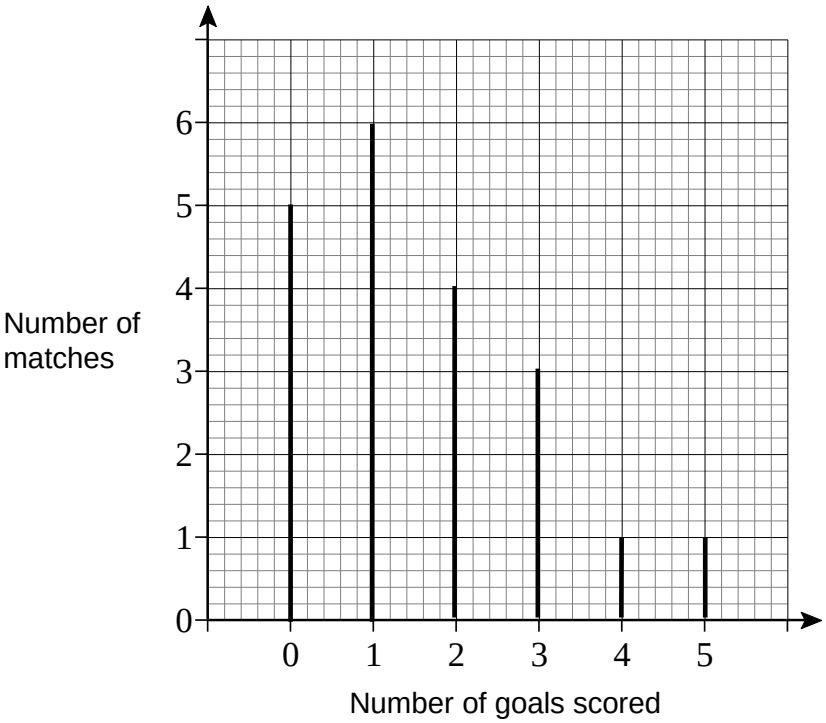
She sells them for £5 each.

How much profit does **Anna** make selling all her cakes?

[3 marks]

Answer £ _____

3 The diagram shows the number of goals scored by a team in 20 matches.



3 (a) How many times did the team only score 2 goals in a match?

[1 mark]

Answer _____

3 (b) At the end of the season the team had played 24 matches.
They scored 40 goals in total.

How many goals did they score in the last 4 matches?

[2 marks]

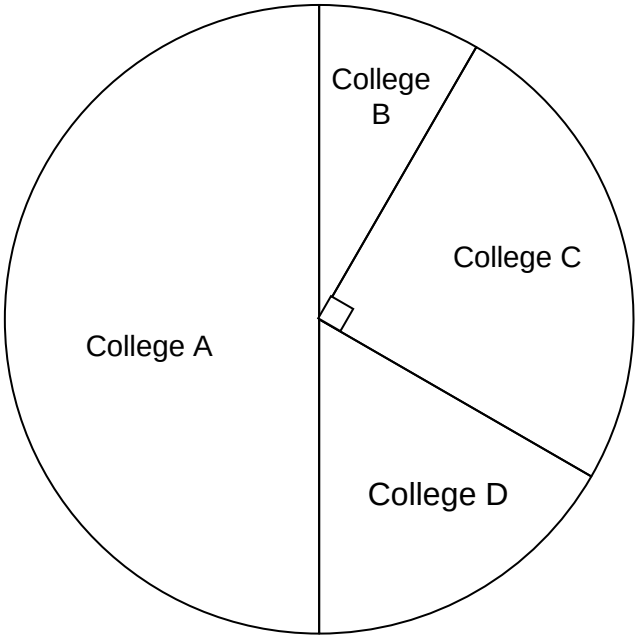
_____

_____

_____

Answer _____

4 The pie chart shows information about the number of students attending four colleges.



4 (a) What percentage of the total attend College C?

[1 mark]

Answer _____ %

4 (b) Compare the number of students at College A with the number at the other colleges.

[1 mark]

_____

_____

4 (c) 1200 students attend College D.

How many students attend all the colleges?

[3 marks]

_____

_____

_____

Answer _____

Probability (1) – Foundation (Non-calculator)

Knowledge

Sparx Codes

Using probability phrases	U803
Writing probabilities as fractions	U408
Writing probabilities as fractions, decimals and percentages	U510
Probabilities of mutually exclusive events	U683
Expected results from repeated experiments	U166
Sample space diagrams	U104
Frequency trees	U280
Tree diagrams for independent events	U558

1 In a raffle there is one winning ticket.
In total 360 tickets are sold.

1 (a) Rachel buys 12 tickets.

What is the probability she buys the winning ticket?
Give your answer as a fraction in its simplest form.

[2 marks]

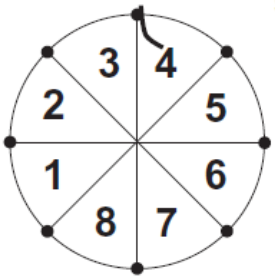
Answer _____

1 (b) How many tickets should Zain buy to have a $\frac{1}{90}$ chance of winning?

[2 marks]

Answer _____

2 In a game, a player spins this wheel.
The wheel is fair.



What is the probability that the player scores

2 (a) an even number greater than 2?

[1 mark]

Answer _____

2 (b) a prime number?

[1 mark]

Answer _____

2 (c) a square number?

[1 mark]

Answer _____

2 (d) a number that is a factor of 24?

[1 mark]

Answer _____

3 There are 40 counters in a bag.

Three-eighths of the counters are yellow.
One-fifth of the counters are red.
The rest of the counters are blue.

One counter is chosen at random.

Work out the probability that the counter is blue.

[4 marks]

Answer _____

4 A class of 30 students are asked about their favourite hobby.

The results are shown in the table. Some of the values are missing.

Hobby	Boy	Girl	Totals
Playing football		2	**10**
Reading	2	1	**3**
Watching TV	5		**9**
Playing computer games	3	5	**8**
Totals	**18**	**12**	**30**

A student is chosen at random.

Work out the probability that the student is:

4 (a) a boy whose favourite hobby is playing football

[2 marks]

Answer _____

4 (b) a girl whose favourite hobby is not reading

[2 marks]

Answer _____

The teacher chooses a student at random from the class and it is a boy,

4 (b) Work out the probability that his favourite hobby is either watching TV or playing computer games.

Give your answer as a fraction in its simplest form.

[3 marks]

Answer _____

Probability (2) – Foundation (Non-calculator)

Knowledge

Sparx Codes

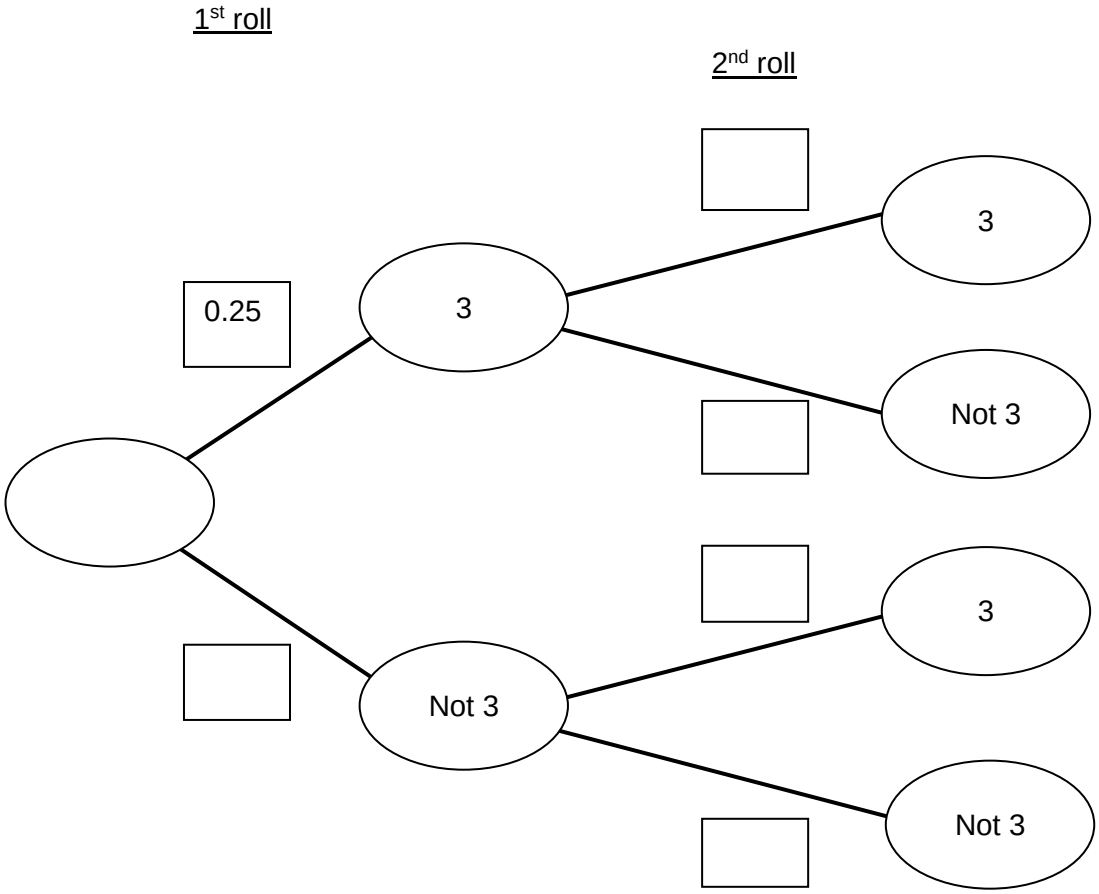
Using probability phrases	U803
Writing probabilities as fractions	U408
Writing probabilities as fractions, decimals and percentages	U510
Probabilities of mutually exclusive events	U683
Expected results from repeated experiments	U166
Sample space diagrams	U104
Frequency trees	U280
Tree diagrams for independent events	U558

1 The probability that a biased dice lands on a 3 is 0.25

The dice is rolled twice.

1 (a) Complete the tree diagram.

[2 marks]



1 (b) Work out the probability that both rolls are **not** a 3.

[2 marks]

Answer _____

1 (c) Work out the probability of scoring exactly one 3

[2 marks]

Answer _____

2 A bag contains 20 balls.

The ratio of red to blue balls is 3 : 7

A ball is picked at random and replaced.

The bag is shaken and then a second ball is picked at random.

2 (a) Work out the probability that **two** red balls are picked.

[3 marks]

Answer _____

2 (b) Work out the probability that the balls picked are different colours.

[2 marks]

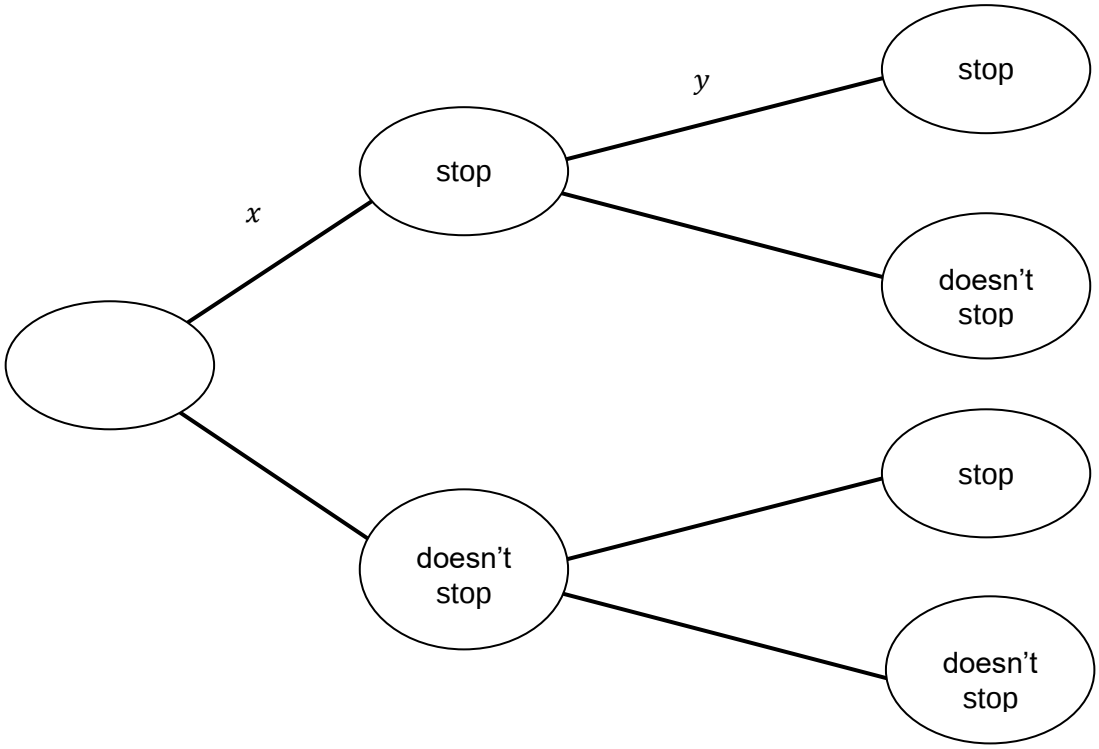
Answer _____

2 (c) How would the probability of red for the second ball change if the first ball was not replaced?

[1 mark]

3 A car passes through two sets of traffic lights each day.

The driver records whether he has to stop at the lights over a long period of time and produces the following tree diagram.



3 (a) Tick the expression for the probability that the driver does not stop at the first set of lights.

[1 mark]

$1 + x$ ☐

$x - 1$ ☐

$1 - x$ ☐

$\frac{1}{2}x$ ☐

3 (b) Work out an expression for the probability that the driver does **not** stop at the first set of lights but stops on the second set?

[1 mark]

Answer _____

3 (c) Work out an expression for the probability that the driver stops on at least one set of lights?

Simplify your answer.

[3 marks]

Answer _____

Probability (3) – Foundation (Calculator)

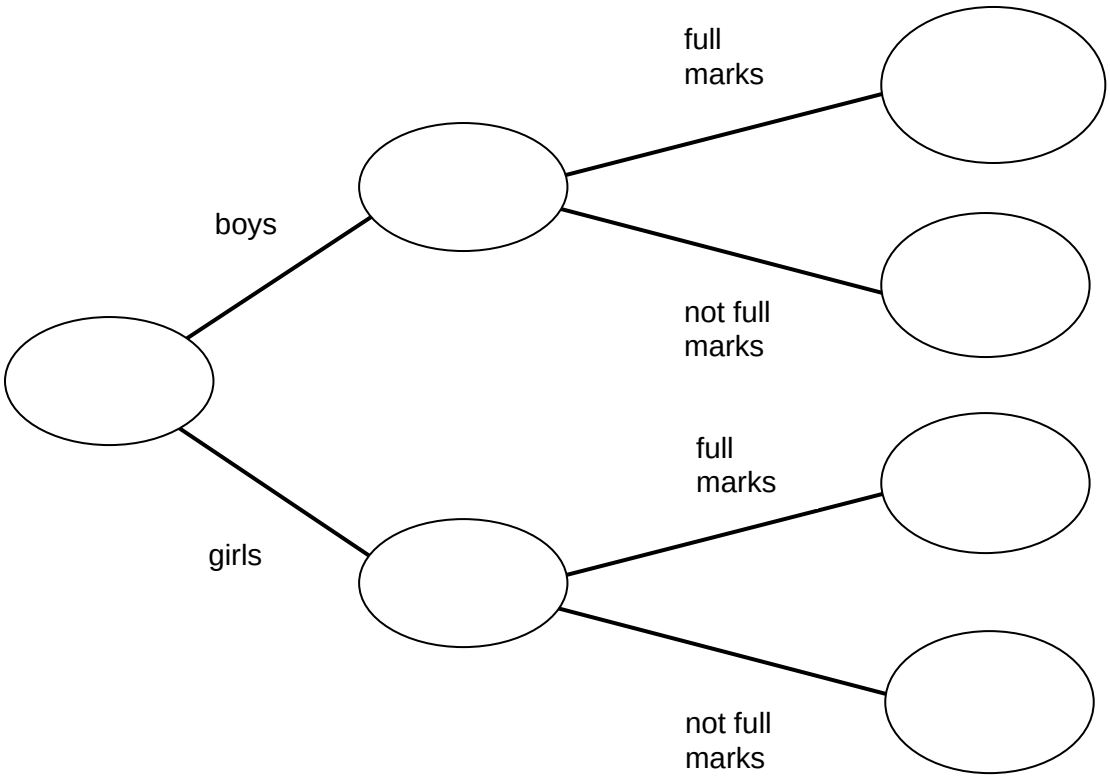
Knowledge		
Sparx Codes	Using standard form with positive indices	U330
	Using standard form with negative indices	U534
	Multiplying and dividing numbers in standard form	U264
	Adding and subtracting numbers in standard form	U290
	Standard form with a calculator	U161

1 90 students take a test.

The ratio of boys to girls is 3 : 2.
One third of the boys score full marks.
The number of girls scoring full marks is half the number who do **not** score full marks.

1 (a) Complete the frequency tree.

[3 marks]



1 (b) A student is chosen at random.

What is the probability it is a girl who did **not** get full marks?
Give your answer as a fraction in its simplest form.

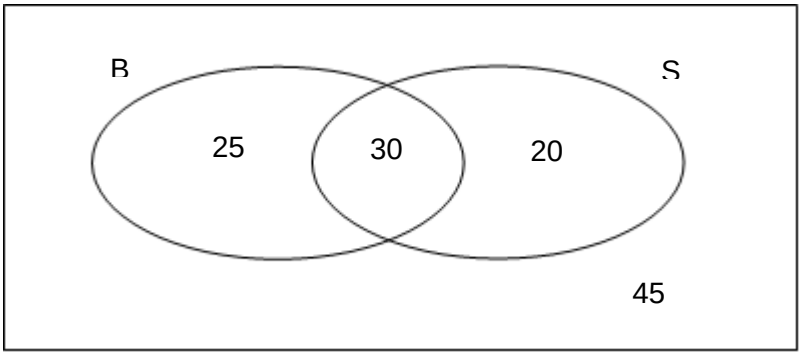
[2 marks]

Answer _____

2 A farmer collects some eggs from his hens one morning.

The eggs are either brown (B) or white and are sorted into small (S) and large sizes.

The Venn diagram shows the results.



Two eggs are chosen at random.

2 (a) Work out the probability that the first egg is large and white.

[2 marks]

Answer _____

2 (b) The first egg was small.

Work out the probability that the second egg is small.

[1 mark]

Answer _____

3 A large park has thousands of flowers. The flowers are pink, yellow or blue.
55% of the flowers are pink and the ratio of yellow to blue flowers is 2 : 1

3 (a) Complete the table to show the relative frequency of each colour of flower in the park.

[3 marks]

Flower colour	**Yellow**	**Pink**	**Blue**
Relative frequency			

3 (b) Bees visit the flowers to get pollen to make honey.
The probability that flowers are visited by a bee are shown.

Flower colour	**Yellow**	**Pink**	**Blue**
Probability of being visited by a bee	0.6	0.3	0.75

Produce a tree diagram in the space below to show all the information from (a) and (b)

[5 marks]

Ratio and proportion – Foundation

Knowledge

Sparx Codes

Writing and simplifying ratios	U687
Using equivalent ratios to find unknown amounts	U753
Converting between ratios, fractions and percentages	U176
Sharing amounts in a given ratio	U577
Combining ratios	U921
Calculating with ratios and algebra	U676
Changing ratios	U865

1 The workers in a company are in the ratio female : male = 1 : 4.5

1 (a) What fraction of the workers are female?

[2 marks]

Answer _____

1 (b) The company has 150 female workers.

How many workers are there altogether?

[2 marks]

Answer _____

2 $a : b = 2 : 7$

$a^2 = 36$

Work out the **two** possible values of b.

[3 marks]

Answer _____ and _____

3 A box contains 192 pens,
They are red, green or blue.

A quarter of the pens are red.
The ratio green pens : blue pens = 1 : 8

How many blue pens are there?

[4 marks]

Answer _____

4 $x : y = 5 : 1$

4 (a) Circle the equation of y as a function of x.

[1 mark]

$y = \frac{x}{6}$ $y = \frac{x}{5}$ $y = 5x$ $y = 6x$

4 (b) Show that $x + y : x - y = 3 : 2$

[2 marks]

5 90 hazelnuts have a mass of 125 g
Hazelnuts have 630 calories per 100 g

Work out the number of calories per hazelnut.

[3 marks]

Answer _____ calories

6 Jake and Kim share some money in the ratio 1 : 3
Kim gets £90 **more** than Jake.

How much does Kim get?

[3 marks]

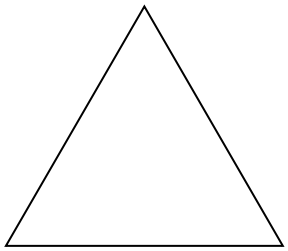
Answer £ _____

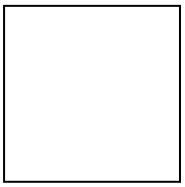
Perimeter and Area (1) – Foundation

Knowledge	Sparx Codes		
		Finding the area and perimeter of simple shapes	U993
		Finding the perimeter of compound shapes	U351
		Finding the area of compound shapes	U970
		Finding the area of triangles	U945
		Finding the area of compound shapes containing triangles	U575
		Finding the area of parallelograms	U424
		Area and perimeter of rectangles and compound shapes	U226

1 The diagram shows an equilateral triangle and a square.

Each side of the triangle is 14 cm





Not drawn accurately

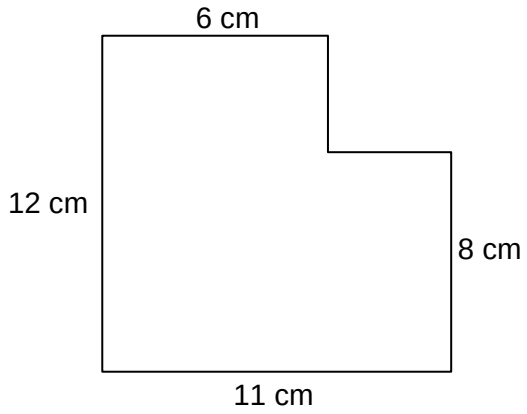
The perimeter of the triangle is equal to the perimeter of the square.

Work out the length of a side of the square.

[3 marks]

Answer _____ cm

2 This shape is made from rectangles.



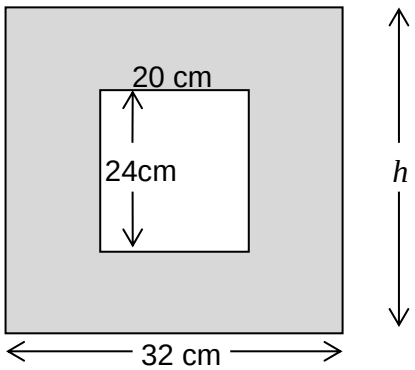
Not drawn accurately

Work out the area of the shape.

[4 marks]

Answer _____ cm^2

3 The diagram shows a rectangular mirror inside a rectangular frame.



Not drawn accurately

The frame is the same width all the way around.

3 (a) Work out h, the overall height of the frame.

[3 marks]

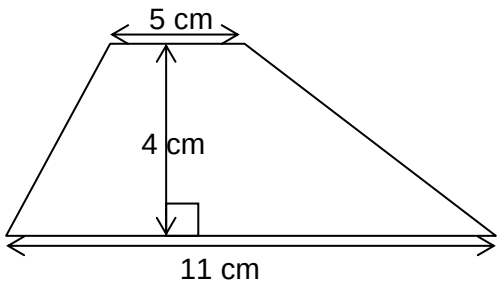
Answer _____ cm

3 (b) Work out the shaded area.

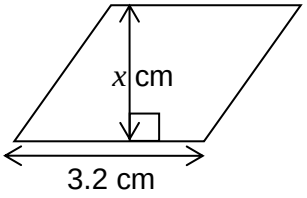
[3 marks]

Answer _____ cm^2

4



Not drawn accurately



The area of the trapezium is four times the area of the parallelogram.

Work out the value of x.

[3 marks]

Answer _____

5 (a) Circle the number of vertices of a triangular prism.

[1 mark]

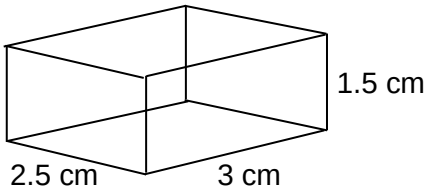
4 5 6 9

5 (b) Circle the number of edges of a square based pyramid

[1 mark]

4 5 8 10

6 A framework in the form of a cuboid is made from wire.



Work out the total length of wire used.

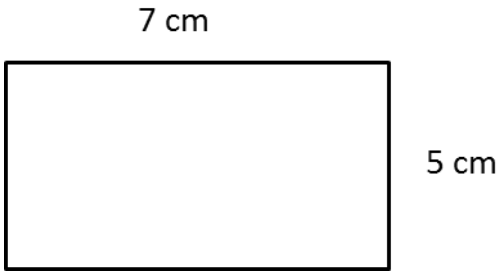
[2 marks]

Answer _____ cm

Perimeter and Area (2) – Foundation

Knowledge	Sparx Codes		
		Finding the area and perimeter of simple shapes	U993
		Finding the perimeter of compound shapes	U351
		Finding the area of compound shapes	U970
		Finding the area of triangles	U945
		Finding the area of compound shapes containing triangles	U575
		Finding the area of parallelograms	U424
		Area and perimeter of rectangles and compound shapes	U226

1 This rectangle is 7 cm long and 5 cm wide.



Not drawn accurately

1 a) Calculate the perimeter of the rectangle.

Answer _____ cm **[1 mark]**

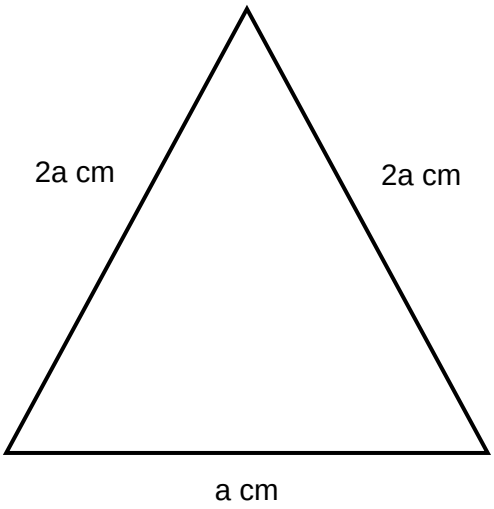
1 b) Calculate the area of the rectangle.

Answer _____ cm^2 **[1 mark]**

2 Work out the perimeter of this triangle.

Simplify your answer.

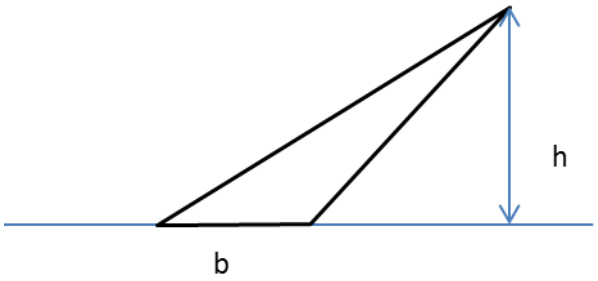
[1 mark]



Answer _____ cm

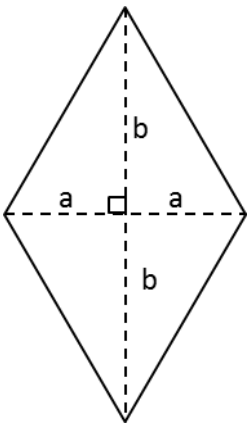
3 Find a formula for the area of each of the following shapes

3 a)



Answer _____ **[1 mark]**

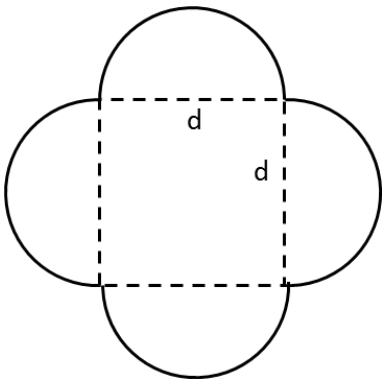
3 b)



Answer _____

[2 marks]

3 c)

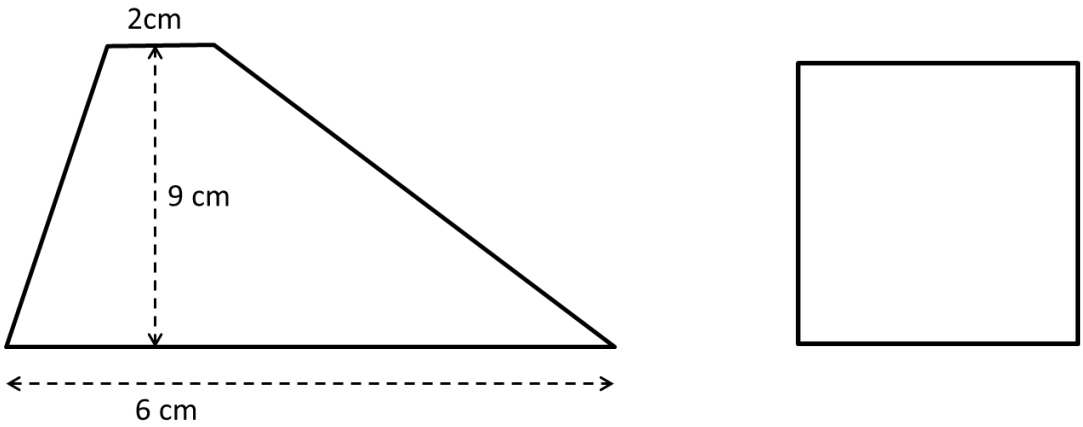


Answer _____

[3 marks]

4) The trapezium and the square have the same areas.

Not drawn accurately



What is the perimeter of the square?

Answer _____

[4 marks]

Volume – Foundation

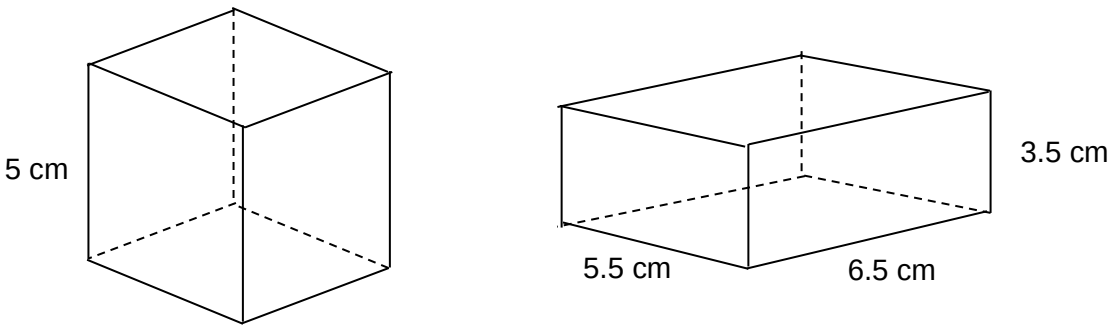
Knowledge	Sparx Codes		
		Finding the volume of cubes and cuboids	U786
		Finding the volume of prisms	U174
		Finding the volume of pyramids	U484
		Finding the volume of cylinders	U915
		Finding the volume of cones	U116
		Finding the volume of spheres	U617

1 Which of the following is **not** a measure of volume?
Circle your answer.

[1 mark]

litre cubic centimetre metre mm^3

2 Here are a cube and a cuboid.



Which has the greater volume?
You **must** show your working.

[3 marks]

Answer _____

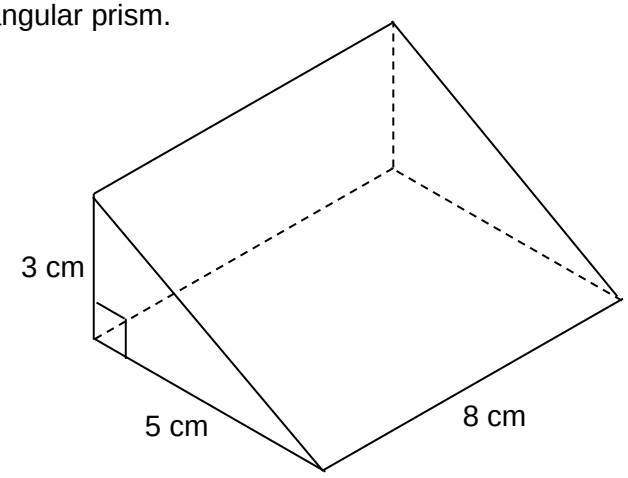
3 A cylinder has a radius of 4 cm and a height of 6 cm

Work out the volume.
Give your answer in terms of π

[2 marks]

Answer _____ cm^3

4 Here is a triangular prism.

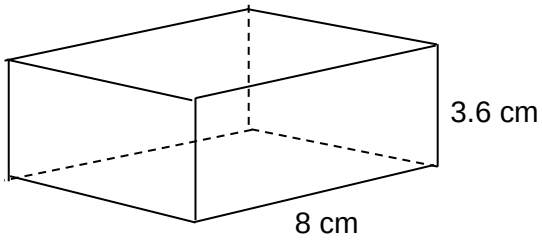


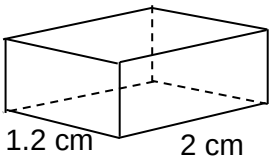
Work out the volume.

[3 marks]

Answer _____ cm^3

5 These two cuboids are similar in shape.





5 (a) How many small cuboids will fill the large cuboid?

[2 marks]

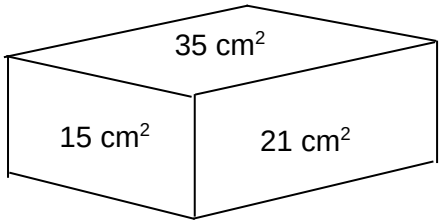
Answer _____

5 (b) Which information, given on the diagrams, is **not** necessary to answer part (a).
Give a reason to support your answer,

[2 mark]

6 Here is a cuboid.

The **areas** of the top and two sides are shown.

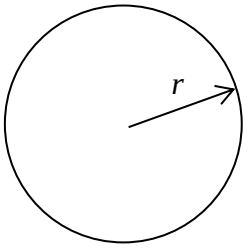


Work out the volume of the cuboid.

[3 marks]

Answer _____ cm^3

7 Here is a sphere.



Volume = $\frac{4}{3}\pi r^3$

The volume of the sphere is 36π cm^3

Work out the value of r.

[2 marks]

Answer _____

Measures – Foundation

Knowledge	Sparx Codes		
		Estimating and measuring	U102
		Converting units of length, mass and capacity	U388
		Converting units of area	U248
		Converting units of volume	U468
		Problem solving: Converting units of length, area and volume	U663
		Using appropriate units	U497

1 Circle the most sensible measurement for the quantity shown.

1 (a) The length of a human finger.

[1 mark]

7 cm 70 cm 170 cm 1700 cm

1 (b) The area of a garden.

[1 mark]

50 cm^2 100 cm^2 50 m^2 50 km^2

1 (c) The amount of water a kettle can hold.

[1 mark]

2 ml 20 ml 200 ml 2000 ml

1 Adam's weight to the nearest kilogram is 65 kg

2 (a) What is the greatest possible value of his weight?

[1 mark]

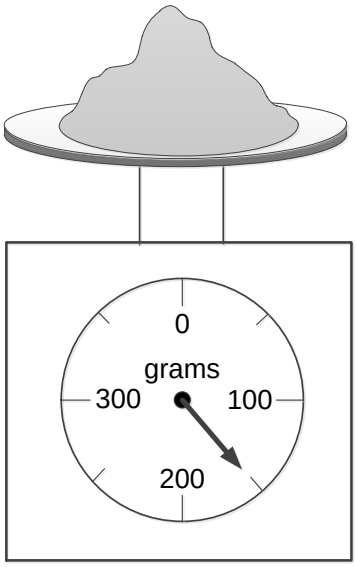
Answer _____ kg

2 (a) What is the least possible value of his weight?

[1 mark]

Answer _____ kg

3 Tom weighs some flour.



3 (a) How much does the flour weigh?

[1 mark]

Answer _____ g

3 (b) 1.2 kg of flour are needed for a recipe.

Explain how to use the scales to weigh 1.2 kg of flour**.**

[2 marks]

_____

_____

_____

4 Convert 24 000 cm^3 into m^3

[2 marks]

Answer _____

5 The speed of a car is shown in kilometres per hour.

5 miles = 8 kilometres

Work out the speed of the car in miles per hour.

[3 marks]

Answer _____ miles per hour

6 Sam leaves home at 9:00 am
He works out his journey to work takes 8100 seconds.

At what time did he arrive at work?

[3 marks]

Answer _____

7 Tom's car travels 40 miles per gallon.
One litre of petrol costs £1.19
1 gallon = 4.5 litres

Work out the cost of petrol when Tom drives 200 miles.

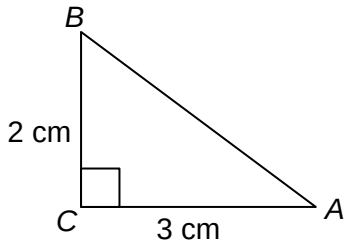
[4 marks]

Answer £ _____

Trigonometry – Foundation

Knowledge	Sparx Codes		
		Understanding sin, cos and tan	U605
		Finding unknown sides in right-angled triangles	U283
		Finding unknown angles in right-angled triangles	U545
		Using the exact values of trigonometric ratios	U627
		Angles of elevation and depression	U967
		Calculating with trigonometry and bearings	U164

1 What is the value of tan *A* for this triangle?



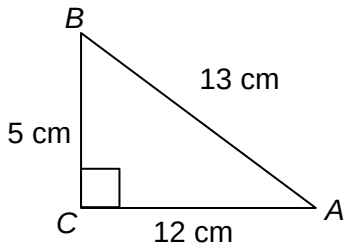
Not drawn accurately

Circle your answer.

[1 mark]

$\frac{2}{3}$ $\frac{2}{5}$ $\frac{2}{\sqrt{13}}$ $\frac{3}{\sqrt{13}}$

2 What is the value of sin *A* for this triangle?



Not drawn accurately

Circle your answer.

[1 mark]

$\frac{5}{12}$ $\frac{5}{13}$ $\frac{12}{13}$ $\frac{13}{5}$

3 (a) Use your calculator to work out $25 \cos 54°$

Give your answer to 1 decimal place.

[1 mark]

Answer _____

3 (b) Use your calculator to work out $\frac{15}{\tan 32^\circ}$

Give your answer to the nearest whole number.

[1 mark]

Answer _____

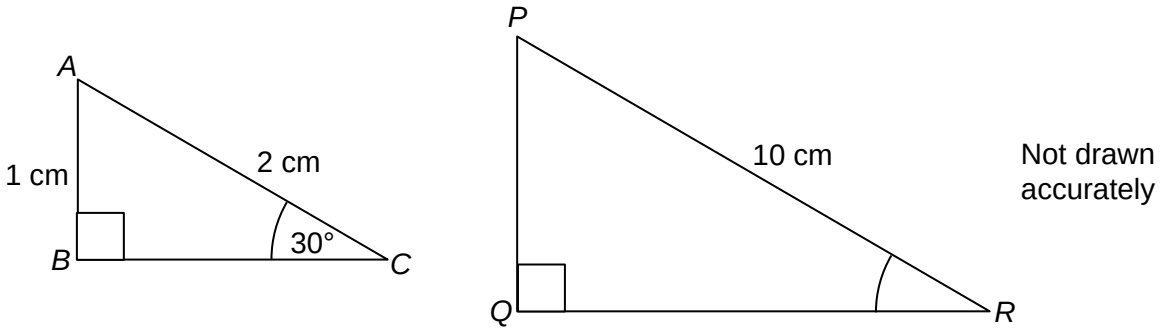
3(c) Use your calculator to work out $\tan^{-1}\left(\frac{18}{35}\right)$

Give your answer to 1 decimal place

[1 mark]

Answer _____ degrees

4 Triangles *ABC* and *PQR* are similar.



Not drawn accurately

4 (a) Write down the size of angle *BAC*.

[1 mark]

Answer _____ degrees

4 (b) Write down the size of angle *PRQ*.

[1 mark]

Answer _____ degrees

4 (c) Use Pythagoras' theorem to work out the length *BC*.
Give your answer as an exact value.

[2 marks]

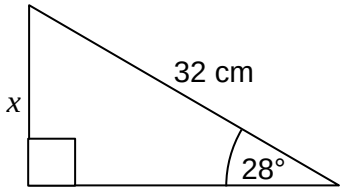
Answer _____ cm

4 (d) Work out the length of *QR*.
Give your answer as an exact value.

[1 mark]

Answer _____ cm

5



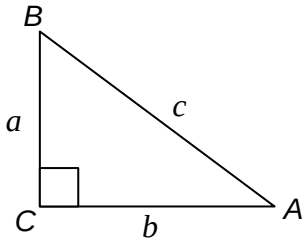
Not drawn accurately

Which of the following gives the length x in centimetres?
Circle your answer.

[1 mark]

32 × sin 28° 28 × sin 32° 32 × cos 28° 28 × cos 32°

6 For this triangle, which of the following is **not** true?



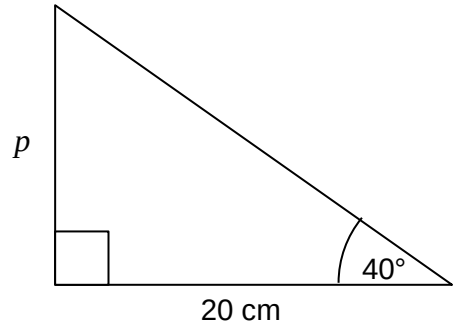
Circle your answer.

[1 mark]

tan A = $\frac{b}{a}$ sin B = $\frac{b}{c}$ sin A = $\frac{a}{c}$ cos A = $\frac{b}{c}$

7 Work out the length p.

[2 marks]

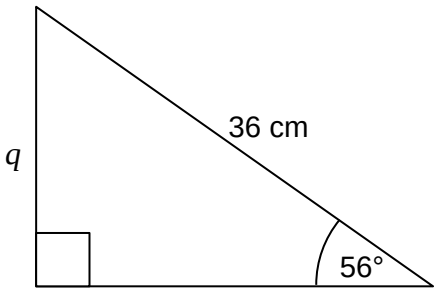


Not drawn accurately

Answer _____ cm

8 Work out the length q.

[2 marks]

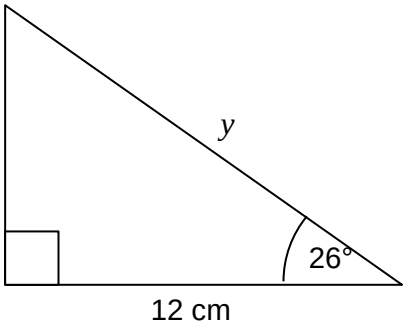


Not drawn accurately

Answer _____ cm

9 Work out the length y.

[2 marks]

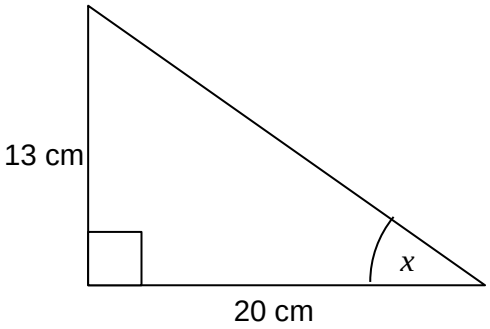


Not drawn accurately

Answer _____ cm

10 Work out the size of angle x.

[2 marks]



Not drawn accurately

Answer _____ degrees

Basic algebra (1) – Foundation

Knowledge	Sparx Codes		
		Simplifying expressions by collecting like terms	U105
		Simplifying expressions using index laws	U662
		Expanding single brackets	U179
		Expanding double brackets	U768
		Factorising into one bracket	U365
		Solving equations with one step	U755
		Solving equations with two or more steps	U325
		Solving equations with the unknown on both sides	U870
		Changing the subjects of formulae	U556

1 Work out the value of $35 - 3 \times 9$

[1 mark]

Answer _____

2 Insert brackets to make the calculation correct $100 - 4 + 3^2 = 51$

[1 mark]

Answer _____

3 Put these in order of size, starting with the smallest.

You **must** show your working.

[3 marks]

$3 + 6^2 - 10$ $20 - (2 + 3)^2$ $15 - 54 \div 3^3$

_____

_____

_____

Answer _____

4 (a) Simplify $a + a + a + a + a + a$

[1 mark]

Answer _____

4 (b) Simplify $7 \times b \times c$

[1 mark]

Answer _____

4 (c) Simplify $12 \times d \times d \times d$

[1 mark]

Answer _____

4 (d) Write as a single fraction in its simplest form $(5 \times m \times m) \div (8 \times n)$

[1 mark]

Answer _____

4 (e) Write as a single fraction in its simplest form $(4 \times n \times n \times 5) \div (2 \times m \times 7)$

[2 marks]

_____

_____

Answer _____

5 Circle the expression that describes 20 more than x.

[1 mark]

$20 > x$ $\quad$ $x + 20$ $\quad$ $20x$ $\quad$ $x - 20$

6 1 kilogram of bananas costs 87p

Write down an expression for the cost of b kilograms of bananas.

[1 mark]

Answer _____ pence

7 Which of these can be written as $16a^2b$?
Circle all the possible answers.

[2 marks]

$2 \times 8 \times a \times a \times b$ $\quad$ $2 \times a \times a + 8 \times b$

$32 \times a \times a \times a \div (2 \times a \times b)$ $\quad$ $32 \times a \times a \times a \div (2 \times a) \times b$

8 Carys has just had a birthday.
She is now A years old.
Her brother, Joshua is 2 years younger.
Her sister, Kiah, is twice as old as Joshua.

Write down an expression for their total age.

[3 marks]

_____

_____

_____

Answer _____

Basic algebra (2) – Foundation

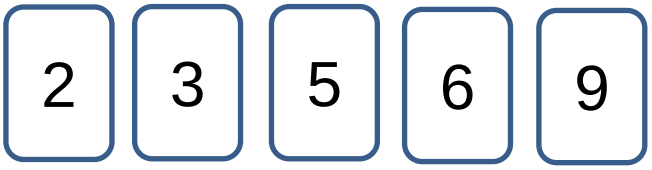
Knowledge	Sparx Codes		
		Simplifying expressions by collecting like terms	U105
		Simplifying expressions using index laws	U662
		Expanding single brackets	U179
		Expanding double brackets	U768
		Factorising into one bracket	U365
		Solving equations with one step	U755
		Solving equations with two or more steps	U325
		Solving equations with the unknown on both sides	U870
		Changing the subjects of formulae	U556

1 Work out the value of $40 - 2 \times 3^2$

[1 mark]

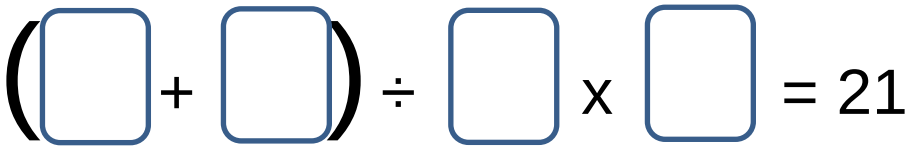
Answer _____

2 Sunita has these cards:



Choose **four** numbers from the cards to make the following calculation correct:

[1 mark]



3 Simplify $5 \times 3 \times f \times f \times f \times g \times g$

[2 marks]

Answer _____

4 Mr Mistry has 3 grandchildren.
He gives Nimisha £m.
He gives Sunhil £80 less than Nimisha.
He gives Akshay twice as much as Sunhil.

Write down an expression for the total amount of money he gives them.

[3 marks]

Answer £ _____

5 Multiply out $5(2a - 7)$

[2 marks]

Answer _____

6 Expand and simplify

6 (a) $2(3h + 6) + 5(4h + 2)$

[3 marks]

Answer _____

6 (b) $6(3j - 2) - 4(2j + 4)$

[3 marks]

Answer _____

7 Sam wants to build a water play area for children.

He wants the shape to have **two** lines of symmetry.

Work out an expression for the total perimeter of the shape.

[4 marks]

Answer _____ m

Basic algebra (3) – Foundation

Knowledge	Sparx Codes		
		Simplifying expressions by collecting like terms	U105
		Simplifying expressions using index laws	U662
		Expanding single brackets	U179
		Expanding double brackets	U768
		Factorising into one bracket	U365
		Solving equations with one step	U755
		Solving equations with two or more steps	U325
		Solving equations with the unknown on both sides	U870
		Changing the subjects of formulae	U556

1 Work out the value of $24 + 4 \times 3^2$

[1 mark]

Answer _____

2 (a) Simplify $6 \times 2 \times d \times d \times e$

[1 mark]

Answer _____

2 (b) Write as a single fraction in its simplest form $(5 \times g \times g \times g) \div (8 \times h \times h)$

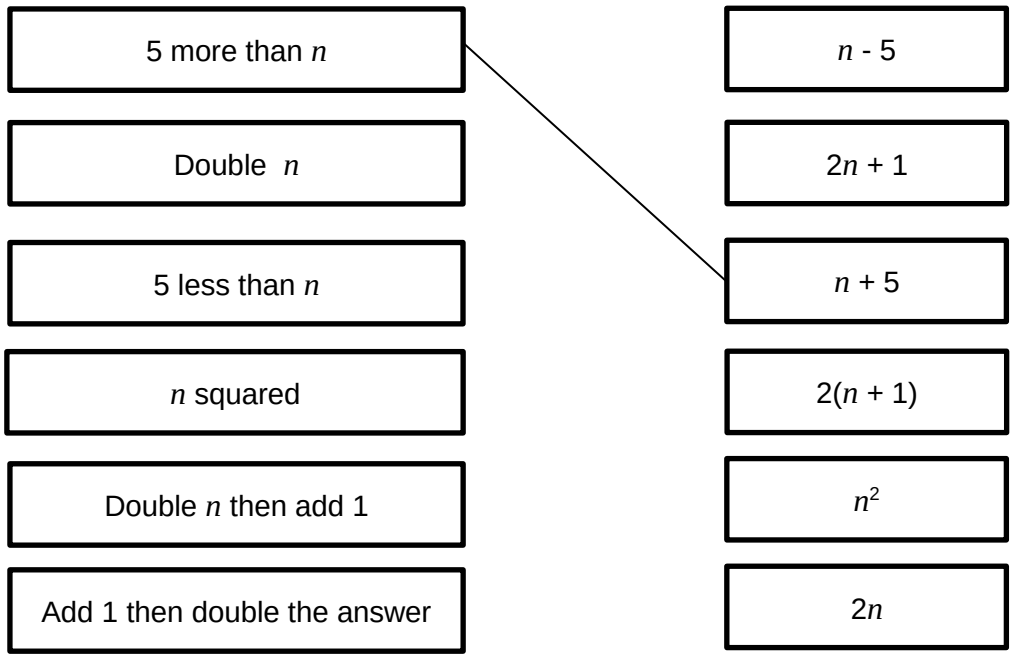
[2 marks]

Answer _____

3 Match each card on the left with a card on the right.

The first one is done for you.

[2 marks]



4 Andrew pays £p for his phone.
Liz pays 3 times as much as Andrew.
Laura pays £20 less than Liz.

Write an expression for the total they pay.

Simplify your answer.

[3 marks]

Answer £ _____

5 Factorise fully each of the following expressions

5 (a) $20a + 16$

[1 mark]

Answer _____

5 (b) $30b - 45$

[1 mark]

Answer _____

5 (c) $16c^3 + 24c$

[2 marks]

Answer _____

5 (d) $18d^3e - 27d^5e$

[2 marks]

Answer _____

Basic algebra (4) – Foundation

Knowledge	Sparx Codes		
		Simplifying expressions by collecting like terms	U105
		Simplifying expressions using index laws	U662
		Expanding single brackets	U179
		Expanding double brackets	U768
		Factorising into one bracket	U365
		Solving equations with one step	U755
		Solving equations with two or more steps	U325
		Solving equations with the unknown on both sides	U870
		Changing the subjects of formulae	U556

1 Work out the value of $3 + 4^2 - 20 \div 5$

[2 marks]

Answer _____

2 Insert brackets in the following to make it correct

[1 mark]

$$3 \times 4 + 2 \div 8 - 2 = 3$$

3 George says that $4 + a + a + a + b + b = 24ab$

Describe the mistakes George has made.

Give the correct answer.

[2 marks]

Answer _____

4 On Monday David travels m miles.
On Tuesday he travels 35 miles more than he did on Monday.
On Wednesday he travels a total of twice the distance he travelled on Monday.

Work out an expression for the total distance he travels during the three days.

[3 marks]

Answer _____ miles

5 Multiply out $7(3a + 8)$

[2 marks]

Answer _____

6 Expand and simplify

6 (a) $4(5h + 7) + 2(5h - 7)$

[3 marks]

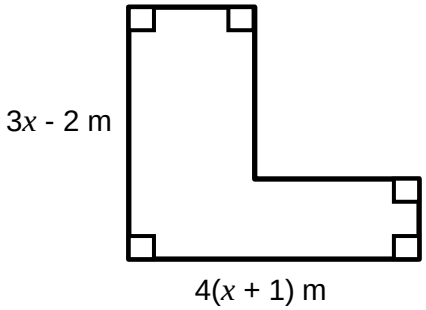
Answer _____

6 (b) $9(3k + 1) – 5(2k - 4)$

[3 marks]

Answer _____

7 A house has an open plan kitchen and lounge as shown.



Not drawn accurately

Work out an expression for the total perimeter of the shape.

[4 marks]

Answer _____ m

8 Factorise fully each of the following expressions

(a) $10x + 15$

[1 mark]

Answer _____

(b) $36x - 48$

[1 mark]

Answer _____

(c) $27x + 45x^5$

[2 marks]

Answer _____

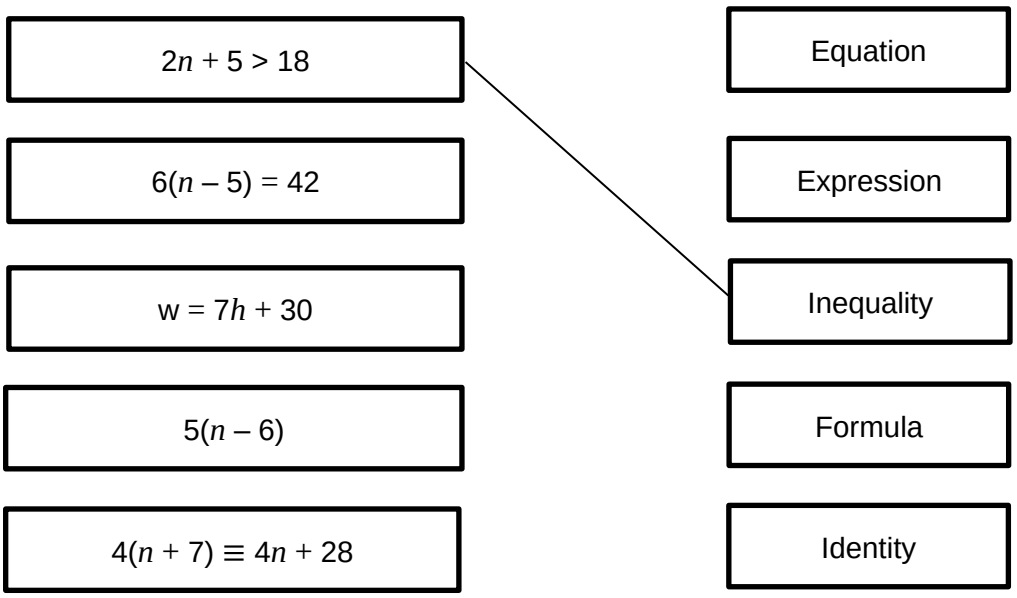
(d) $44x^3y^2 - 33xy^4$

[2 marks]

Answer _____

9 Match each of the following by drawing a line.
The first one has been done for you.

[2 marks]



10 Write down all the integers, n, that satisfy the inequality

[2 marks]

$$-3 < n \leq 1$$

Answer _____

11 Sanjit wants to pick some strawberries.

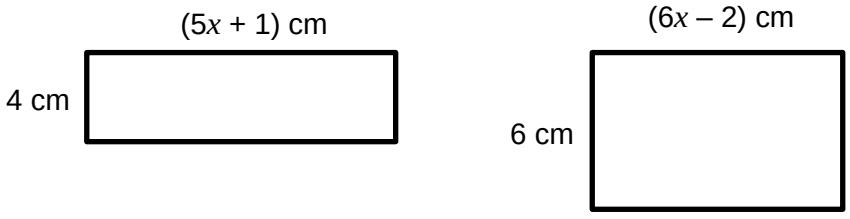
He pays £3 for a box.
He then pays £1.20 per kg of strawberries.

Write down a formula to work out the total cost, C, of picking s kg of strawberries.

[1 mark]

Answer _____

12 These two rectangles have the same area.



Write down an equation to show this.

[1 mark]

Answer _____

Basic algebra (5) – Foundation

Knowledge	Sparx Codes		
		Simplifying expressions by collecting like terms	U105
		Simplifying expressions using index laws	U662
		Expanding single brackets	U179
		Expanding double brackets	U768
		Factorising into one bracket	U365
		Solving equations with one step	U755
		Solving equations with two or more steps	U325
		Solving equations with the unknown on both sides	U870
		Changing the subjects of formulae	U556

1 Work out the value of $40 - (2 + 3)^2 \div 5$

[1 mark]

Answer _____

2 Which of these does **not** give an answer of 18?

Circle your answer.

[1 mark]

$30 - 3 \times 6 + 6$ $6 + 3 \times 2$ $5 + 2^3 \times 2 - 3$

3 Simplify $2 \times 6 \times a \times a \times b \times b \times b$ using index notation

[2 marks]

_____

_____

Answer _____

4 Jean pays for gas, electricity and water every month.

Her gas bill is £G per month.
Her electricity bill is £10 per month more than her gas bill.
Her water bill is half the electricity bill.

Write down an expression for the total cost of the bills for 1 year.

[4 marks]

Answer £

5 Multiply out $7a(3a - 9)$

[2 marks]

Answer

6 Expand and simplify

6 (a) $7(2x + 3) + 4(6x + 9)$

[2 marks]

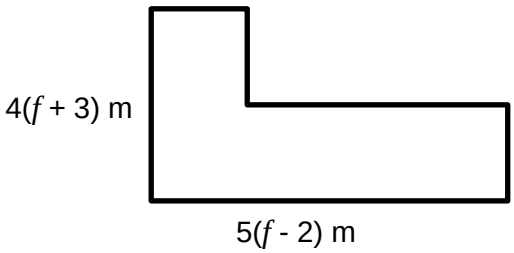
Answer _____

6 (b) $8(4y – 3) – 3(5y + 1)$

[3 marks]

Answer _____

7 Fencing is needed to go around a school field as shown.



Work out an expression for the total length of fencing needed.

[4 marks]

Answer _____

8 Factorise fully:

8 (a) $27n - 36$

[1 mark]

Answer _____

8 (b) $36n^2 - 60n$

[2 marks]

Answer _____

8 (c) $30n^2m^2 - 50n^3m^2$

[2 marks]

Answer _____

9 Use one of these words to describe each of the following

[3 marks]

Expression Equation Identity Formula Inequality

9 (a) $5x + 3 = 2x - 6$ _____

9 (b) $6a(2a - 7) \equiv 12a^2 - 42a$ _____

9 (c) $C = 12n + 36$ _____

10 Write down all the integers, n, satisfied by $-8 \leq n < -1$

[2 marks]

Answer _____

11 John gets paid £300 per week for working 35 hours.

He then gets paid £15 per hour for any overtime.

Write down a formula for his total wages, w, when he works h hours overtime.

[1 mark]

_____

Answer £ _____

12 280 people attended a summer fair.
The total cost for their food was £728.

Hotdogs cost H pence.
Beefburgers cost 20p more than hotdogs.
Ice creams cost twice as much as beefburgers.
Each person ate one hotdog, one beefburger and one ice cream.

Write down an equation in terms of H for this information.

[3 marks]

_____

_____

_____

Answer _____

Equations – Foundation

Knowledge	Sparx Codes		
		Using standard form with positive indices	U330
		Using standard form with negative indices	U534
		Multiplying and dividing numbers in standard form	U264
		Adding and subtracting numbers in standard form	U290
		Standard form with a calculator	U161

1 (a) Solve $\frac{x}{10} = 5$

[1 mark]

$x =$ _____

1 (b) Solve $2y - 9 = 18$

[2 marks]

$y =$ _____

1 (c) Solve $4w + 3 = 20 - 6w$

[3 marks]

$w =$ _____

2 A shop gives reward points based on the money in £ spent by a customer.
It uses this formula.

reward points = 2 × money spent + bonus

The bonus is worked out using this table.

Money spent (to the nearest £)	1 to 20	21 to 50	50 to 100	More than 100
Bonus	5	10	20	25

2 (a) Amy spent £34

Work out her reward points.

[2 marks]

Answer _____

2 (b) Bob was given 220 reward points.

How much, to the nearest £, did he spend?

[2 marks]

Answer £ _____

3 An expression for the nth term of a sequence is $n^2 + 2$

Write down the first three terms of the sequence.

[3 marks]

Answer _____ , _____ , _____

4 Liam and Kyle share their energy bills equally.

Their electricity bill is £x
Their gas bill is £24 more than their electricity bill.

They each pay £59

Work out the cost of the electricity bill and the cost of the gas bill.

[4 marks]

Electricity £ _____

Gas £ _____

5 Solve $\frac{6x+7}{5} = 2x - 4$

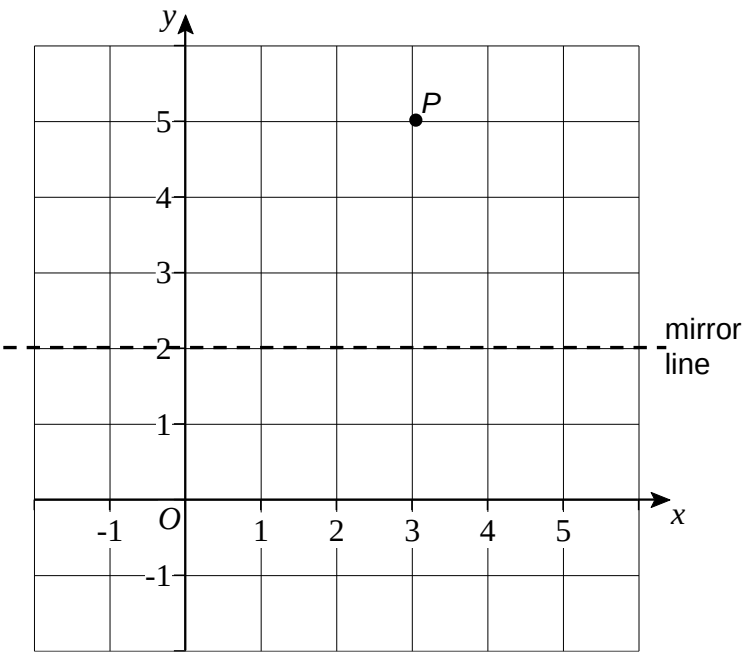
[3 marks]

$x =$ _____

Coordinates and linear graphs – Foundation

Knowledge		
Sparx Codes	Using standard form with positive indices	U330
	Using standard form with negative indices	U534
	Multiplying and dividing numbers in standard form	U264
	Adding and subtracting numbers in standard form	U290
	Standard form with a calculator	U161

1



Point *P* is reflected in the mirror line.

1 (a) Circle the equation of the mirror line.

[1 mark]

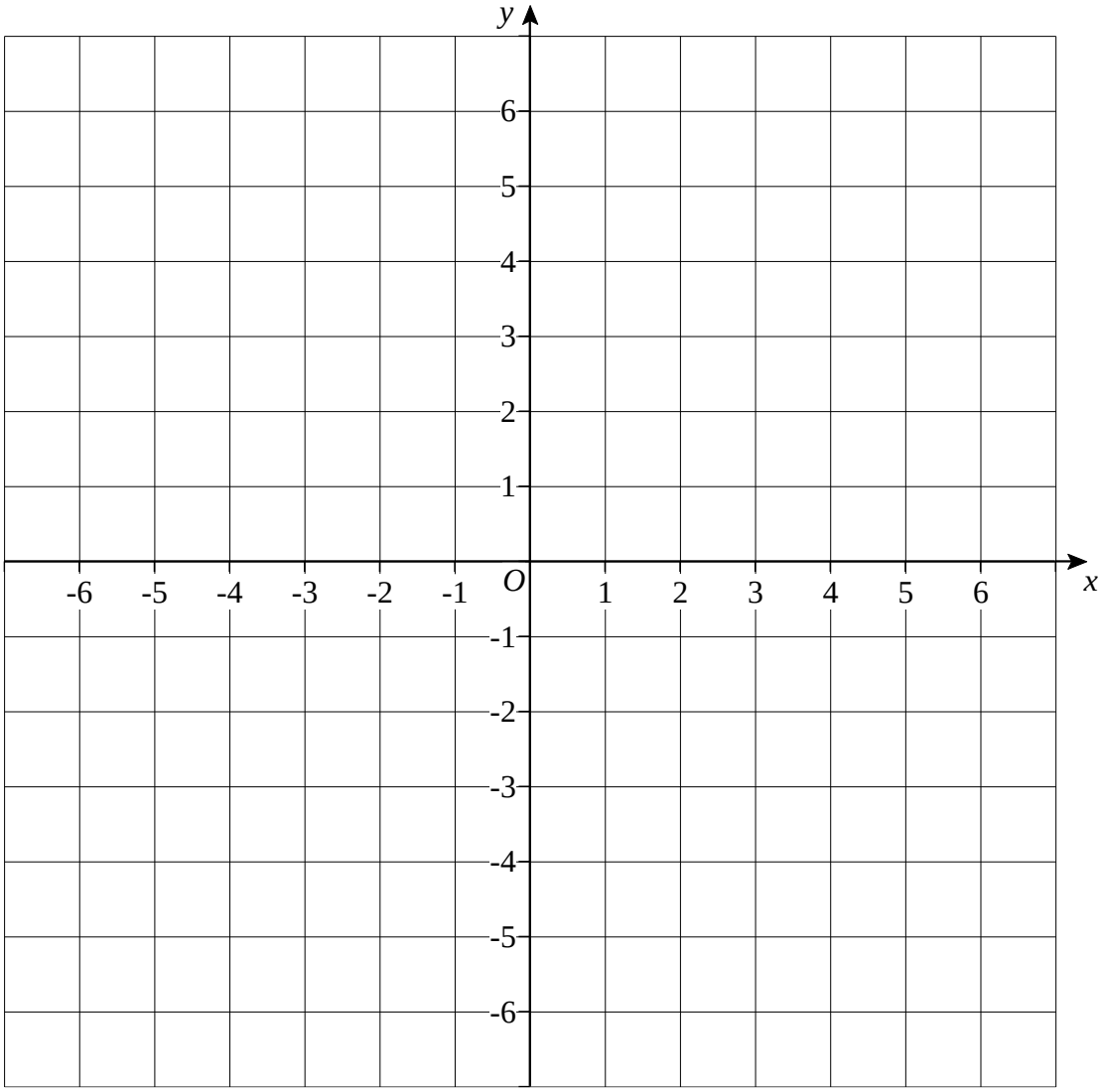
$y = x + 2$ $x + y = 2$ $x = 2$ $y = 2$

1 (b) Work out the coordinates of the reflection of point *P*.

[1 mark]

Answer (,)

2



2 (a) Plot the points $A(-3, 2)$ and $B(1, -2)$ on the grid.

[2 marks]

2 (b) Point C has

the same x-coordinate as A
three times the y-coordinate of B.

Plot C on the grid.

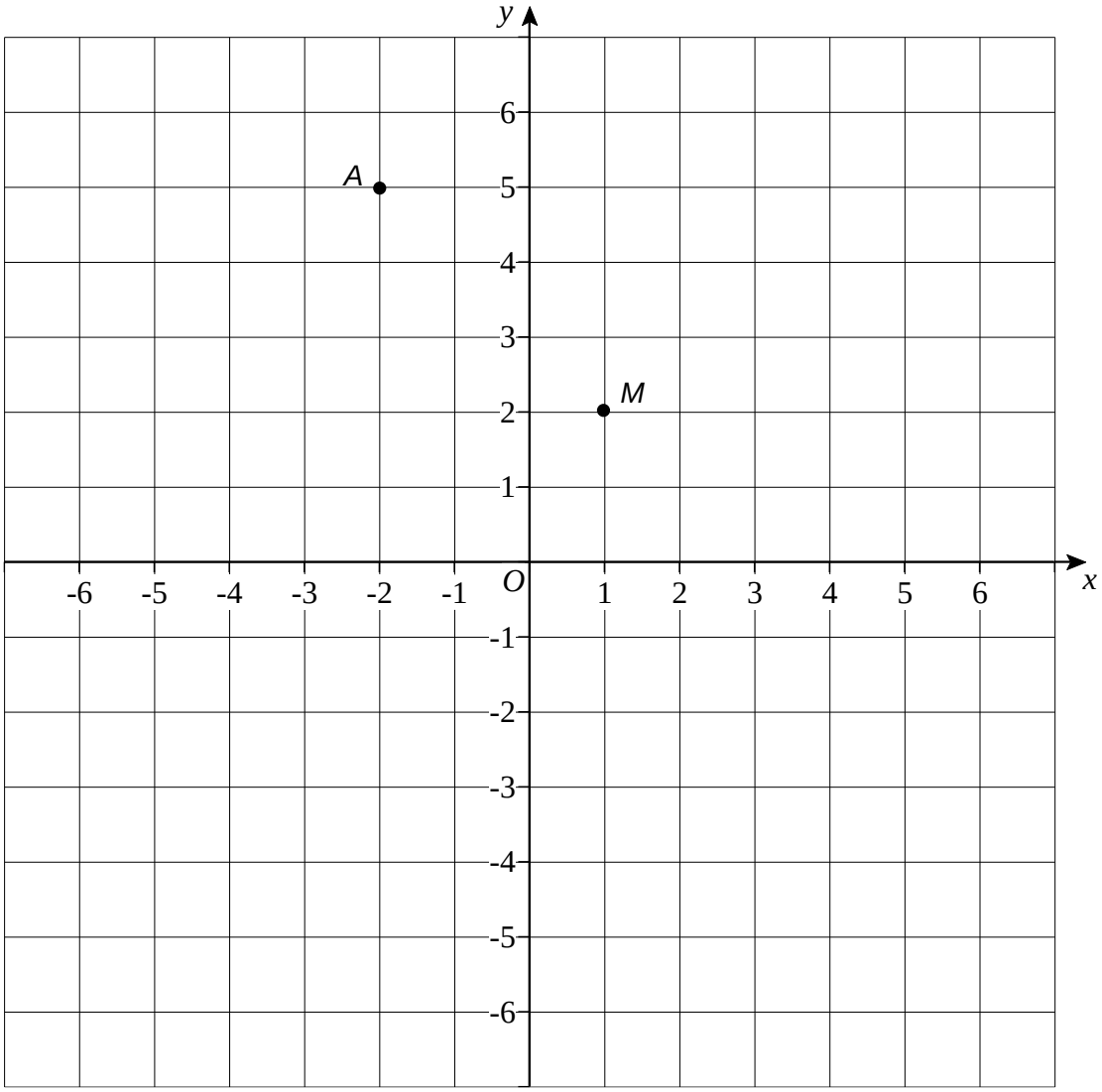
[2 marks]

2 (c) Circle the **two** answers that describe triangle ABC.

[2 marks]

equilateral isosceles scalene right-angled

3



3 (a) *M* is the midpoint of the line *AB*.

Work out the coordinates of *B*.

[2 marks]

Answer (,)

3 (b) Write down the coordinates of two other points on the line AB with midpoint *M*.

[2 marks]

Answer (,) and (,)

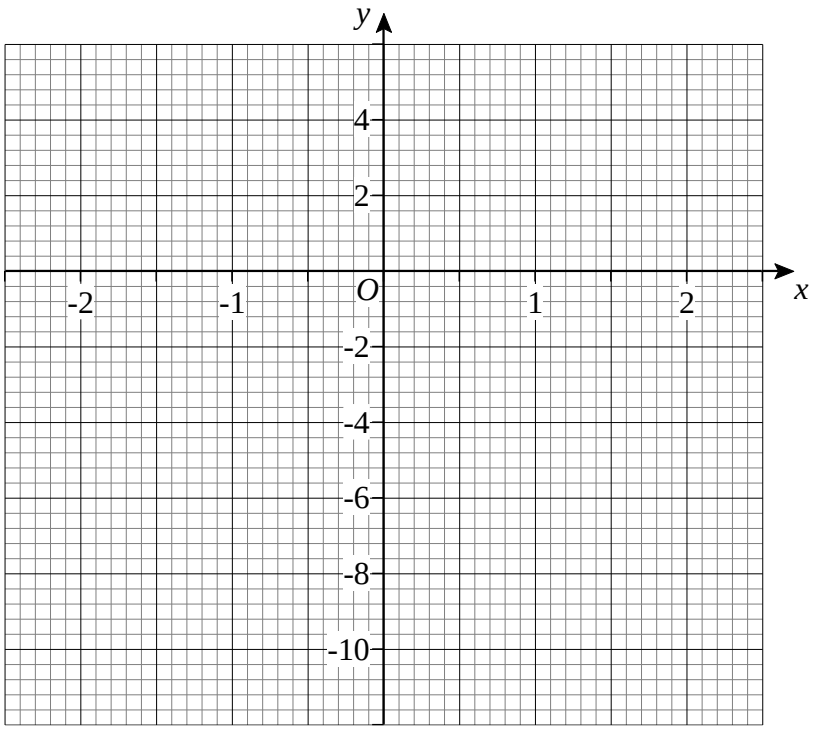
4 (a) Complete the table for $y = 3x - 2$

[2 marks]

x	–2	–1	0	1	2
y	–8		–2		4

4 (b) On the grid draw the graph of $y = 3x - 2$ for values of x from –2 to 2

[2 marks]

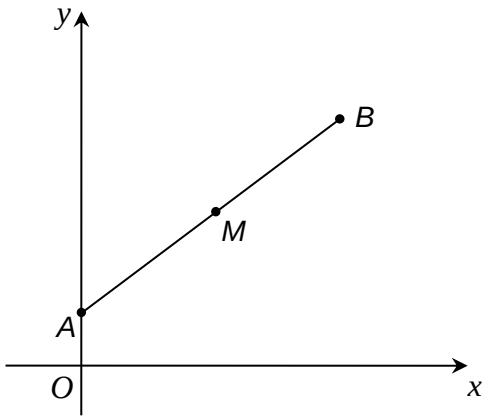


5 Work out the coordinates of **two** points that lie on the line $y = 12 - 5x$

[2 marks]

Answer (,) and (,)

6 A is (0, 4) and B is (10, 9)



Not drawn accurately

Work out the coordinates of the midpoint, M, of the line AB.

[2 marks]

Answer (,)

Algebra: Quadratics, Rearranging Formulae and Identities – Foundation

Knowledge		
Sparx Codes	Using standard form with positive indices	U330
	Using standard form with negative indices	U534
	Multiplying and dividing numbers in standard form	U264
	Adding and subtracting numbers in standard form	U290
	Standard form with a calculator	U161

1 (a) Expand $2y(x - 3y^2)$

[2 marks]

Answer _____

1 (b) Factorise $8x + 3x^2$

[1 mark]

Answer _____

2 Simplify

[3 marks]

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

Answer _____

2 (b) $\frac{a^6}{a^3}$

Answer _____

2 (c) $(a^6)^3$

Answer _____

3 Factorise $x^2 + 2x - 15$

[2 marks]

Answer _____

4 Expand $(y + 4)(y - 3)$

[2 marks]

Answer _____

5 Make x the subject of $ax - by = cx - dy$

[3 marks]

Answer _____

Solving quadratic equations – Foundation (20 minutes)

Knowledge

Sparx Codes

Using standard form with positive indices	U330
Using standard form with negative indices	U534
Multiplying and dividing numbers in standard form	U264
Adding and subtracting numbers in standard form	U290
Standard form with a calculator	U161

1 Expand and simplify $(x + 5)(x - 4)$

[2 marks]

Answer _____

2 Factorise $x^2 + 12x + 20$

[2 marks]

Answer _____

3 Solve the equation $x^2 + 4x - 12 = 0$

[3 marks]

Answer _____

4 Solve the equation $x^2 - 25 = 0$

[1 mark]

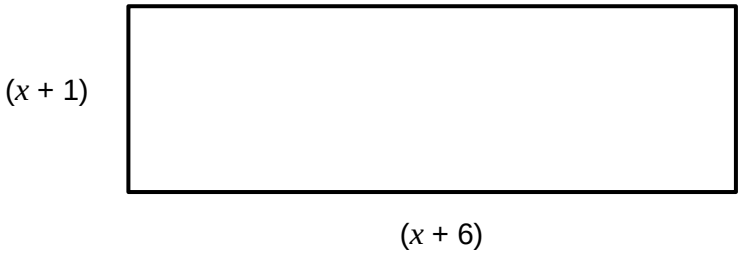
Answer _____

5 Solve $x^2 - 11x + 30 = 0$

[3 marks]

Answer _____

6 The area of the rectangle is 66 cm^2



6 (a) Using this information, show that $x^2 + 7x - 60 = 0$

[3 marks]

Answer _____

6 (b) Solve the equation to find x

[3 marks]

Answer _____

Indices – Foundation (20 minutes)

Knowledge		
Sparx Codes	Using standard form with positive indices	U330
	Using standard form with negative indices	U534
	Multiplying and dividing numbers in standard form	U264
	Adding and subtracting numbers in standard form	U290
	Standard form with a calculator	U161

Section A

10 minutes. Calculator.

1 What whole number power of 2 is 1024?

[1 mark]

Answer _____

2 Circle the number that is a power of 7

[1 mark]

14 77 343 490

3 Use your calculator to work out

3 (a) $\dfrac{\sqrt{33.64}}{19.8+9.2}$

[1 mark]

Answer _____

3 (b) How much less than 1000 is 9.8^3?

[1 mark]

Answer _____

4 Work out $\frac{2^7 \times 3^5}{6^3}$

[1 mark]

Answer _____

5 (a) Write $11^{20} \div 11^4$ as a single power of 11

[1 mark]

Answer _____

5 (b) Write 4^5 as a single power of 2

[1 mark]

Answer _____

6 Write 91 as the sum of two cube numbers.

[1 mark]

Answer _____

7 Raj and his sister Zia are both at secondary school.
Raj is three years older than Zia.
The sum of the squares of their ages is 369

How old are they?

[2 marks]

Zia = _____ years old

Raj = _____ years old

Section B

Non-calculator.
Put your calculator away.
You may still work on section A but you must **not** use a calculator.

8 Circle the number that is 1 **more** than a cube number

[1 mark]

10 26 37 65

9 Circle the number that is **not** a whole number power of 3

[1 mark]

9 18 27 81

10 Write down the value of $\sqrt{196}$

[1 mark]

Answer _____

11 Work out $\sqrt{2^4 + 3^2}$

[2 marks]

Answer _____

12 Write $\sqrt{1\text{million}}$ as a power of 10

[1 mark]

Answer _____

13 Solve the equation $x^2 - 1 = 48$

[2 marks]

Answer _____

14 Tina says,

"The difference between any 2 consecutive square numbers is **always** odd."

Is she correct?

Yes ☐ No ☐

Give reasons for your answer.

[2 marks]

Standard form – Foundation

Knowledge	Sparx Codes	
	Using standard form with positive indices	U330
	Using standard form with negative indices	U534
	Multiplying and dividing numbers in standard form	U264
	Adding and subtracting numbers in standard form	U290
	Standard form with a calculator	U161

You may use your calculator in this section.

1 Here are five numbers.

47 000 $\quad 4.5 \times 10^4 \quad 5 \times 10^3 \quad 2.8 \times 10^5 \quad$ 125 000

Work out the difference between the largest and smallest numbers.

Give your answer in standard form.

[3 marks]

Answer _____

2 Work out $(5.9 \times 10^7) \div (2.3 \times 10^4)$

Give your answer in standard form to 2 significant figures.

[3 marks]

Answer _____

3 Solve $\frac{x}{0.02} = 3.1 \times 10^{-4}$

Give your answer in standard form.

[2 marks]

$x =$ _____

4 Here are the probabilities of two independent events.

Event A	2.7×10^{-2}
Event B	3.4×10^{-4}

How many times more likely is event A than event B?

[2 marks]

Answer _____

Section B

Non-calculator.
Put your calculator away.
You may still work on section A but you must **not** use a calculator.

5 Circle the number that is in standard form.

[1 mark]

6.4×5^{-7} 0.9×10^{-7} 1×10^{-7} 10×10^{-7}

6 Write 32 million in standard form.

[1 mark]

Answer _____

7 Write 4.12×10^{-6} as an ordinary number.

[1 mark]

Answer _____

8 Work out $(5 \times 10^{-3})^2$
Give your answer in standard form.

[2 marks]

Answer _____

9 The table shows the surface area of six planets.

Planet	Surface area (km^2)
A	8.10×10^9
B	460 million
C	6.20×10^{10}
D	7.64×10^9
E	1.45×10^8
F	4.27×10^{10}

9 (a) Circle the planet with the smallest surface area.

[1 mark]

A B C D E F

9 (b) Circle the planet with the largest surface area.

[1 mark]

A B C D E F

10 The area of the Earth covered by water is 361 million km^2
The area of the Earth **not** covered by water is 149 million km^2

Work out the total area of the Earth.
Give your answer in standard form.

[3 marks]

Answer _____ km^2