STAGE C LEARNING OBJECTIVES

Learning Outcome	Tier	R	Y	G
Topic 1: Calculations (Core)				
LO1: To be able to use a method to solve multiplication problems	F	R	Y	G
LO2: To be able to use a method to solve division problems	F	R	Y	G
LO3: To be able to use BIDMAS to calculate solutions	F	R	Y	G
LO4: To be able to state a value to a required degree of accuracy	F	R	Y	G
Topic 2: Algebra (Core)				
LO1: TBAT simplify like terms	F	R	Y	G
LO2: TBAT expand brackets and simplify the result	F	R	Y	G
LO3: To be able to factorise expressions	F	R	Y	G
Topic 3: Fractions (Core)				
LO1: To be able to use the property of fractional equivalence	F	R	Y	G
LO2: To be able to add and subtract fractions	F	R	Y	G
Topic 4: Area and Volume (Core)				
LO1: To be able to calculate area of compound shapes	F	R	Y	G
LO2: To be able to derive and use formula for area	F	R	Y	G
LO3: To be able to apply the formula for volume of a prism (excluding cylinders)	F	R	Y	G
Topic 5: Percentages (Core)				
LO1: Calculate a percentage of a quantity using a calculator where appropriate	F	R	Y	G
LO2: Express a quantity as a percentage of an amount	F	R	Y	G
Topic 6: Algebra (Core)				
LO1: TBAT solve simple equations with integer solutions	F	R	Y	G
LO2: TBAT recognise the difference between an equation, formula and identity	F+	R	Y	G
LO3: TBAT rearrange and substitute into formulae	F	R	Y	G
LO4: TBAT interpret simple expressions as function machines	F	R	Y	G
Topic 7: Graphing (Core)				
LO1: TBAT plot simple graphs of linear functions	F	R	Y	G
LO2: TBAT plot simple graphs of quadratic functions	F	R	Y	G
Topic 8: Probability (Core)				
LO1: TBAT identify when events are mutually exclusive and know the sum of these events would be 1	F	R	Y	G

F - Foundation
F+ - Additional foundation
H – Higher

Stage C – Topic 1 Calculations	
LO1: To be able to use a method to solve multiplication problems	
1	£213 × 16
2	32.40 × 23
3	A DVD costs £12.25. Work out the cost of 9 of these DVDs.
4	John takes 27 boxes out of his van. The weight of each box is 41.7 kg. Work out the total weight of the 27 boxes.
LO2: To be able to use a method to solve division problems	
1	Work out a) 325 ÷ 5 b) 448 ÷ 8 c) 221 ÷ 13 d) 377 ÷ 29
2	Work out a) 9 ÷ 0.3 b) 6 ÷ 0.1 c) 12 ÷ 0.4 d) 0.56 ÷ 0.08
3	A box can hold 19 books. Work out how many boxes will be needed to hold 646 books.
4	A teacher has £539 to spend on books. Each book costs £26 How many books can the teacher buy?
5	A box contains 7 books, each weighing 2.5 kg. Work out the total weight of the box.
6	John takes 13 boxes out of his van. The weight of each box is 25.5 kg Work out the total weight of the 13 boxes.
LO3: To be able to use BIDMAS to calculate solutions	
	Work out the following.
1	$6 \times 5 + 2$
2	$(9 + 2) \times 2 + 5$
3	$4 \times (1 + 4) - 6$
4	$6 \times 4 - 3 \times 5$
5	$\frac{7 - 2^2}{4^2 - 15}$
6	$\frac{20 - 3^2}{10 - (5+4)}$
LO4: To be able to state a value to a required degree of accuracy	
1	Round these numbers to the nearest 10: a) 26 b) 62 c) 75 d) 231 e) 797 Round these numbers to the nearest 100: a) 78 b) 223 c) 549 d) 1450 e) 1382 Round these numbers to the nearest 1000: a) 850 b) 1455 c) 3230 d) 7500 e) 8455

2	Round the following numbers to 1 decimal place a) 48.9732 b) 163.9299 c) 19.952
3	Round the following numbers to 2 decimal places a) 10.697 b) 8.993 c) 14.9964
4	Work out the answer to 2.6882×14.71728 and give your answer correct to 2 decimal places.
5	Work out the answer to $64.2 \div 5.7$ and give your answer correct to 1 decimal place.

Mixed Problems	
1	David is saving for a new bike which costs £175. He has been saving £7 a week for 9 weeks. How much more does he need to save?
2	18 eggs are needed to make an omelette for 6 people, how many eggs are needed to make an omelette for 4 people?
3	I bought a card costing £1.76 and a chocolate bar costing 63p. There was a 10% sale that day. How much did I spend?
4	Carmen weighs 53kg. Her sister weighs 18kg less. She said: 'Together, we weigh 23kg less than our Dad!' How much does their Dad weigh?

Stage C – Topic 2 - Algebra

LO1: To be able to simplify like terms

1 *Simplify the following expressions:*

a) y + y + y b) z x z x z x z x z c) a + 5a + 2a + 3a d) 4a + 9a e) 8b - 10b

f) 3f + 6g + 4f + 5g g) 5a + 2b + 6a – 2b h) 6c + 5d - 3c + 8d i) 7b + 6a - 5b + 3a

j) 3ab - 2bc + 6ab + 9bc + 5ad k) $2x^2 - 3x + 3x^2 + 6x$ l) 6ab + (- 6ab) – 3bc – (-4bc) m) 5h x 6h

LO2: To be able to expand brackets and simplify the result

1 Expand:

a) $3(x+4)$ b) $6(x-2)$ c) $5(x+4)$ d) $3(x+9)$

e) $4(2x+3)$ f) $5(4x-2)$ g) $-(x+1)$ h) $-(4x-2)$

2 Expand and Simplify:

a) $2(x+1)+3(x+2)$ b) $4(x+3)+2(x+7)$

c) $5(x+3)+2(x+7)$ d) $8(x+10)+2(x+4)$

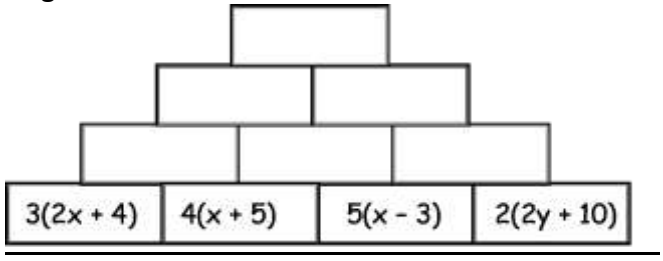
3 Expand and Simplify: *(watch out for the negative signs)*

a) $4(x+4)-3(x+2)$ b) $5(x+2)-2(x+1)$

c) $7(x+3)-4(x+2)$ d) $2(5x+10)-2(3x+1)$

4 **5**. Expand and Simplify: *(as tricky as they get)*

a) $4(x-5)-2(x-3)$ b) $4(x-2)-6(x-4)$

	c) $4(2x-4)-5(2x-1)$ d) $6(3x-2)-4(5x-9)$
5	A rectangle measures $(x+3)$ m by 5m. Write an expression for the: a) area of the rectangle b) perimeter of the rectangle
6	Write an expression for the **perimeter** and the **area** of the rectangle below.  3x + 5 7x - 3
LO3: To be able to factorise expressions	
1	Factorise the following: a) 4t + 20 b) 8u – 40 c) 12v – 30 d) 24 + 8w e) 6d – 3
2	Factorise the following: a) a) $w^2 + 8w$ b) $a + 2a^2$ c) $2a^2 - 3a$ d) $6d^2 - 3d$ e) $4p^2 - 2p$
3	Factorise the following: a) a) 4b+10ab b) 2cd-5c c) ab + bc - bd d) $6ab^2 + 15a^2b$
4	Factorise the following fully: a) abc - 2bc b) $4b + 8b^2$ c) $12m - 18m^2$ d) $8k^2 + 12k^3$
5	Factorise the following fully: a) $4c^2d^3 - 10cd^2$ b) $2ab + 3a^2b + 4a^2b^2$
6	Factorise the following fully: $6a^4b^6 - 8a^3b^5 + 12a^2b^3$
Extension	
	Work out what each of the bricks at the bottom simplify to, then add the 2 bricks next to each other to give the brick above them. 

Stage C – Topic 3 - Fractions

LO1: To be able to use the property of fractional equivalence

1 Find the missing values in these equivalent fractions.

$$\frac{2}{5} = \frac{6}{\square} = \frac{\square}{30} = \frac{14}{\square}$$

2 How do you know that $\frac{3}{7}$ is not equivalent to $\frac{25}{56}$?

3 Write the following fractions in their simplest forms a) $\frac{2}{4}$ b) $\frac{5}{10}$ c) $\frac{4}{6}$ d) $\frac{6}{9}$

4 Write the following fractions in their simplest forms a) $\frac{9}{30}$ b) $\frac{14}{18}$ c) $\frac{7}{49}$ d) $\frac{48}{72}$

LO2: To be able to add and subtract fractions

1 Work out the following: a) $\frac{1}{7} + \frac{3}{7}$ b) $\frac{3}{8} + \frac{1}{4}$ c) $\frac{2}{3} + \frac{3}{10}$ d) $\frac{1}{2} + \frac{2}{5}$

2 Work out the following: a) $\frac{3}{4} - \frac{1}{2}$ b) $\frac{5}{7} - \frac{2}{3}$ c) $\frac{5}{8} - \frac{1}{3}$ d) $\frac{8}{9} - \frac{2}{3}$

3 Work out the following: a) $2\frac{1}{2} + 1\frac{3}{4}$ b) $1\frac{2}{5} + \frac{2}{3}$ c) $3\frac{2}{5} - 1\frac{1}{2}$ d) $2\frac{3}{8} - \frac{3}{5}$

4 Ted received his pocket money on Friday.

He spent $\frac{3}{5}$ of his pocket money on games.

He spent $\frac{1}{10}$ of his pocket money on magazines.

What fraction of his pocket money did he have left?

5 Maisie buys a bag of flour.

She uses $\frac{1}{4}$ to bake a cake and $\frac{2}{5}$ to make a loaf.

a) What fraction of the bag of flour was used?
b) What fraction of the bag of flour is left?

Mixed Problems

1 Andy and Bob have a pizza each. After they have eaten some of their pizzas, Andy has $\frac{1}{3}$ of his pizza left and Bob has $\frac{1}{4}$ of his left. What fraction of pizza do they have left in total?

2 Charlene has a bag of sweets. She gives $\frac{2}{5}$ to her friend and eats $\frac{1}{4}$. What fraction of the bag of sweets does Charlene have left?

3 Dave and Ed are putting together bags of marbles to sell for charity. Dave has $\frac{3}{5}$ of a bag left over and Ed has $\frac{2}{3}$ of a bag left. Can they combine what they each have left to make another bag? *(You must show your workings)*

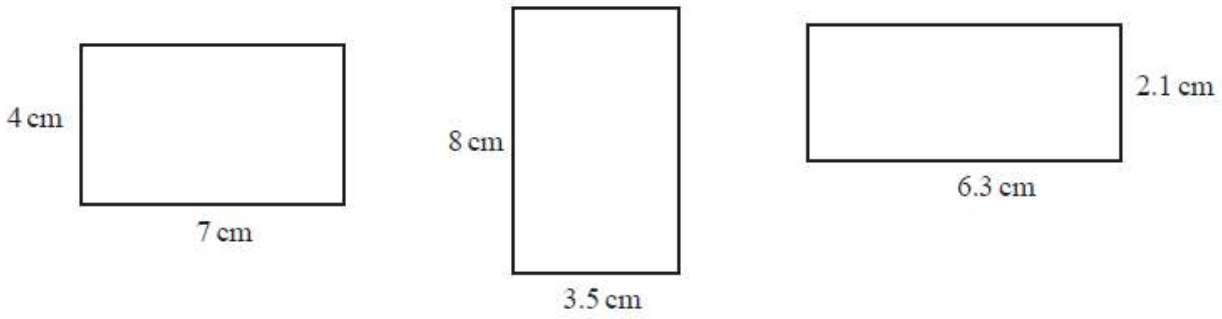
4 Freya wants to make two cakes. She has $\frac{3}{4}$ of a bag of flour. The first cake requires $\frac{2}{5}$ of a bag of flour and the second cake needs $\frac{3}{10}$ of a bag of flour. Does Freya have enough flour to make both cakes?
(You must show your workings)

5	George's van can carry a maximum of 5 tonnes. George needs to deliver two loads weighing $3\frac{1}{4}$ tonnes and $1\frac{5}{6}$ tonnes. Can George take both loads at once? *(You must show your workings)*
6	Harriet is sowing grass seed in her garden. She has $1\frac{2}{3}$ bags of grass seed. Her front garden needs $\frac{7}{8}$ of a bag and the back garden needs $\frac{5}{6}$ of a bag. Does Harriet have enough grass seed? *(You must show your workings)*

Stage C – Topic 4 - Area and Volume

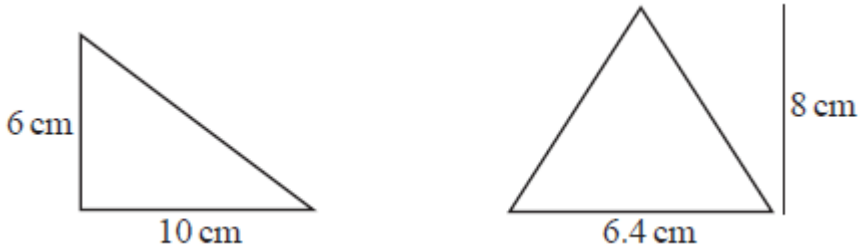
LO1: To be able to calculate area of compound shapes

1 Find the area of the following rectangles:



2 A rectangle has an area of 40cm² and a length of 8 cm.
Sketch the rectangle and find the width.

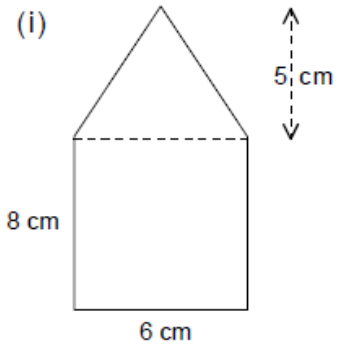
3 Find the area of the following triangles:



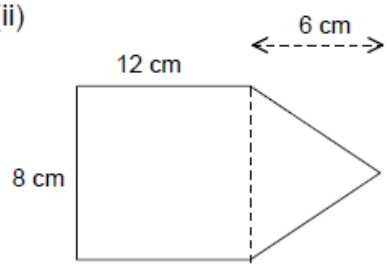
4 The area of a triangle is 60 cm²
The base of the triangle is 12 cm long.
Sketch a triangle with this area and base and work out the height of the triangle.

5 Work out the area of the following shapes:

(i)



(ii)



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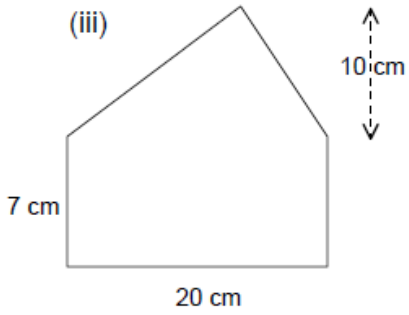

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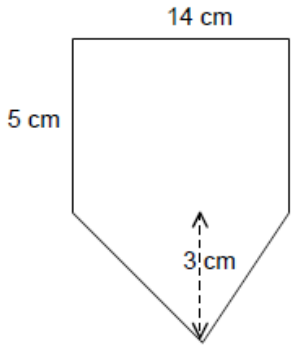

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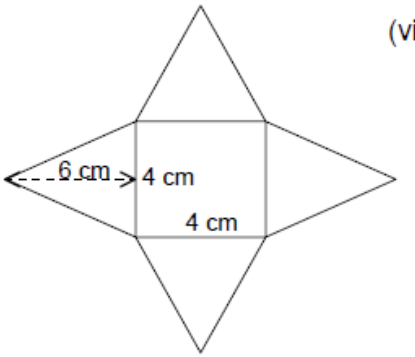
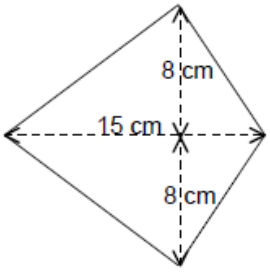
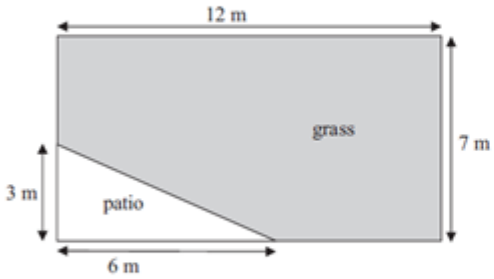


(vi)



6 Mrs Kunal's garden is in the shape of a rectangle.
Part of the garden is a patio in the shape of a triangle.
The rest of the garden is grass.



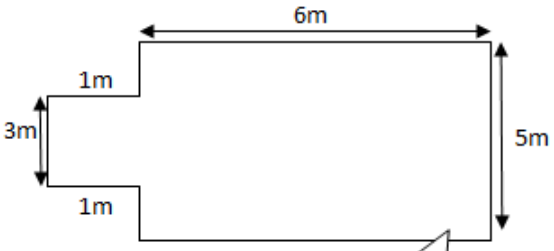
Mrs Kunal wants to spread fertiliser over all her grass.

One box of fertiliser is enough for 32m² of grass.

How many boxes of fertiliser will she need?
You must show your working.

7 Daniel wants new carpet tiles for his office. A plan of the office is shown below.

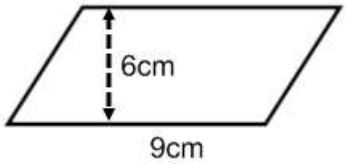
a) What area of carpet tiles does Daniel need?



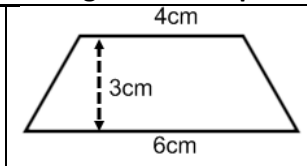
b) How much will it cost Daniel to buy carpet tiles for his office?

LO2: To be able to derive and use formula for area of parallelogram and trapezium

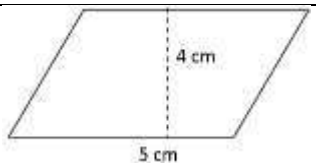
1

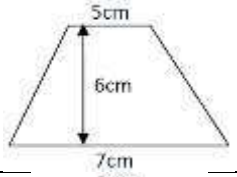


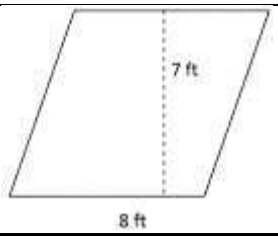
$A = bh$
$b = 9 \;\; h = 6$
$A = 9 \times 6$
$A = \mathbf{54cm^2}$

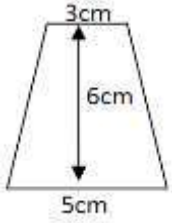


$A = \frac{a+b}{2} \times h$
$a = 4 \;\; b = 6 \;\; h = 3$
$A = \frac{4+6}{2} \times 3$
$A = \mathbf{30cm^2}$





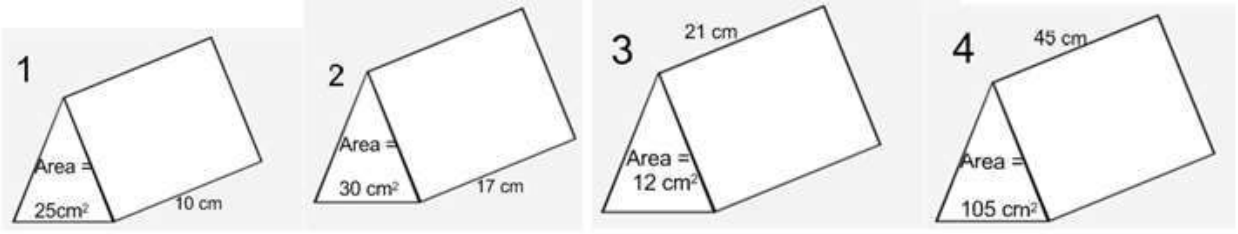




LO3: To be able to apply the formula for volume of a prism (excluding cylinders)

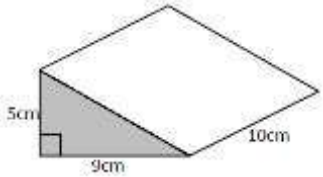
$\boldsymbol{Volume = cross\ section\ area \times length\ (or\ height)}$

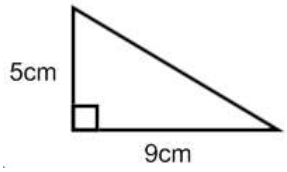
1



2

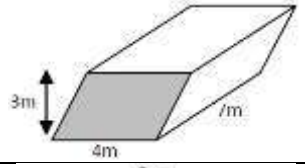
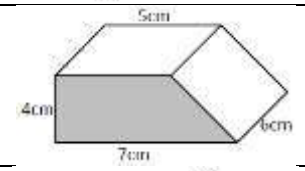
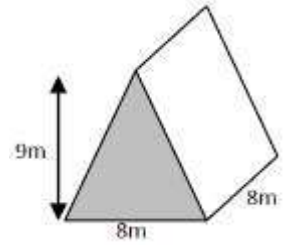
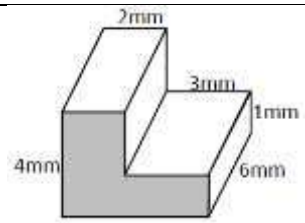
$\boldsymbol{Volume = cross\ section\ area \times length\ (or\ height)}$





$A = \frac{bh}{2}$
$A = \frac{5 \times 9}{2}$
$A = \mathbf{22.5cm^2}$

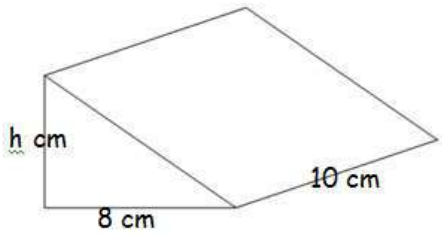
$V = A \times l$
$V = 22.5 \times 10$
$V = \mathbf{225cm^3}$

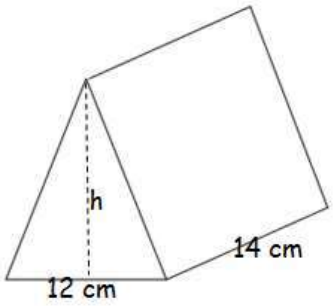
3

Find the lengths marked with a letter.

a) Volume = 880 cm^3



b) Volume = 1176 cm^3



Stage C – Topic 5 Percentages	
LO1: To be able to calculate a percentage of a quantity using a calculator where appropriate	
1	Without using a calculator, work out the following: a) 10% of £170 b) 30% of £90 c) 17.5% of £600 d) 15% of £68
2	The normal price of a jacket is £54. In a sale, the price is reduced by 30% What is the sale price?
3	A football costs £14 plus 20% VAT. How much is the football?

4	Using a calculator, work out the following: a) 21% of £340 b) 64% of £1080 c) 61.7% of £2000 d) 17.5% of £68.40
5	A computer costs £406 plus VAT at 20%. Work out the total cost of the computer.
6	A car is usually priced at £9800 but now has a discount of 8%. What is the new price of the car?
7	65% of a car, by weight, is steel and iron. If a car weighs 1100 kg, what is the weight of steel and iron in the car?
8	Tony earns £17800 per year and receives a 3.8% pay rise. How much does he now earn?
LO2: To be able to express a quantity as a percentage of an amount	
1	Without using a calculator, write the following as percentages: a) 12 out of 50 b) 15 out of 25 c) 8 out of 10 d) 11 out of 20
2	Tim got 17 out of 20 in a French test. Write 17 out of 20 as a percentage.
3	Work out £14 as a percentage of £40
4	If there are 9 girls and 11 boys in a class, what percentage of the class are girls?
5	Using a calculator, write the following as percentages: a) 12 out of 34 b) 62 out of 85 c) 113 out of 153 d) 2150 out of 3452
6	Sarah sat a Science test and got a score of 64 marks out of 112 possible marks. What was her mark as a percentage? Give your answer to 1 decimal place.
7	In a class of 32 students, 18 of them are boys. What percentage of the class are boys? Give your answer to 1 decimal place.
8	In a French class there are 13 girls and 6 boys. What percentage of the class are girls? Give your answer to 1 decimal place.

9	A new car usually costs £8500. Henry gets a discount of £1000. What is the discount as a percentage of the usual cost? Give your answer to 1 decimal place.

Mixed Problems	
1	The captain of a football team scored 17 out of the 85 goals they scored that season. What percentage of the goals did he score?
2	Alex has 3 dolls, 12 teddy bears and 5 soft rabbits. What percentage of her toys are a) teddy bears b) dolls c) cuddly toys?
3	Joe buys a new laptop in a sale. He gets a discount of 20%. The laptop originally cost £350 what price did Joe pay?
4	Income tax is 20%. What is the net income of someone who earns £800 per month?
5	The population of grey seals in Scotland is under threat. It has declined by 30% in the last decade. In 2000 there were 1500 grey seals, how many are there today?

Stage C – Topic 6 Algebra

LO1: To be able to solve simple equations with integer solutions

1

$x - 5 = 18$ $+5 \quad +5$ $\boldsymbol{x = 23}$	$4x = 32$ $\div 4 \quad \div 4$ $\boldsymbol{x = 8}$	$\frac{x}{7} = 5$ $\times 7 \quad \times 7$ $\boldsymbol{x = 35}$	$4x - 5 = 15$ $+5 \quad +5$ $\boldsymbol{4x = 20}$ $\div 4 \quad \div 4$ $\boldsymbol{x = 5}$
$2x = 12$	$7 = x - 3$	$\frac{d}{4} = 7$	$3k + 8 = 20$
$3m - 7 = 20$	$\frac{a}{4} + 7 = 13$	$6n - 4 = 32$	$5c + 9 = 39$
$7r - 10 = 25$	$\frac{2a}{4} - 7 = 13$	$5x + 7 = 57$	$9m + 5 = 3m + 23$

LO2: To be able to recognise the difference between an equation, formula and identity

1

Expression - a mathematical phrase	**Equation** - a mathematical statement that contains unknown values	**Formula** - mathematical relationship or rule expressed in symbols	**Identity** - something that is always true for any values of the variables that are involved
$4z + 3y$	$10z + 8 = 17$	$SA = 6a^2$	$2(a + 9) \equiv 2a + 18$

Put these under the correct heading depending if they are expressions, equations, formula or identities

EXPRESSION	EQUATION	FORMULA	IDENTITY
$A = \pi r^2$	$3r - 3 = 12$	$2(x + y) \equiv 2x + 2y$	$3x + 2y$
$\frac{x+y}{2} \equiv \frac{x}{2} + \frac{y}{2}$	$A \times B \equiv B \times A$	$8r - 14$	$4 = 3t - 8$
$\frac{1}{2}bh = A$	$2r + 9 = -8$	$S = \frac{D}{T}$	$9x + 15y$
$x^2 + y^2 \equiv (x + y)^2 - 2xy$	$C = \frac{5}{9}(F - 32)$	$17r + 3 = 8$	$17x - 11y$

LO3: To be able to rearrange and substitute into formulae

1

Claudia owns *f* films. Barry owns twice as many films as Claudia.

a) How many films does Barry own?

b) How many films do Claudia and Barry own in total?

c) How many films would they own in total if they each gave away 3 of their films?

2

I have *b* flower bulbs. To find the number of flowers that should grow from them (*F*), multiply the number of bulbs by 3 and then add 5.
Write a formula for the number of flowers I can expect.

3

Alf has £18 in the bank. He gets a job, and for each hour he works, he is paid £8. Assuming he spends nothing, write a formula for the amount of money (*M*) Alf will have after he has worked for *h* hours.

4

The cost of hiring crazy gold equipment is a fixed price of £3 plus 8p for every minutes of use.
Write a formula for the cost (*C*) of hiring the equipment for *g* minutes of crazy golf.

5

If $x = 4$ and $y = 3$, find z when:

a. $z = y - 1$ b. $z = x + y$ c. $z = 3y - 2$ d. $z = 6x - y$

6

1. If $m = 5$ and $n = 2$, find l when:

a. $l = mn$	b. $l = \frac{2m}{n}$	c. $l = m^2$	d. $l = m - n^2$

LO4 To be able to interpret simple expressions as function machines

1

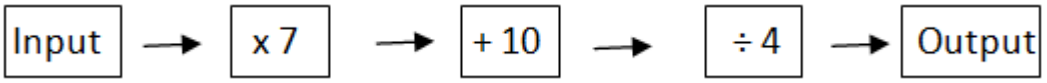
Here is a function machine:

Input → x 4 → + 8 → ÷ 3 → Output

If my input is 7, what will my output be?	If my output is 8, what number did I put in?

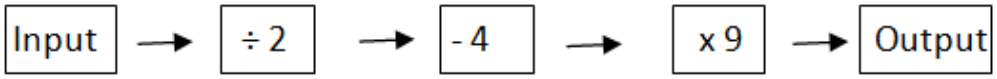
2

Here is a function machine:



If my input is 6, what will my output be?	If my output is 20, what number did I put in?

Here is a function machine:

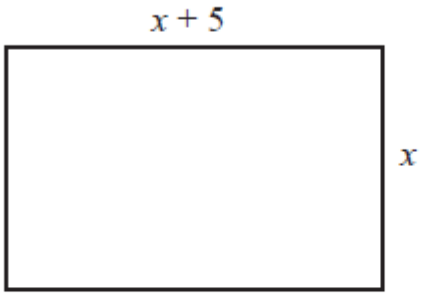


If my input is 14, what will my output be?	If my output is 108, what number did I put in?

Mixed Problems

1

The width of a rectangle is x centimetres.
The length of the rectangle is $(x + 5)$ centimetres.



a) Find an expression, in terms of x, for the perimeter of the rectangle.
Give your answer in its simplest form.

The perimeter of the rectangle is 38 centimetres.

b) Work out the length of the rectangle.

2

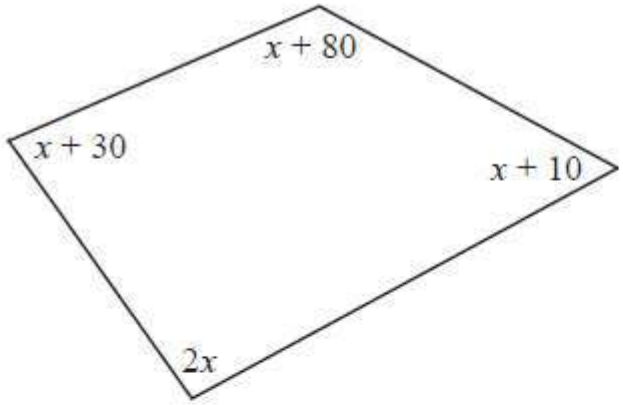


*Diagram **NOT** accurately drawn*

The sizes of the angles, in degrees, of the quadrilateral are

$x + 10$
$2x$
$x + 80$
$x + 30$

a) Use this information to write down an equation in terms of x.

b) Use your answer to part (a) to work out the size of the smallest angle of the quadrilateral.

Stage C – Topic 7 - Graphing

LO1: To be able to plot simple graphs of linear functions

1

On the axes draw and label the following straight line graphs (you will not be able to plot all the points on the axes):

1. $y = x$ (the y is the same as the x)

x	-4	-3	-2	-1	0	1	2	3	4
y									

2. $y = 2x$ (times all x by 2)

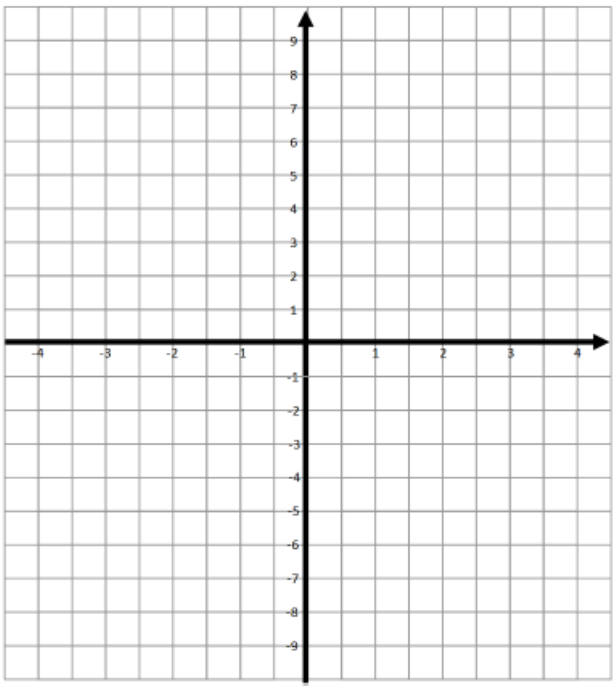
x	-4	-3	-2	-1	0	1	2	3	4
y									

3. $y = x + 4$

x	-4	-3	-2	-1	0	1	2	3	4
y									

4. $y = x - 6$

x	-4	-3	-2	-1	0	1	2	3	4
y									



2

Use the new set of axes for these graphs.

5. $y = -x$ (multiply all x by -1)

x	-4	-3	-2	-1	0	1	2	3	4
y									

6. $y = 2x + 1$ (multiply all x by 2 then add 1)

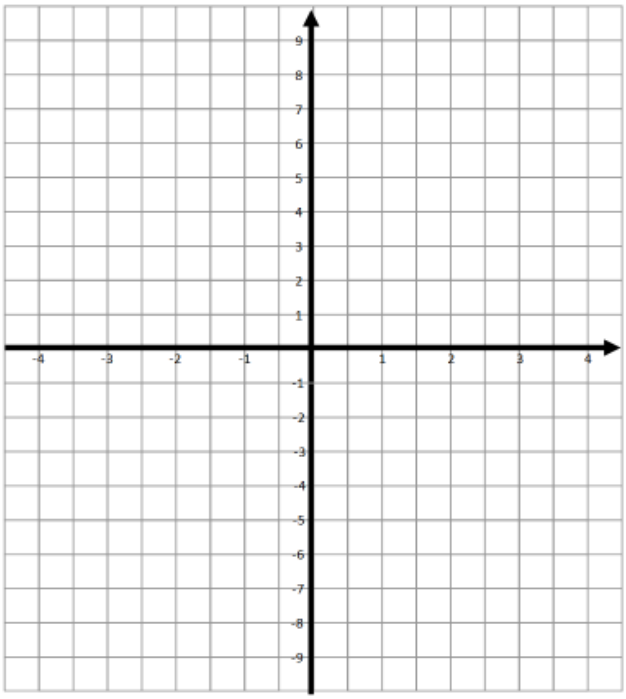
x	-4	-3	-2	-1	0	1	2	3	4
y									

7. $y = 3x - 4$ (multiply all x by 3 the subtract 4)

x	-4	-3	-2	-1	0	1	2	3	4
y									

8. $y = -2x$ (multiply all x by -2)

x	-4	-3	-2	-1	0	1	2	3	4
y									

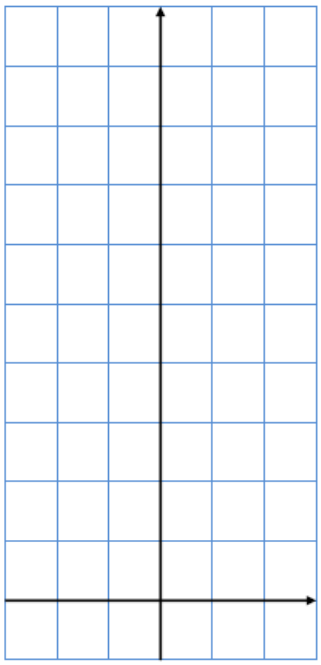


LO2: To be able to plot simple graphs of quadratic functions

1

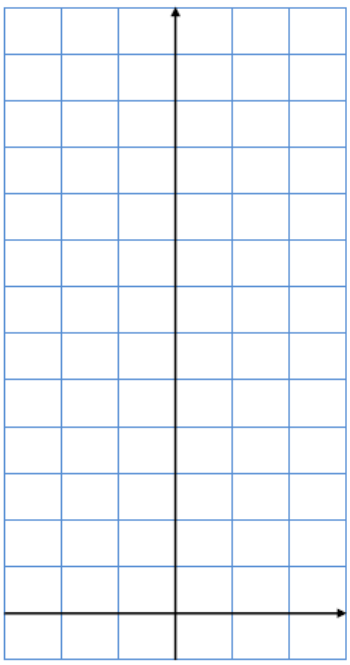
$y = x^2$

x	-3	-2	-1	0	1	2	3
y							



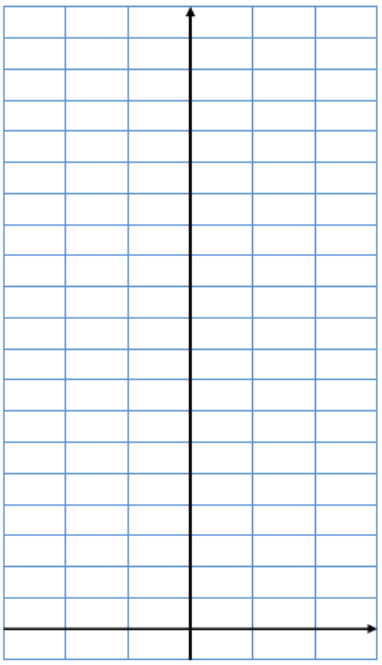
$y = x^2 + 3$

x	-3	-2	-1	0	1	2	3
y							



$y = 2x^2$

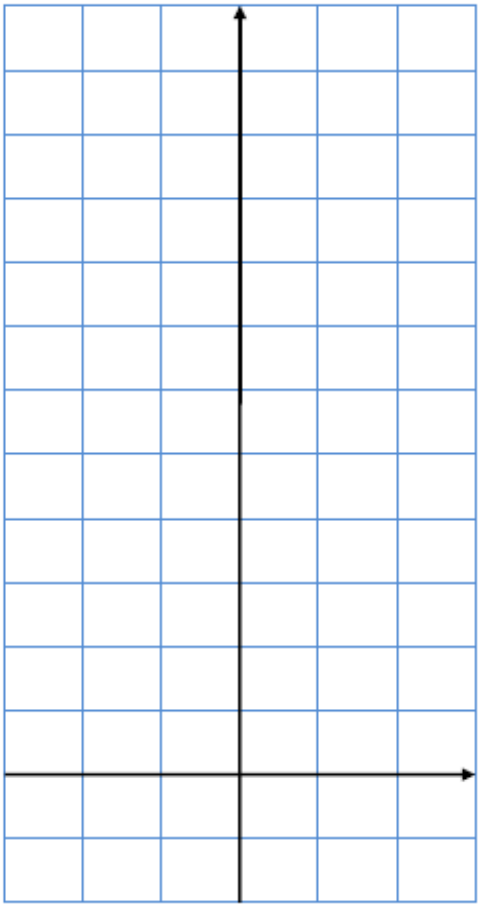
x	-3	-2	-1	0	1	2	3
y							



2

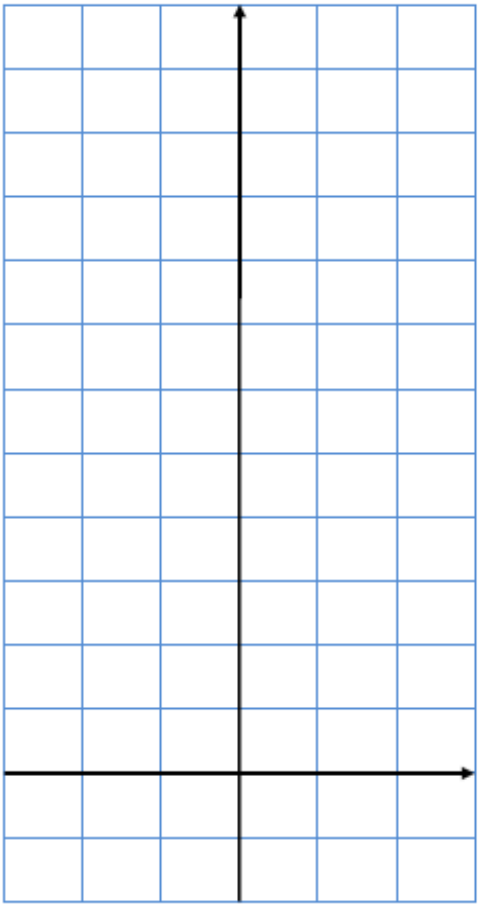
$y = x^2 + x$

x	-3	-2	-1	0	1	2	3
y							



$y = x^2 - x$

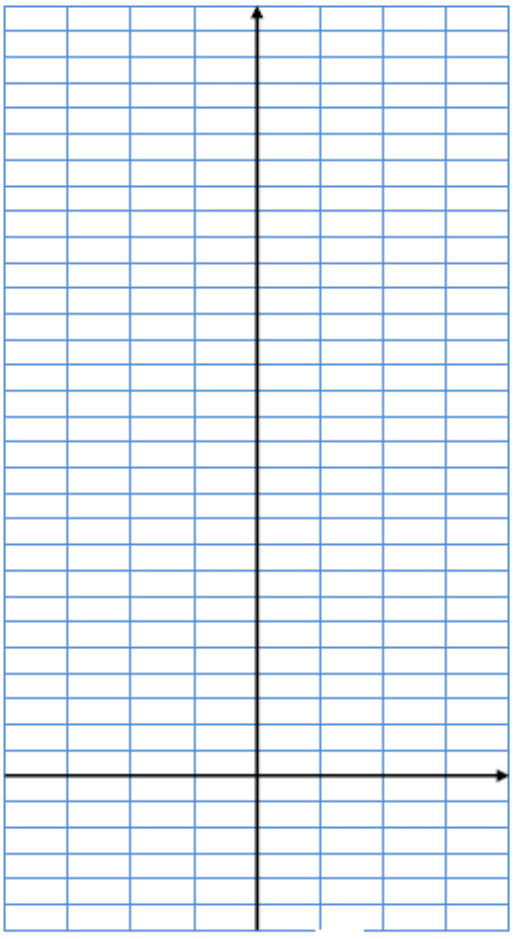
x	-3	-2	-1	0	1	2	3
y							



3

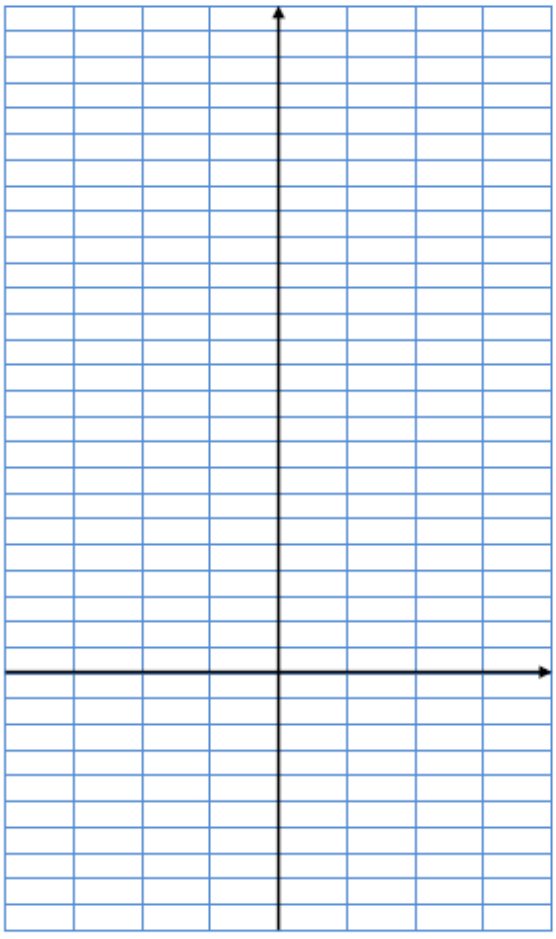
$y = x^2 - 2x - 4$

x	-4	-3	-2	-1	0	1	2	3	4
y									



$y = x^2 + x - 8$

x	-4	-3	-2	-1	0	1	2	3	4
y									



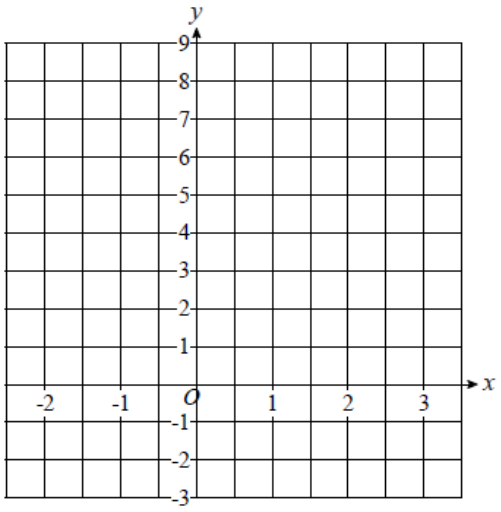
Mixed Problems

1

a) Complete the table of values for $y = 2x + 2$

x	-2	-1	0	1	2	3
y		0	2			

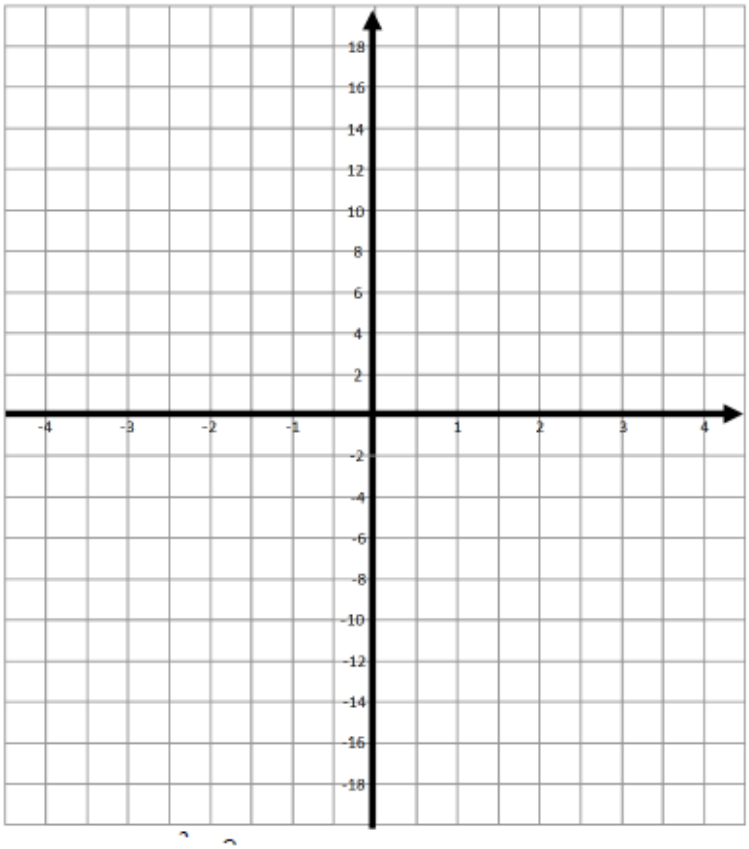
b) On the grid, draw the graph of $y = 2x + 2$.



2

2. $y = x^2 + 2$

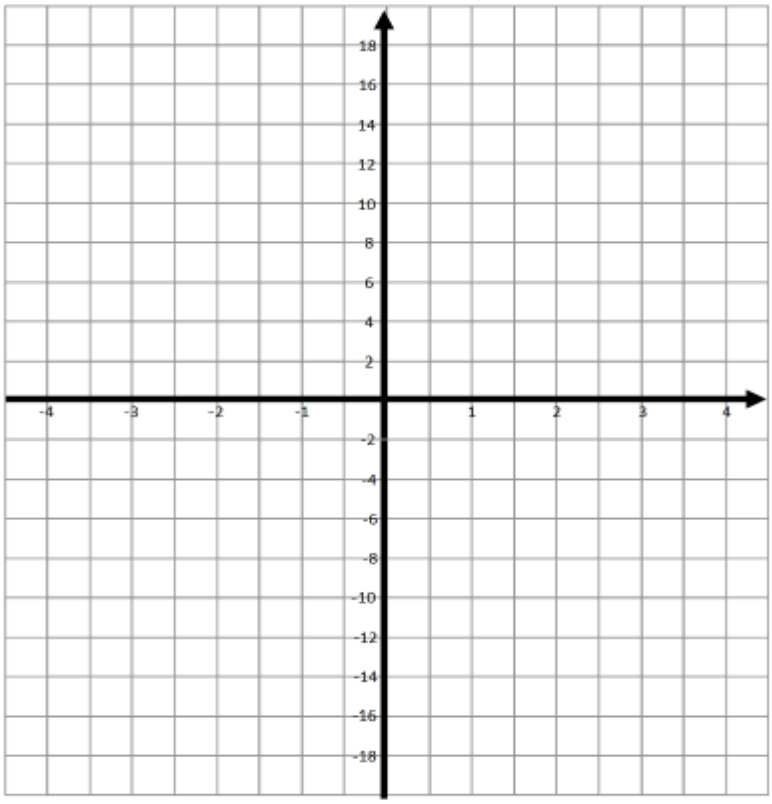
x	-4	-3	-2	-1	0	1	2	3	4
y		11			2				



3

3. $y = x^2 - 5$

x	-4	-3	-2	-1	0	1	2	3	4
y		4							11



4

1) a) Complete the table of values for $y = 2x - 3$

x	-1	0	1	2	3	4
y				1		

b) Using the axes on the right draw the graph of $y = 2x - 3$

c) Use your graph to work out the value of y when $x = 2.5$

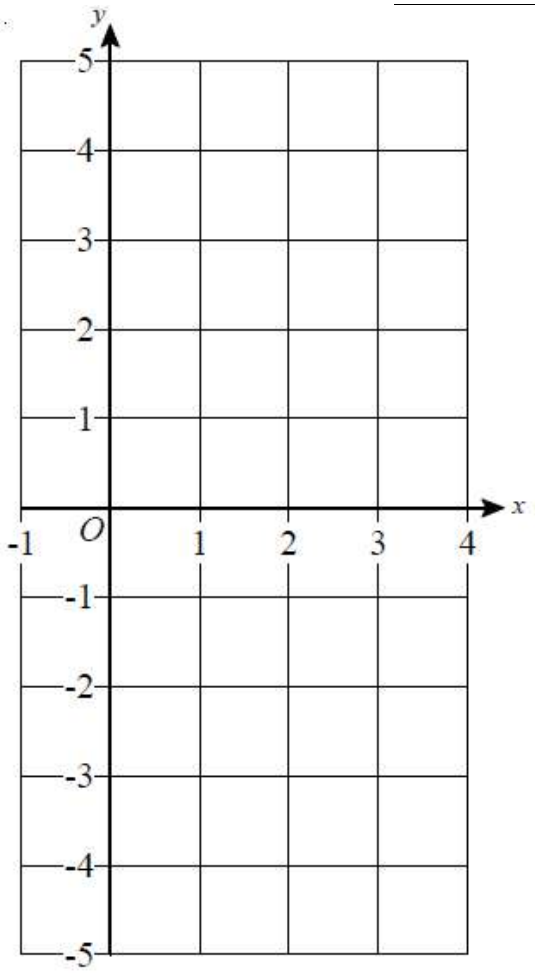
d) Use your graph to work out the value of x when $y = 4.5$

---

2) a) Complete the table of values for $y = 2 - x$

x	-1	0	1	2	3	4
y					-1	

b) Using the axes on the right, again, draw the graph of $y = 2 - x$

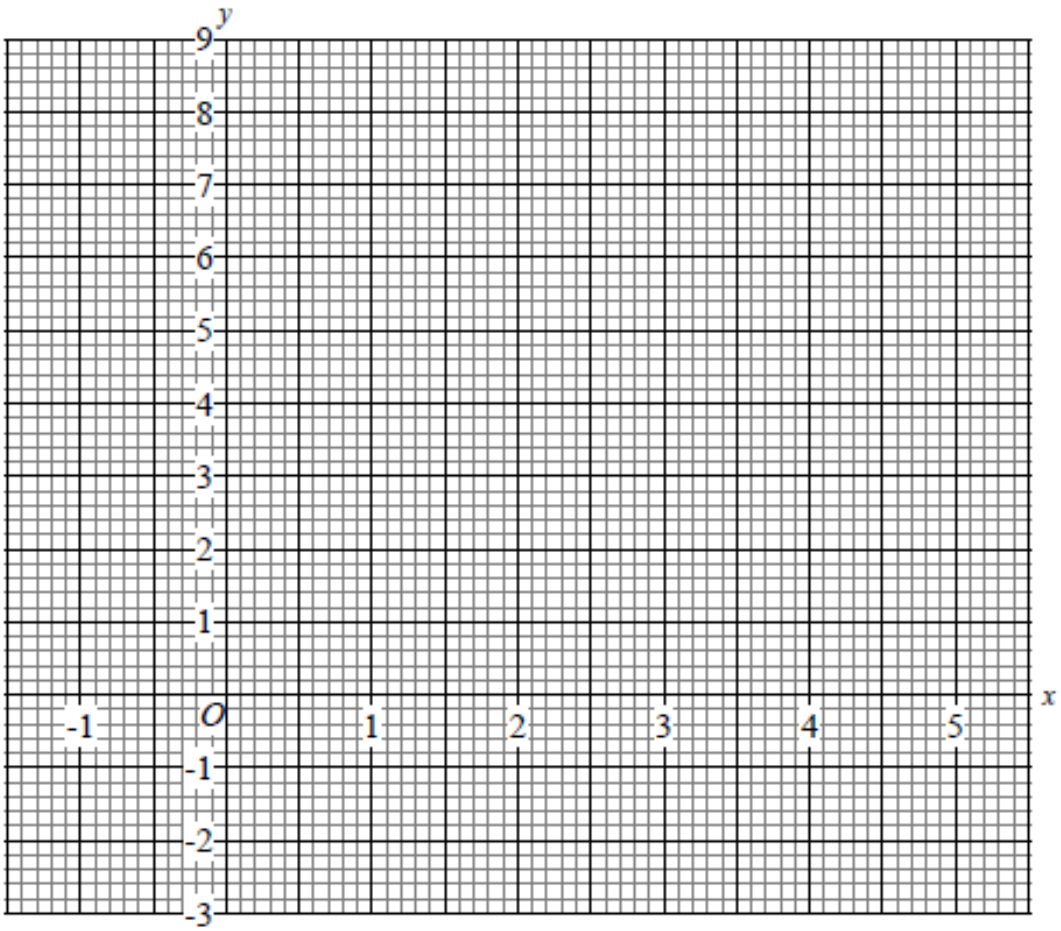


5

Complete the table of values for $y = x^2 - 4x + 3$

x	-1	0	1	2	3	4	5
y		3	0		0		8

On the grid, draw the graph of $y = x^2 - 4x + 3$

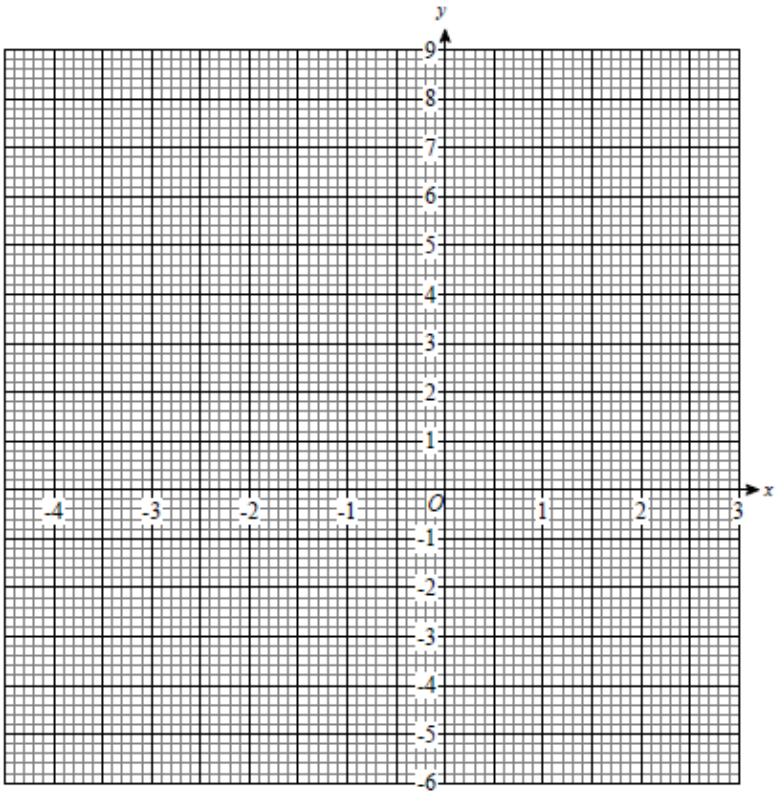


6

a) Complete the table of values for $y = x^2 + x - 4$

x	-4	-3	-2	-1	0	1	2	3
y	8		-2	-4				8

b) On the grid, draw the graph of $y = x^2 + x - 4$



Stage C – Topic 8 - Probability	
LO1: To be able to identify when events are mutually exclusive and know the sum of these events would be 1	
1	These events are called *mutually exclusive* because they can't happen at the same time. A six sided dice is rolled. Which of these pairs of outcomes are mutually exclusive? a. The number is even and a multiple of 3 b. The number is odd and a multiple of 2 c. The number is odd and square
2	Which of these pairs of events are mutually exclusive? a. Winning a football match and drawing the same match b. Wearing one red sock and one blue sock c. Eating toast for breakfast and Chips for dinner d. Being on time and being late for a day at school

3	The probability that it will rain tomorrow is $\frac{1}{5}$. What is the probability that it won't rain?
4	If the probability of passing a driving test is 0.54, what is the probability of failing it?
5	The probability that a football team will win their next game is $\frac{2}{11}$. The probability they will lose is $\frac{3}{11}$. What is the probability the game will be a draw?
6	On the school dinner menu there is only ever one of four options. Some of the options are more likely to be on the menu than others. The table shows the options available on any day, together with three of the probabilities. a) Work out the probability of the dinner option being Fish. b) Which option is most likely? c) Work out the probability that it is a Curry or Sausages on any particular day. d) Work out the probability that it is **not** Casserole.
7	Julie buys a book every week. Her favourite types are Novel, Drama, Biography and Romance. The table shows the probability that Julie chooses a particular type of book. a) Work out the probability that she will choose a Novel or a Drama. b) Work out the probability that she will choose a Biography or a Romance. The probability that she will choose a Biography is the same as the probability she will choose a Romance. c) Work out the probability that she will choose a Biography.

Food	Curry	Sausages	Fish	Casserole
Probability	0.36	0.41		0.09

Type of book	Novel	Drama	Biography	Romance
Probability	0.24	0.16	x	x

Mixed Problems

1 There are some blue, red, green and purple balls in a bag, find the probability of a purple ball being pulled out if these are the probabilities of the other colours:

a.

Blue	Red	Green	Purple
0.1	0.3	0.3	

b.

Blue	Red	Green	Purple
0.15	0.42	0.23	

c.

Blue	Red	Green	Purple
0.4	0.35	0.02	

Complete the table.

2 A dice is rolled.

a. List the six mutually exclusive outcomes and their probabilities.
b. What is the probability of a 6?
c. What is the probability of not getting a 6?

3 Jean is going on an activities holiday. Each activity lasts a whole day. She can only do one activity a day. The probability that she will go pony-trekking on any one day is 0.6

a. Work out the probability that Jean will not go pony-trekking on the first day.

b. The probability that Jean will go windsurfing on any one day is 0.25
Work out the probability that Jean will go windsurfing **or** pony-trekking on the first day.

4 A bag contains a number of balls, which are yellow, blue or green. The probability of selecting a ball at random and getting a green is $\frac{1}{7}$ and the probability of getting a yellow is $\frac{3}{7}$.

(a) What is the probability of getting a blue ball?

(b) If the bag contains 4 green balls, how many yellow balls does it contain?

(c) If the bag contains 6 blue balls, how many balls does the bag contain in total?

5 A bag contains 6 red counters, 5 blue counters and 4 pink counters. A counter is selected from the bag at random.

Find, the probability that the counter is:

(a) either red or pink.
(b) not pink.
(c) not red.
(d) blue or pink.

6

A bag contains a number of balls of different colours. The probability of obtaining a ball of a particular colour is given in the table below.

Colour	Probability
Red	$\frac{3}{8}$
Green	$\frac{1}{4}$
Blue	$\frac{1}{5}$

What is the probability that a ball taken from the bag is:

(a) red or green,

(b) not blue or green,

(c) not one of the colours listed above?

STAGE C ANSWERS

	Stage C : Topic 1 - Answers
LO1	To be able to use a method to solve multiplication problems
1	£3408
2	745.2
3	£110.25
4	1125.9kg
LO2	To be able to use a method to solve division problems
1	a) 65 b) 56 c) 17 d) 13
2	a) 30 b) 60 c) 30 d) 7
3	34
4	21
5	17.5kg
6	331.5kg
LO3	To be able to use BIDMAS to calculate solutions
1	32
2	27
3	14
4	9
5	3
6	11
LO4	To be able to state a value to a required degree of accuracy
1	Round these numbers to the nearest 10: a) 26 30 b) 62 60 c) 75 80 d) 231 230 e) 797 800 Round these numbers to the nearest 100: a) 78 100 b) 223 200 c) 549 500 d) 1450 1 500 e) 1382 1 400 Round these numbers to the nearest 1000: a) 850 1 000 b) 1455 1 000 c) 3230 3 000 d) 7500 8 000 e) 8455 8 000
2	Round the following numbers to 1 decimal place a) 48.9732 49.0 b) 163.9299 163.9 c) 19.952 20.0
3	Round the following numbers to 2 decimal places a) 10.697 10.70 b) 8.993 8.99 c) 14.9964 15.00
4	Work out the answer to 2.6882 × 14.71728 and give your answer correct to 2 decimal places. 39.56
5	Work out the answer to 64.2 ÷ 5.7 and give your answer correct to 1 decimal place. 11.3
	Mixed Problems
1	175 – (7 x 9) = £112

2	18 ÷ 6 = 3 x 4 = 12 eggs or 4 ÷ 6 x 18 = 12 eggs
3	(1.76 + 0.63) x (100% - 10%) = £2.15
4	53 + (53-18) = 88 + 23 = 111kg

Stage C – Topic 2 - Algebra Answers

LO1: To be able to simplify like terms

1 *Simplify the following expressions:*

a) y + y + y = 3y b) z x z x z x z x z = 5z c) a + 5a + 2a + 3a = 11a d) 4a + 9a = 13a

e) 8b - 10b = -2b f) 3f + 6g + 4f + 5g = 7f + 11g g) 5a + 2b + 6a – 2b = 11a

h) 6c + 5d - 3c + 8d = 3c + 13d i) 7b + 6a - 5b + 3a = 9a + 2b j) 3ab - 2bc + 6ab + 9bc + 5ad = 9ab + 7bc + 5ad k) $2x^2 - 3x + 3x^2 + 6x = 5x^2 + 3x$ l) 6ab + (- 6ab) – 3bc – (-4bc) = bc

m) 5h x 6h = $30h^2$

LO2: To be able to expand brackets and simplify the result

1

Ans

Expand:

a) $3(x+4)$	b) $6(x-2)$	c) $5(x+4)$	d) $3(x+9)$
= 3x + 12	**= 6x - 12**	**= 5x + 20**	**= 3x + 27**
e) $4(2x+3)$	f) $5(4x-2)$	g) $-(x+1)$	h) $-(4x-2)$
= 8x + 12	**= 20x - 10**	**= -x - 1**	**= -4x + 4**

2

Ans

Expand and Simplify:

a) $2(x+1)+3(x+2)$ = **5x + 8** b) $4(x+3)+2(x+7)$ = **6x + 26**

c) $5(x+3)+2(x+7)$ = **7x + 29** d) $8(x+10)+2(x+4)$ = **10x + 88**

3

Ans

Expand and Simplify: *(watch out for the negative signs)*

a) $4(x+4)-3(x+2)$ = **x + 10** b) $5(x+2)-2(x+1)$ = **3x + 8**

c) $7(x+3)-4(x+2)$ = **3x + 13** d) $2(5x+10)-2(3x+1)$ = **4x + 18**

4

Ans

Expand and Simplify: *(as tricky as they get)*

a) $4(x-5)-2(x-3)$ = **2x - 14** b) $4(x-2)-6(x-4)$ = **-2x + 16**

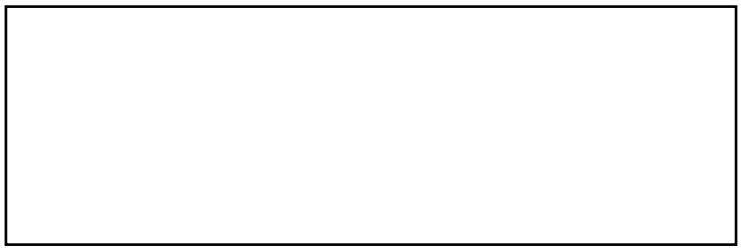
c) $4(2x-4)-5(2x-1)$ = **-2x - 11** d) $6(3x-2)-4(5x-9)$ = **-2x + 24**

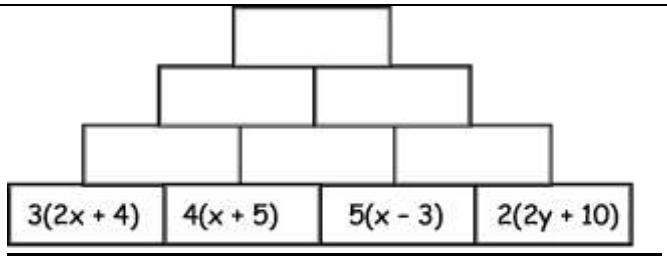
5

Ans

A rectangle measures $(x+3)$ m by 5m. Write an expression for the:

a) area of the rectangle = **5x + 15** b) perimeter of the rectangle = **2x + 16**

6	Write an expression for the **perimeter** and the **area** of the rectangle below. 
Ans	**Perimeter** = 2(7x – 3) + 2(3x + 5) = **20x + 4** **Area** = (3x + 5) (7x – 3) = **$21x^2 + 26x - 15$**
LO3: To be able to factorise expressions	
1	
Ans	Factorise the following: a) 4t + 20 b) 8u – 40 c) 12v – 30 d) 24 + 8w e) 6d – 3 **= 4(t + 5)** **= 8(u – 5)** **= 6(2v – 5)** **= 8(3 + w)** **= 3(2d – 1)**
2	
Ans	Factorise the following: b) a) $w^2 + 8w$ b) $a + 2a^2$ c) $2a^2 - 3a$ d) $6d^2 – 3d$ e) $4p^2 - 2p$ **= w(w + 8)** **= a(1 + 2a)** **= a(2a – 3)** **= 3d(2d – 1)** **= 2p(2p – 1)**
3	
Ans	Factorise the following: c) a) 4b + 10ab b) 2cd - 5c c) ab + bc - bd d) $6ab^2 + 15a^2b$ **= 2b(2 + 5a)** **= c(2d – 5)** **= b(a + c – d)** **= 3ab(2b + 5a)**
4	
Ans	Factorise the following fully: a) abc - 2bc b) $4b + 8b^2$ c) $12m - 18m^2$ d) $8k^2 + 12k^3$ **= bc(a – 2)** **= 4b(1 + 2b)** **= 6m(2 – 3m)** **= $4k^2(2 + 3k)$**
5	
Ans	Factorise the following fully: a) $4c^2d^3 - 10cd^2$ b) $2ab + 3a^2b + 4a^2b^2$ **= $2cd^2(2cd – 5)$** **= ab(2 + 3a + 4ab)**
6	
Ans	Factorise the following fully: $6a^4b^6 - 8a^3b^5 + 12a^2b^3$ **= $2a^2b^3(3a^2b^3 - 4ab^2 + 6)$**
Extension	
	Work out what each of the bricks at the bottom simplify to, then add the 2 bricks next to each other to give the brick above them.



Stage C – Topic 3 - Fractions Answers

LO1: To be able to use the property of fractional equivalence

1 Find the missing values in these equivalent fractions.

$\frac{2}{5} = \frac{6}{15} = \frac{12}{30} = \frac{14}{35}$

2 How do you know that $\frac{3}{7}$ is not equivalent to $\frac{25}{56}$?

You have to multiply 7 by 8 to get 56 but when you multiply 3 by 8 you get 24 not 25

3 a) $\frac{2}{4}$ $\frac{1}{2}$ b) $\frac{5}{10}$ $\frac{1}{2}$ c) $\frac{4}{6}$ $\frac{2}{3}$ d) $\frac{6}{9}$ $\frac{2}{3}$

4 a) $\frac{9}{30}$ $\frac{3}{10}$ b) $\frac{14}{18}$ $\frac{7}{8}$ c) $\frac{7}{49}$ $\frac{1}{7}$ d) $\frac{48}{72}$ $\frac{2}{3}$

LO2: To be able to add and subtract fractions

1 a) $\frac{1}{7} + \frac{3}{7}$ $\frac{4}{7}$ b) $\frac{3}{8} + \frac{1}{4}$ $\frac{5}{8}$ c) $\frac{2}{3} + \frac{3}{10}$ $\frac{29}{30}$

d) $\frac{1}{2} + \frac{2}{5}$ $\frac{9}{10}$

2 a) $\frac{3}{4} - \frac{1}{2}$ $\frac{1}{4}$ b) $\frac{5}{7} - \frac{2}{3}$ $\frac{1}{21}$ c) $\frac{5}{8} - \frac{1}{3}$ $\frac{7}{24}$

d) $\frac{8}{9} - \frac{2}{3}$ $\frac{2}{9}$

3 a) $2\frac{1}{2} + 1\frac{3}{4}$ $4\frac{1}{4}$ c) $3\frac{2}{5} - 1\frac{1}{2}$ $1\frac{9}{10}$

b) $1\frac{2}{5} + \frac{2}{3}$ $2\frac{1}{15}$ d) $2\frac{3}{8} - \frac{3}{5}$ $1\frac{31}{40}$

4 Ted received his pocket money on Friday.

He spent $\frac{3}{5}$ of his pocket money on games.

He spent $\frac{1}{10}$ of his pocket money on magazines.

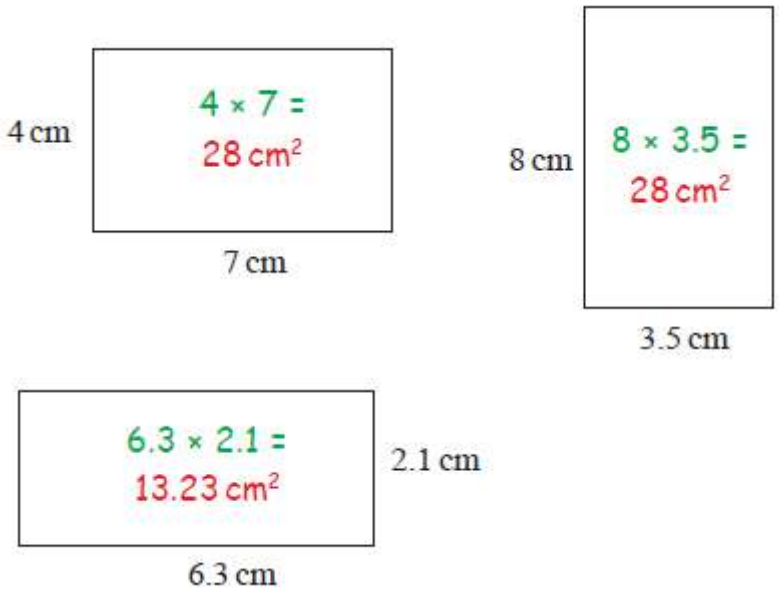
What fraction of his pocket money did he have left? $\frac{3}{10}$

5	Maisie buys a bag of flour. She uses $\frac{1}{4}$ to bake a cake and $\frac{2}{5}$ to make a loaf. a) What fraction of the bag of flour was used? $\frac{13}{20}$ b) What fraction of the bag of flour is left? $\frac{7}{20}$
Mixed Problems	
1	
Ans	Andy and Bob have a pizza each. After they have eaten some of their pizzas, Andy has $\frac{1}{3}$ of his pizza left and Bob has $\frac{1}{4}$ of his left. What fraction of pizza do they have left in total? $\frac{7}{12}$
2	
Ans	Charlene has a bag of sweets. She gives $\frac{2}{5}$ to her friend and eats $\frac{1}{4}$. What fraction of the bag of sweets does Charlene have left? $\frac{13}{20}$
3	
Ans	Dave and Ed are putting together bags of marbles to sell for charity. Dave has $\frac{3}{5}$ of a bag left over and Ed has $\frac{2}{3}$ of a bag left. Can they combine what they each have left to make another bag? *(You must show your workings)* $\frac{19}{15} = 1\frac{4}{15}$, Yes
4	
Ans	Freya wants to make two cakes. She has $\frac{3}{4}$ of a bag of flour. The first cake requires $\frac{2}{5}$ of a bag of flour and the second cake needs $\frac{3}{10}$ of a bag of flour. Does Freya have enough flour to make both cakes? *(You must show your workings)* $\frac{3}{4} - \frac{2}{5} = \frac{7}{20}$; $\frac{7}{20}$ is greater than $\frac{3}{10}$, so Yes
5	George's van can carry a maximum of 5 tonnes. George needs to deliver two loads weighing $3\frac{1}{4}$ tonnes and $1\frac{5}{6}$ tonnes. Can George take both loads at once? *(You must show your workings)* $\frac{13}{4} + \frac{11}{6} = \frac{39+22}{12} = \frac{61}{12} = 5\frac{1}{12}$, **Yes**
6	Harriet is sowing grass seed in her garden. She has $1\frac{2}{3}$ bags of grass seed. Her front garden needs $\frac{7}{8}$ of a bag and the back garden needs $\frac{5}{6}$ of a bag. Does Harriet have enough grass seed? *(You must show your workings)* $\frac{5}{3} - \frac{7}{8} = \frac{40-21}{24} = \frac{19}{24} - \frac{5}{6} = \frac{19-20}{24} = -\frac{1}{24}$, So No

Stage C – Topic 4 – Area and Volume Answers

LO1: To be able to calculate area of compound shapes

1

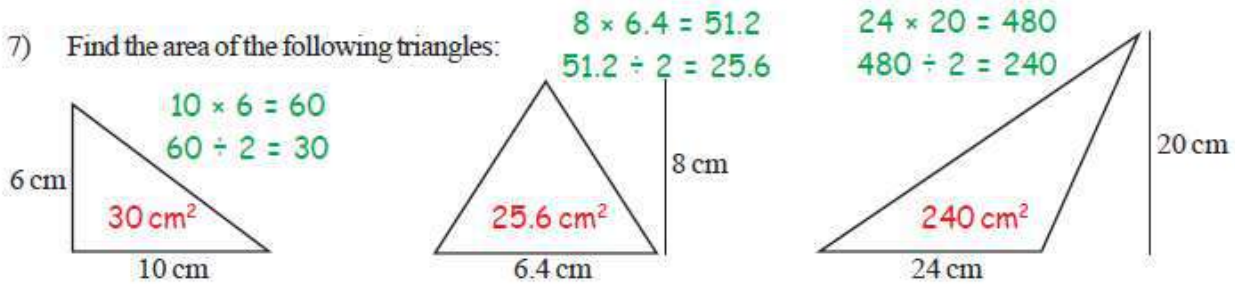


2

A rectangle has an area of 40cm² and a length of 8 cm.
Sketch the rectangle and find the width. 40 ÷ 8 = 5 cm

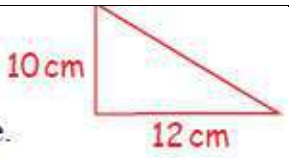
3

7) Find the area of the following triangles:



4

The area of a triangle is 60 cm² 60 × 2 = 120
The base of the triangle is 12 cm long. 120 ÷ 12 = 10
Sketch a triangle with this area and base and work out the height of the triangle.



5

i) 48 + 15 = 63cm² ii) 96 + 24 = 120cm² iii) 140 + 100 = 240cm² iv) 70 + 21 = 91cm²
v) 16 + 48 = 64cm² v) 120cm²

6

(12 x 7) – (6 x 3 ÷ 2) = 75 ÷ 32 = 2.34375, hence 3 boxes

7

a) (6 x 5) + (1 x 3) = 33cm²
b) 33 x 8 = £264

LO2: To be able to derive and use formula for area of parallelogram and trapezium

1

Ans

a) 5 x 4 = 20cm² b) 7 x 8 = 56ft c) {(5 + 7) ÷ 2} x 6 = 36cm² d) {(3 + 5) ÷ 2} x 6 = 24cm²

LO3: To be able to apply the formula for volume of a prism (excluding cylinders)

1

Ans	a) 25 x 10 = 250cm³ b) 30 x 17 = 510cm³ c) 12 x 21 = 252cm³ d) 105 x 45 = 4725cm³
2	
Ans	a) 3 x 4 x 7 = 84cm³ b {(5 + 7) ÷ 2} x 4 x 6 = 144cm³ c) (8 x 9 ÷ 2) x 8 = 288cm³ d) (2 x 4 x 6) + (3 x 1 x 6) = 66cm³
3	
Ans	a) 880 ÷ 10 x 2 ÷ 8 = 22cm b) 1176 ÷ 14 x 2 ÷ 12 = 14

	Stage C : Topic 5 Percentages - Answers
LO1	To be able to calculate a percentage of a quantity using a calculator where appropriate
1	a) 10% of £170 £17 b) 30% of £90 £27 c) 17.5% of £600 £105 d) 15% of £68 £10.20
2	The normal price of a jacket is £54. In a sale, the price is reduced by 30% What is the sale price? £37.80
3	A football costs £14 plus 20% VAT. How much is the football? £16.80
4	a) 21% of £340 £71.40 b) 64% of £1080 £691.20 c) 61.7% of £2000 £1234 d) 17.5% of £68.40 £11.97
5	A computer costs £406 plus VAT at 20%. Work out the total cost of the computer. £487.20
6	A car is usually priced at £9800 but now has a discount of 8%. What is the new price of the car? £9016
7	65% of a car, by weight, is steel and iron. If a car weighs 1100 kg, what is the weight of steel and iron in the car? 715 kg
8	Tony earns £17800 per year and receives a 3.8% pay rise. How much does he now earn? £18476.40
LO2	To be able to express a quantity as a percentage of an amount

1	a) 12 out of 50 24% b) 15 out of 25 60% c) 8 out of 10 80% d) 11 out of 20 55%
2	Tim got 17 out of 20 in a French test. Write 17 out of 20 as a percentage. 85%
3	Work out £14 as a percentage of £40 35%
4	If there are 9 girls and 11 boys in a class, what percentage of the class are girls? 45%
5	a) 12 out of 34 35.3% b) 62 out of 85 72.9% c) 113 out of 153 73.9% d) 2150 out of 3452 62.3%
6	Sarah sat a Science test and got a score of 64 marks out of 112 possible marks. What was her mark as a percentage? 57.1% Give your answer to 1 decimal place.
7	In a class of 32 students, 18 of them are boys. What percentage of the class are boys? 56.3% Give your answer to 1 decimal place.
8	In a French class there are 13 girls and 6 boys. What percentage of the class are girls? 68.4% Give your answer to 1 decimal place.
9	A new car usually costs £8500. Henry gets a discount of £1000. What is the discount as a percentage of the usual cost? 11.8% Give your answer to 1 decimal place.
	Mixed Problems
1	The captain of a football team scored 17 out of the 85 goals they scored that season. What percentage of the goals did he score? 20%
2	Alex has 3 dolls, 12 teddy bears and 5 soft rabbits. What percentage of her toys are a) teddy bears? 60% b) dolls? 15% c) cuddly toys? 25%
3	Joe buys a new laptop in a sale. He gets a discount of 20%. The laptop originally cost £350 what price did Joe pay? £280
4	Income tax is 20%. What is the net income of someone who earns £800 per month? £160

5	The population of grey seals in Scotland is under threat. It has declined by 30% in the last decade. In 2000 there were 1500 grey seals, how many are there today? 1050
	Stage C : Topic 6 Algebra - Answers
LO1	To be able to solve simple equations with integer solutions

1

$2x = 12$ X = 6	$7 = x - 3$ X = 10	$\frac{d}{4} = 7$ d = 28	$3k + 8 = 20$ k = -2
$3m - 7 = 20$ m = 9	$\frac{a}{4} + 7 = 13$ a = 24	$6n - 4 = 32$ n = 6	5c + 9 = 39 c = 6
$7r - 10 = 25$ r = 5	$\frac{2a}{4} - 7 = 13$ a = 40	$5x + 7 = 57$ x = 10	9m + 5 = 3m + 23 6m = 18 m = 6

LO2	To be able to recognise the difference between an equation, formula and identity

1

Expression - a mathematical phrase	**Equation** - a mathematical statement that contains unknown values	**Formula** - mathematical relationship or rule expressed in symbols	**Identity** - something that is always true for any values of the variables that are involved
$4z + 3y$	$10z + 8 = 17$	$SA = 6a^2$	$2(a + 9) \equiv 2a + 18$

Put these under the correct heading depending if they are expressions, equations, formula or identities

EXPRESSION	EQUATION	FORMULA	IDENTITY
$3x + 2y$	$3r - 3 = 12$	$A = \pi r^2$	$2(x+y) \equiv 2x + 2y$
$8r - 14$	$4 = 3t - 8$	$\frac{1}{2}bh = A$	$\frac{x+y}{2} \equiv \frac{x}{2} + \frac{y}{2}$
$9x + 15y$	$2r + 9 = -8$	$S = \frac{D}{T}$	$A \times B \equiv B \times A$
$17x - 11y$	$17r + 3 = 8$	$C = \frac{5}{9}(F - 32)$	$x^2 + y^2 \equiv (x+y)^2 - 2xy$

LO3	To be able to rearrange and substitute into formulae

1 Claudia owns *f* films. Barry owns twice as many films as Claudia.

a) How many films does Barry own? *2f*

b) How many films do Claudia and Barry own in total? *f + 2f = 3f*

c) How many films would they own in total if they each gave away 3 of their films?

f – 3 + 2f – 3 = 3f - 6

2 I have *b* flower bulbs. To find the number of flowers that should grow from them (*F*), multiply the number of bulbs by 3 and then add 5.

	Write a formula for the number of flowers I can expect. *F = 3b + 5*
3	Alf has £18 in the bank. He gets a job, and for each hour he works, he is paid £8. Assuming he spends nothing, write a formula for the amount of money (*M*) Alf will have after he has worked for *h* hours *M = £8h + £18*
4	The cost of hiring crazy gold equipment is a fixed price of £3 plus 8p for every minutes of use. Write a formula for the cost (*C*) of hiring the equipment for *g* minutes of crazy golf. *C = £3 + 8g*
5	*a) z = 2 b) z = 7 c) z = 7 d) z = 21*
6	*a) l = 10 b) l = 5 c) l = 25 d) l = 1*
LO4	To be able to interpret simple expressions as function machines
1	If my input is 7, what will my output be? 12 / If my output is 8, what number did I put in? 4
2	Here is a function machine: Input → x 7 → + 10 → ÷ 4 → Output If my input is 6, what will my output be? 13 / If my output is 20, what number did I put in? 10 Here is a function machine: Input → ÷ 2 → - 4 → x 9 → Output If my input is 14, what will my output be? 27 / If my output is 108, what number did I put in ? 32
	Mixed Problems
1	a) 4x + 10 b) x = 7 ; hence Length = 7 + 5 = 12
2	a) 5x + 120 = 360 b) x = 48° ; hence smallest angle = 48 + 10 = 58°

Stage C – Topic 7 – Graphing Answers
LO1: To be able to plot simple graphs of linear functions

1

On the axes draw and label the following straight line graphs (ypu will not be able to plot all the points on the axes):

1. $y = x$ (the y is the same as the x)

x	-4	-3	-2	-1	0	1	2	3	4
y	-4	-3	-2	-1	0	1	2	3	4

2. $y = 2x$ (times all x by 2)

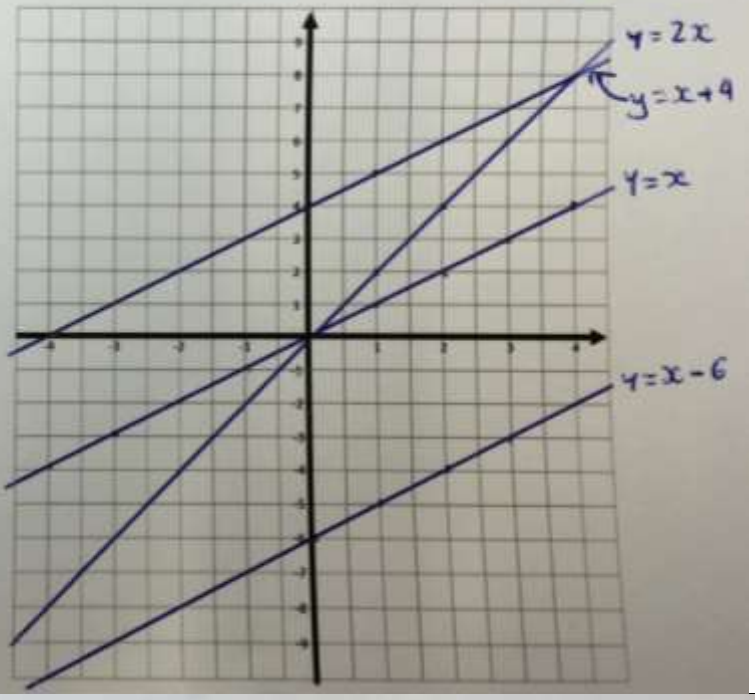
x	-4	-3	-2	-1	0	1	2	3	4
y	-8	-6	-4	-2	0	2	4	6	8

3. $y = x+4$

x	-4	-3	-2	-1	0	1	2	3	4
y	0	1	2	3	4	5	6	7	8

4. $y = x-6$

x	-4	-3	-2	-1	0	1	2	3	4
y	-10	-9	-8	-7	-6	-5	-4	-3	-2



2

Use the new set of axes for these graphs.

5. $y = -x$ (multiply all x by -1)

x	-4	-3	-2	-1	0	1	2	3	4
y	4	3	2	1	0	-1	-2	-3	-4

6. $y = 2x+1$ (multiply all x by 2 then add 1)

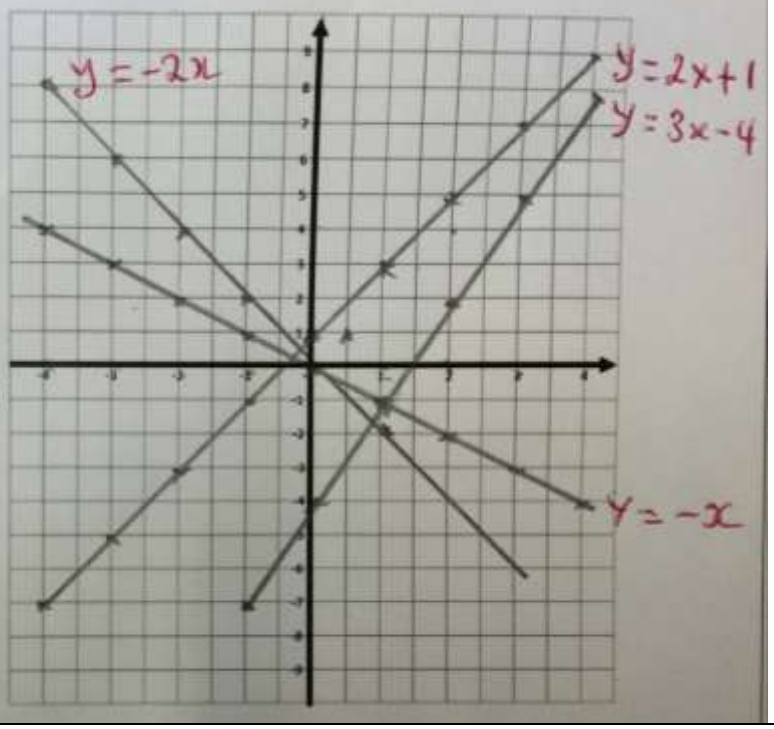
x	-4	-3	-2	-1	0	1	2	3	4
y	-7	-5	-3	-1	1	3	5	7	9

7. $y = 3x-4$ (multiply all x by 3 the subtract 4)

x	-4	-3	-2	-1	0	1	2	3	4
y	-16	-13	-10	-7	-4	-1	2	5	8

8. $y = -2x$ (multiply all x by -2)

x	-4	-3	-2	-1	0	1	2	3	4
y	8	6	4	2	0	-2	-4	-6	-8

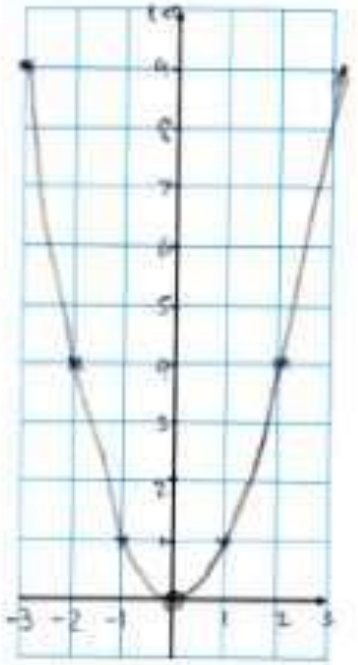


LO2: To be able to plot simple graphs of quadratic functions

1

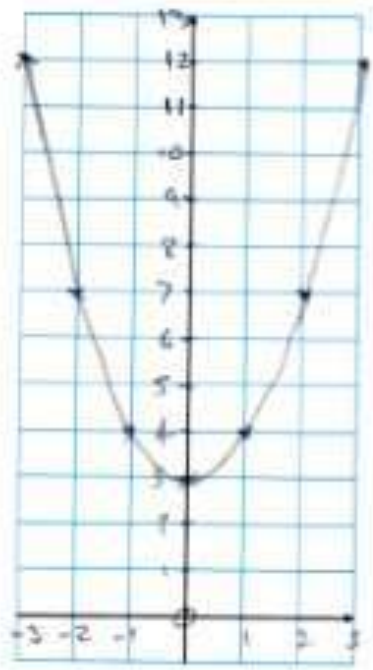
$y = x^2$

x	-3	-2	-1	0	1	2	3
y	9	4	1	0	1	4	9



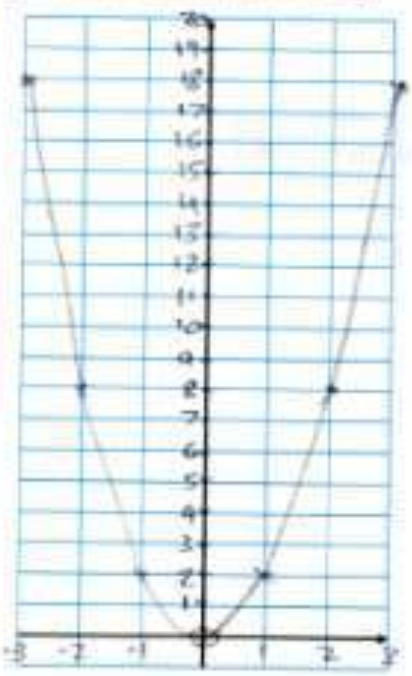
$y = x^2 + 3$

x	-3	-2	-1	0	1	2	3
y	12	7	4	3	4	7	12



$y = 2x^2$

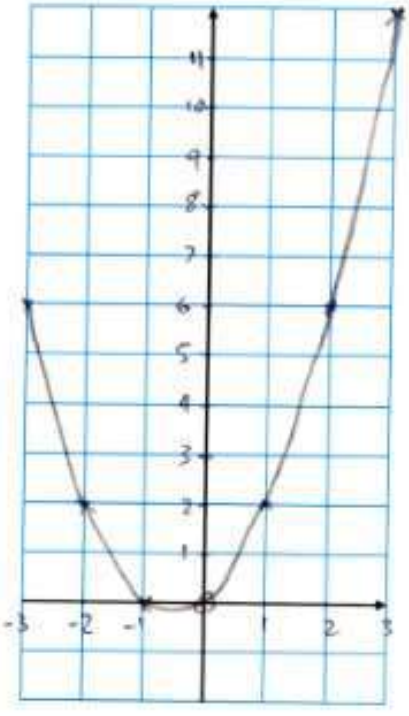
x	-3	-2	-1	0	1	2	3
y	18	8	2	0	2	8	18



2

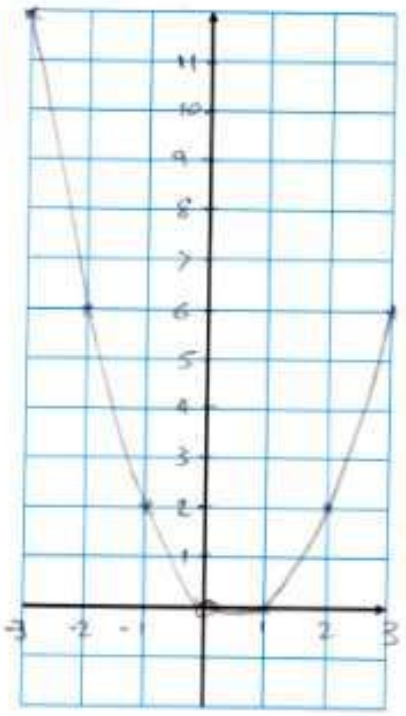
$y = x^2 + x$

x	-3	-2	-1	0	1	2	3
y	6	2	0	0	2	6	12

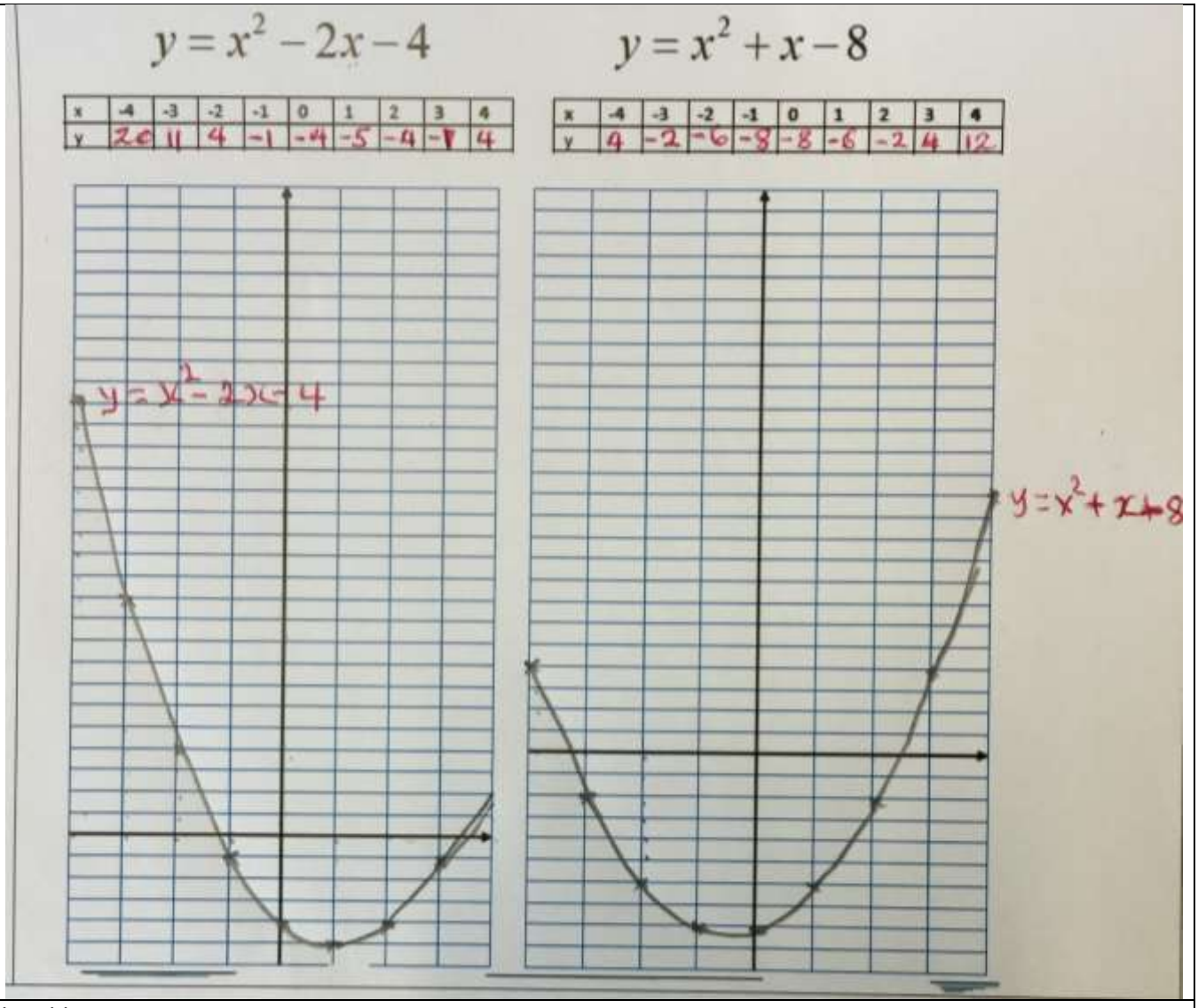


$y = x^2 - x$

x	-3	-2	-1	0	1	2	3
y	12	6	2	0	0	2	6



3



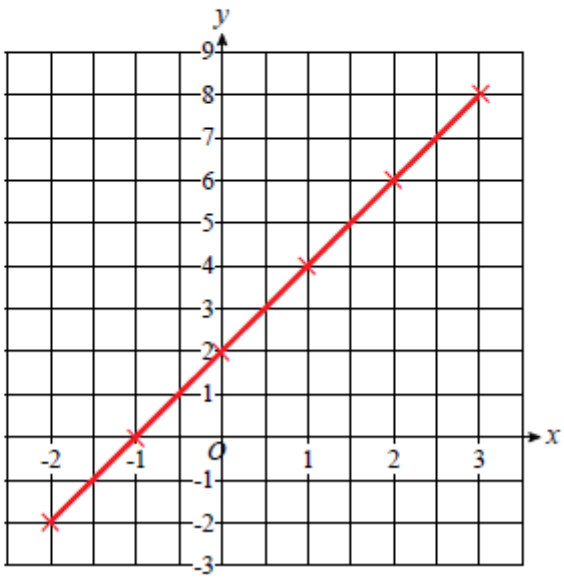
Mixed Problems

1

a) Complete the table of values for $y = 2x + 2$

x	-2	-1	0	1	2	3
y	-2	0	2	4	6	8

b) On the grid, draw the graph of $y = 2x + 2$.



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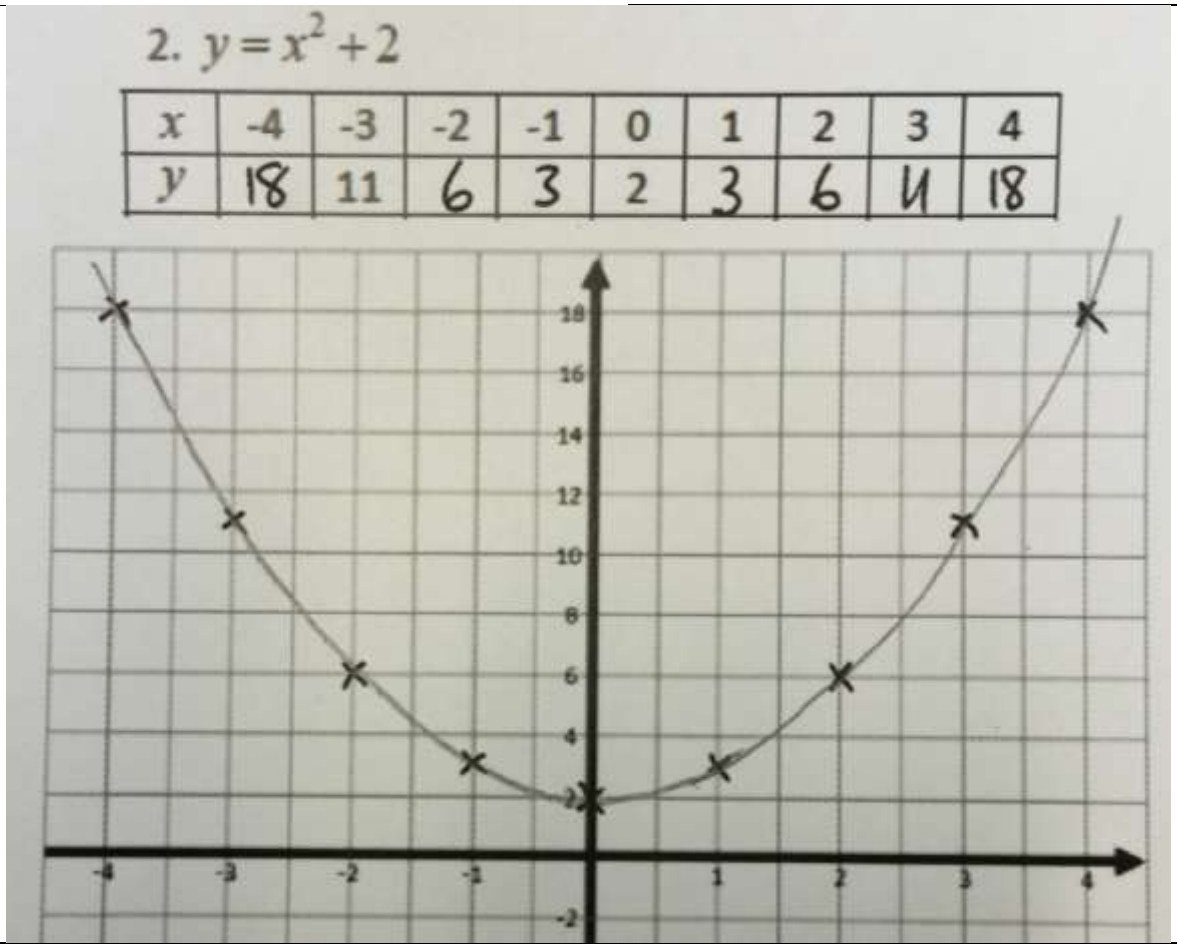
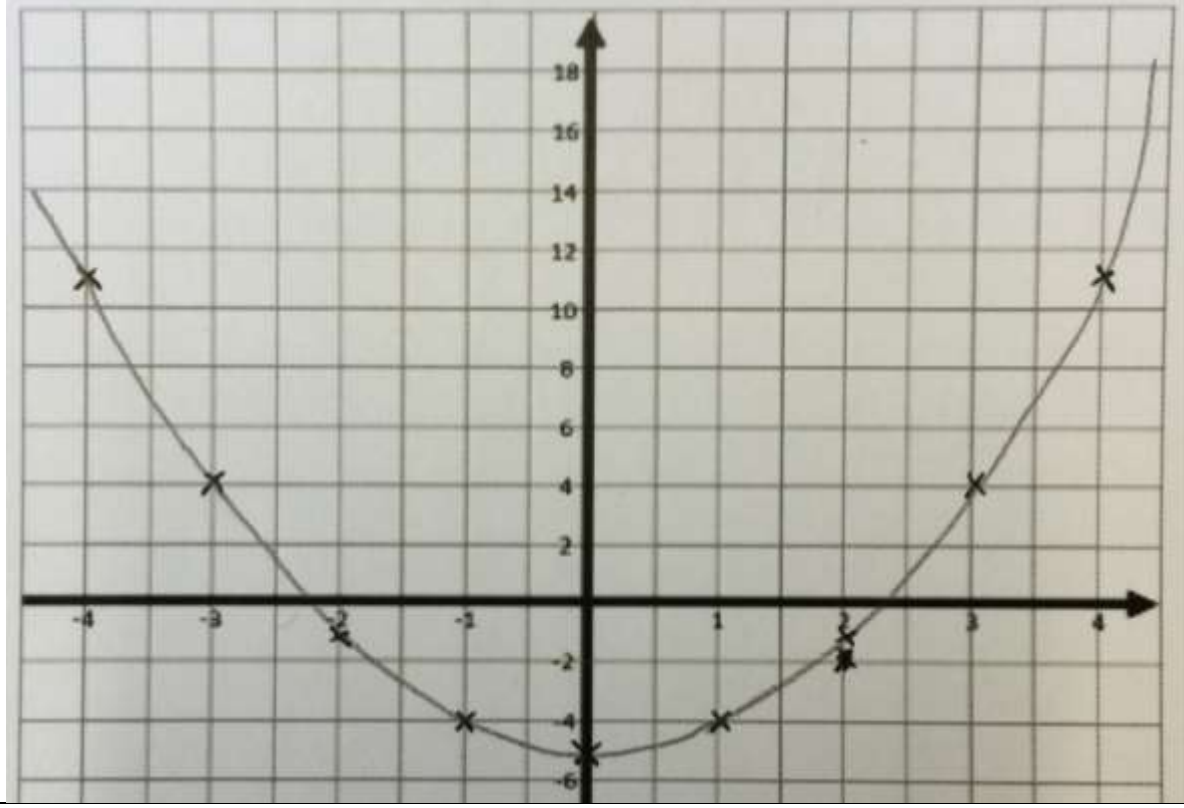


3

3. $y = x^2 - 5$

x	-4	-3	-2	-1	0	1	2	3	4
y	11	4	−1	−4	−5	−4	−1	4	11



4

1) a) Complete the table of values for $y = 2x - 3$

x	-1	0	1	2	3	4
y	-5	-3	-1	1	3	5

b) Using the axes on the right draw the graph of $y = 2x - 3$

c) Use your graph to work out the value of y when $x = 2.5$ $y = 2$

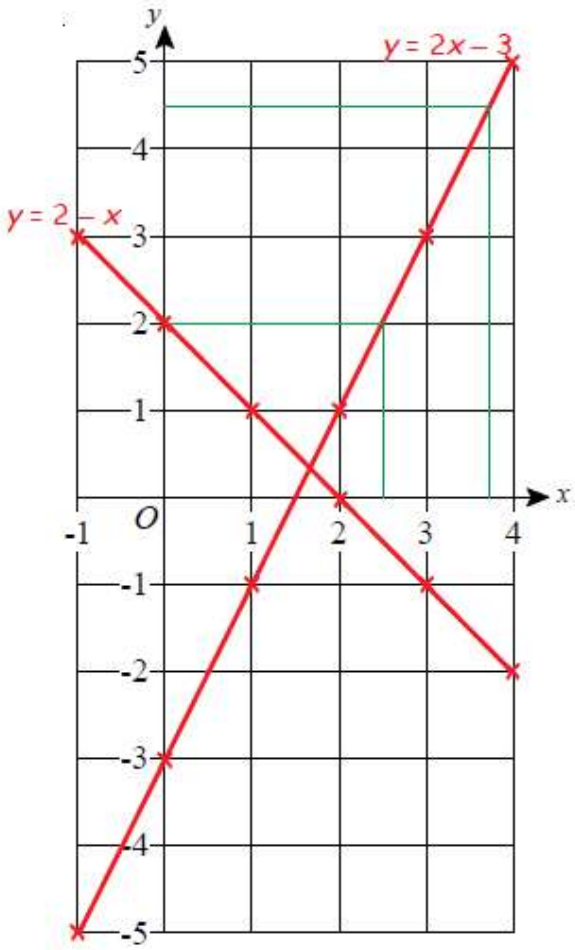
d) Use your graph to work out the value of x when $y = 4.5$ $x = 3.75$

---

2) a) Complete the table of values for $y = 2 - x$

x	-1	0	1	2	3	4
y	3	2	1	0	-1	-2

b) Using the axes on the right, again, draw the graph of $y = 2 - x$

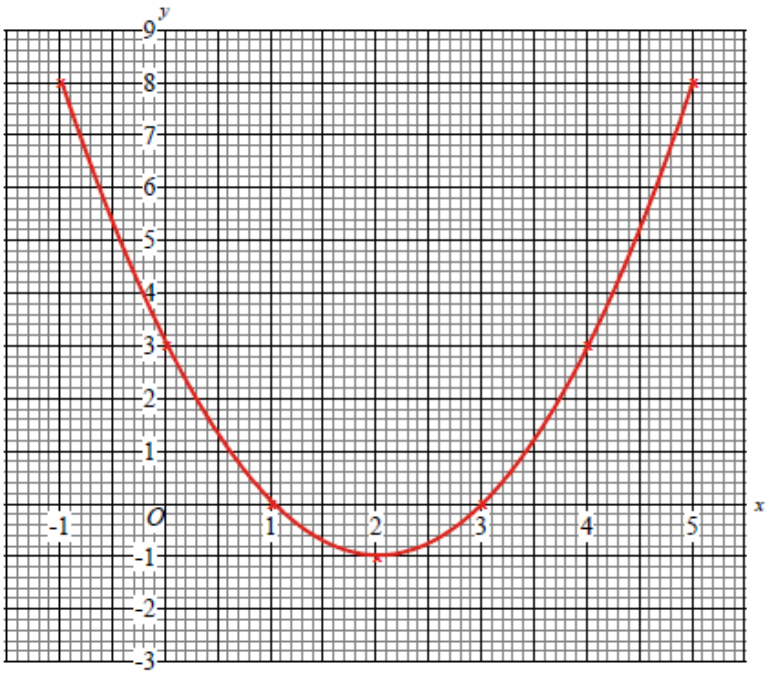


5

1) Complete the table of values for $y = x^2 - 4x + 3$

x	-1	0	1	2	3	4	5
y	8	3	0	-1	0	3	8

On the grid, draw the graph of $y = x^2 - 4x + 3$

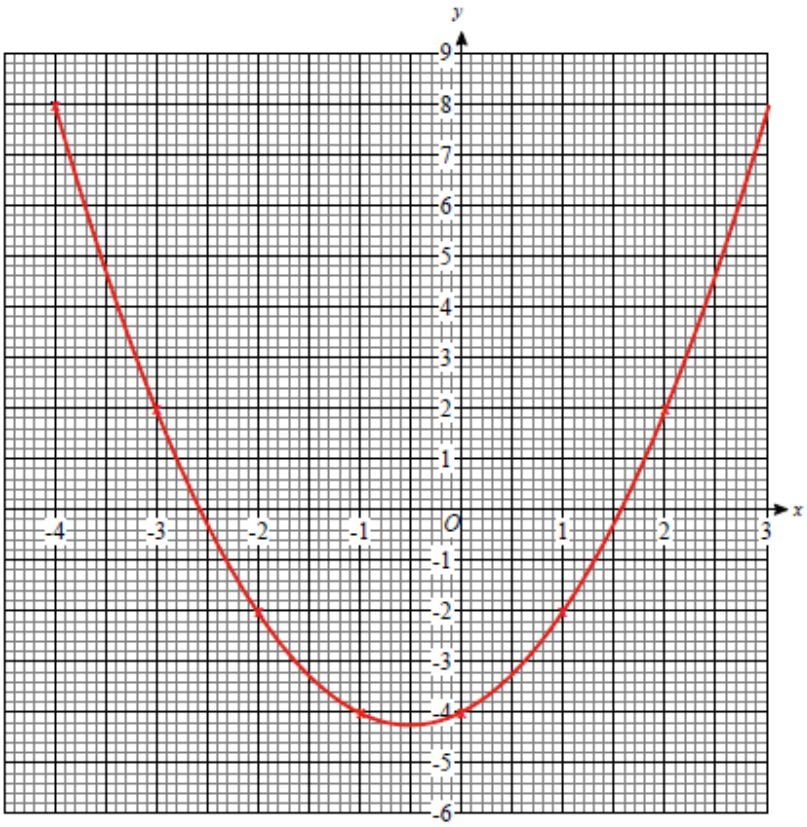


6

a) Complete the table of values for $y = x^2 + x - 4$

x	-4	-3	-2	-1	0	1	2	3
y	8	2	-2	-4	-4	-2	2	8

b) On the grid, draw the graph of $y = x^2 + x - 4$



Stage – Topic 8 – Probability Answers

LO1: To be able to identify when events are mutually exclusive and know the sum of these events would be 1

1

Ans

A six sided dice is rolled. Which of these pairs of outcomes are mutually exclusive?

A The number is even and a multiple of 3 Not mutually exclusive

c. The number is odd and a multiple of 2 mutually exclusive

d. The number is odd and square Not mutually exclusive

2

Ans

Which of these pairs of events are mutually exclusive?

a. Winning a football match and drawing the same match mutually exclusive

b. Wearing one red sock and one blue sock Not mutually exclusive

c. Eating toast for breakfast and Chips for dinner Not mutually exclusive

d. Being on time and being late for a day at school mutually exclusive

3

Ans

The probability that it will rain tomorrow is $\frac{1}{5}$. What is the probability that it won't rain?

4

Ans

If the probability of passing a driving test is 0.54,
what is the probability of failing it? 0.46

5

Ans

The probability that a football team will win their next game is $\frac{2}{11}$.
The probability they will lose is $\frac{3}{11}$.
What is the probability the game will be a draw? $\frac{6}{11}$

6

Ans

On the school dinner menu there is only ever one of four options.
Some of the options are more likely to be on the menu than others.
The table shows the options available on any day, together with three of the probabilities.

Food	Curry	Sausages	Fish	Casserole
Probability	0.36	0.41	0.14	0.09

a) Work out the probability of the dinner option being Fish. 0.14

b) Which option is most likely? Sausages

c) Work out the probability that it is a Curry or Sausages on any particular day. 0.77

d) Work out the probability that it is **not** Casserole. 0.91

7

Ans

Julie buys a book every week.
Her favourite types are Novel, Drama, Biography and Romance.
The table shows the probability that Julie chooses a particular type of book.

Type of book	Novel	Drama	Biography	Romance
Probability	0.24	0.16	x	x

a) Work out the probability that she will choose a Novel or a Drama. 0.4

b) Work out the probability that she will choose a Biography or a Romance. 0.6

The probability that she will choose a Biography is the same as the probability she will choose a Romance.

c) Work out the probability that she will choose a Biography. 0.3

Mixed Problems

1

Ans

There are some blue, red, green and purple balls in a bag, find the probability of a purple ball being pulled out if these are the probabilities of the other colours:

a.

Blue	Red	Green	Purple
0.1	0.3	0.3	0.3

b.

Blue	Red	Green	Purple
0.15	0.42	0.23	0.2

c.

Blue	Red	Green	Purple
0.4	0.35	0.02	0.23

2

Ans

A dice is rolled.

a. List the six mutually exclusive outcomes and their probabilities. 1, 2, 3, 4, 5, 6

b. What is the probability of a 6? $\frac{1}{6}$

c. What is the probability of not getting a 6? $\frac{5}{6}$

3

Ans

Jean is going on an activities holiday. Each activity lasts a whole day. She can only do one activity a day. The probability that she will go pony-trekking on any one day is 0.6

a. Work out the probability that Jean will not go pony-trekking on the first day. 0.4

b. The probability that Jean will go windsurfing on any one day is 0.25
Work out the probability that Jean will go windsurfing **or** pony-trekking on the first day. 0.6 + 0.25 = 0.85

4

Ans

a) $\frac{3}{7}$ b) 3 x 4 = 12 balls c) 2 + 6 + 6 = 14 balls

5

Ans

a) P(red or pink) = $\frac{10}{15} = \frac{2}{3}$

b) P(not pink) = $\frac{11}{15}$

c) P(not red) = $\frac{9}{15} = \frac{3}{5}$

d) P(blue or pink) = $\frac{9}{15} = \frac{3}{5}$

6

Ans

a) P(red or green) = $\frac{3}{8} + \frac{1}{4} = \frac{5}{8}$

b) P(not blue or green) = $1 - (\frac{1}{4} + \frac{1}{5}) = \frac{9}{20}$

c) P(not red, green or blue) = $1 - (\frac{3}{8} + \frac{1}{4} + \frac{1}{5}) = \frac{7}{20}$