GCSE Maths Intermediate Booklet 1

Name: .....

Set: .....

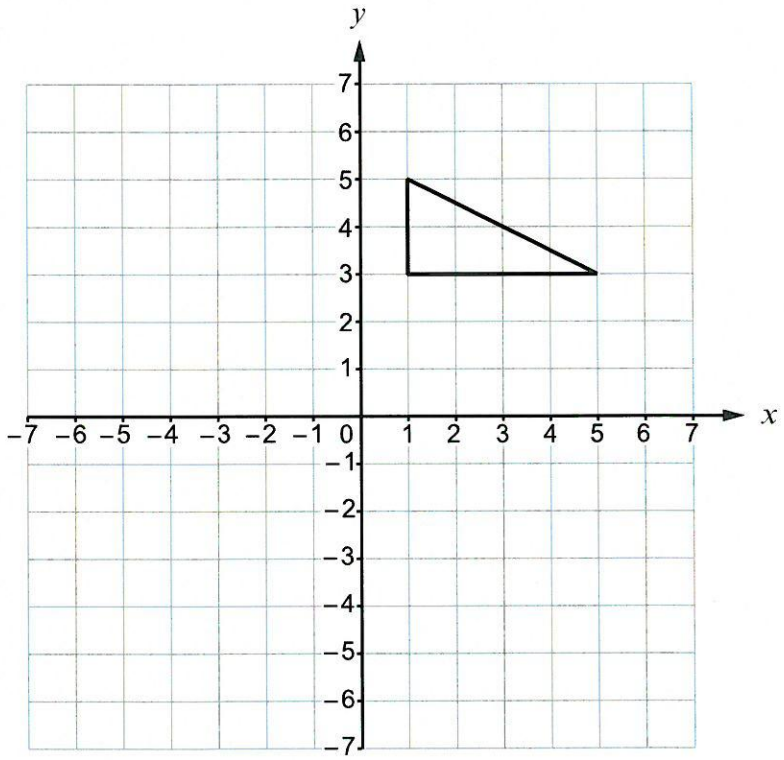
Transformations

F+I U1 June 2017

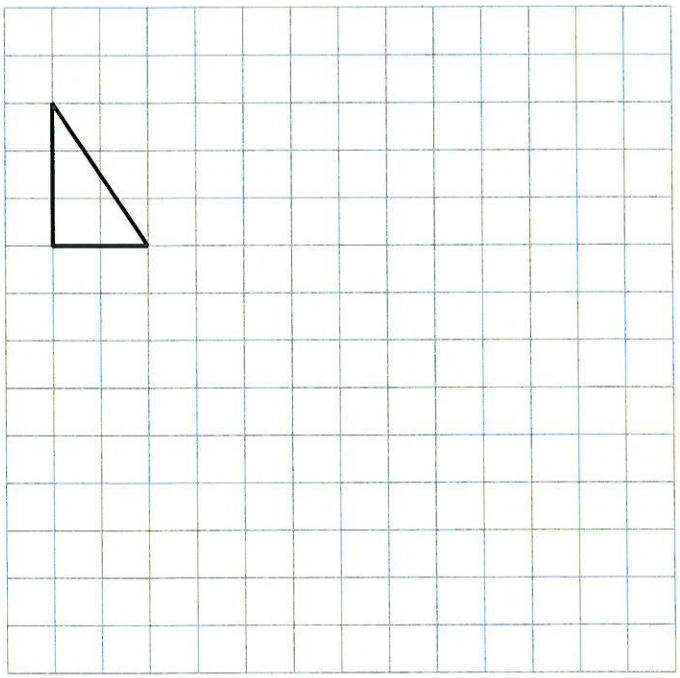
4

Examiner only

3. *(a)* Reflect the triangle below in the x-axis. [1]

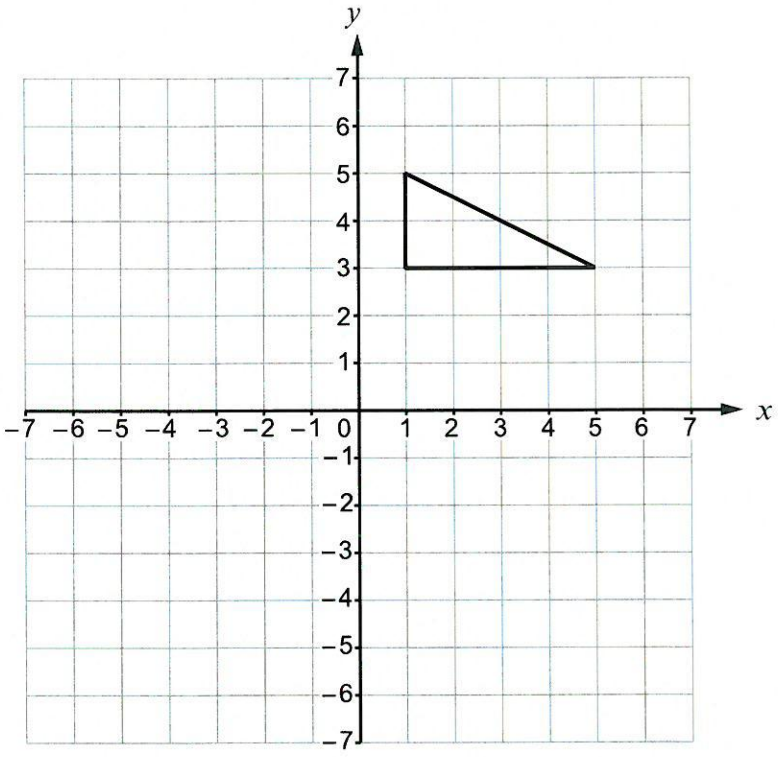


(b) Enlarge the triangle below by a scale factor of 3. [2]



Examiner only

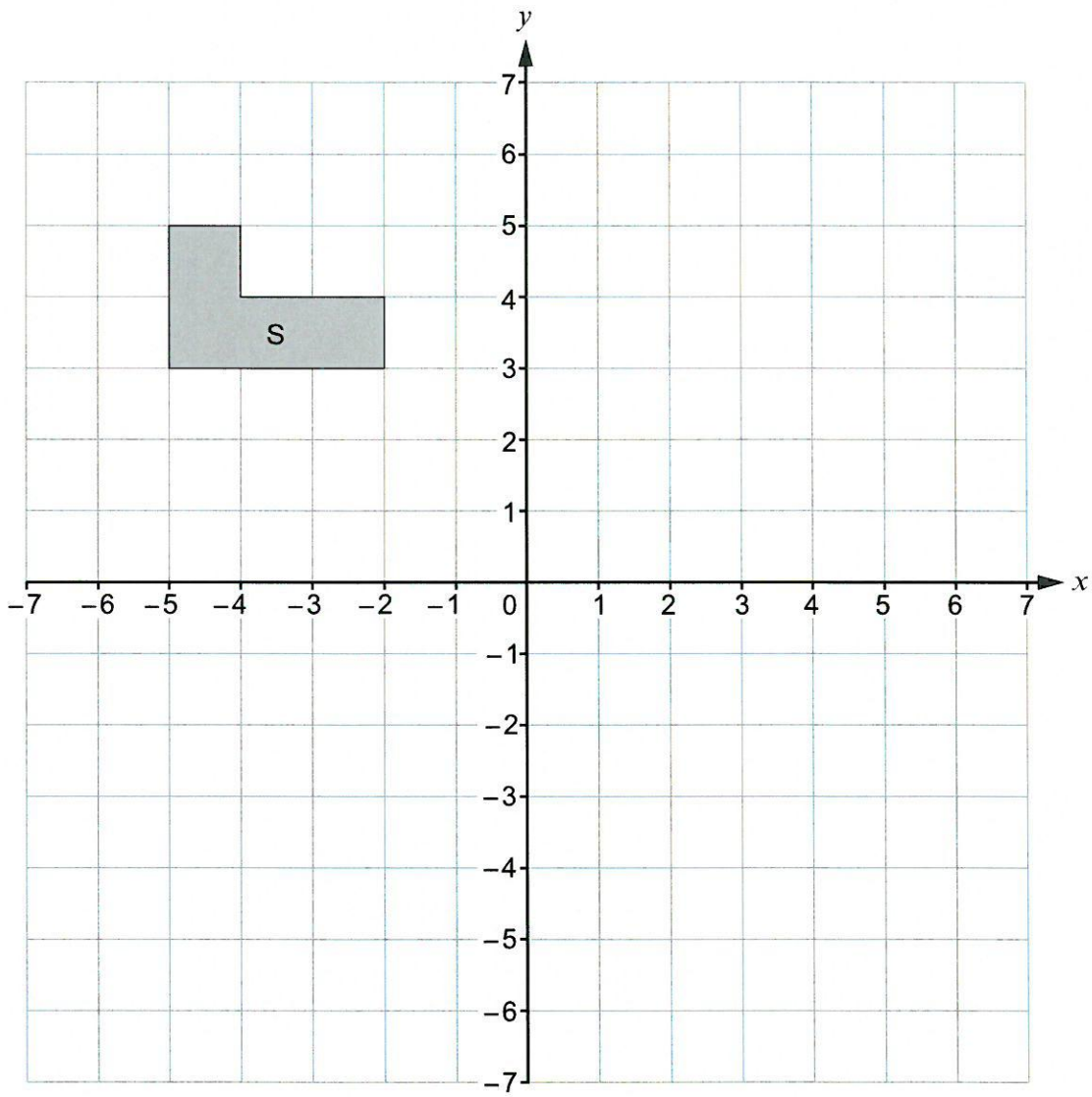
(c) Translate the triangle below 3 squares to the left and 2 squares down. [1]



F+I Maths June 2018 U1

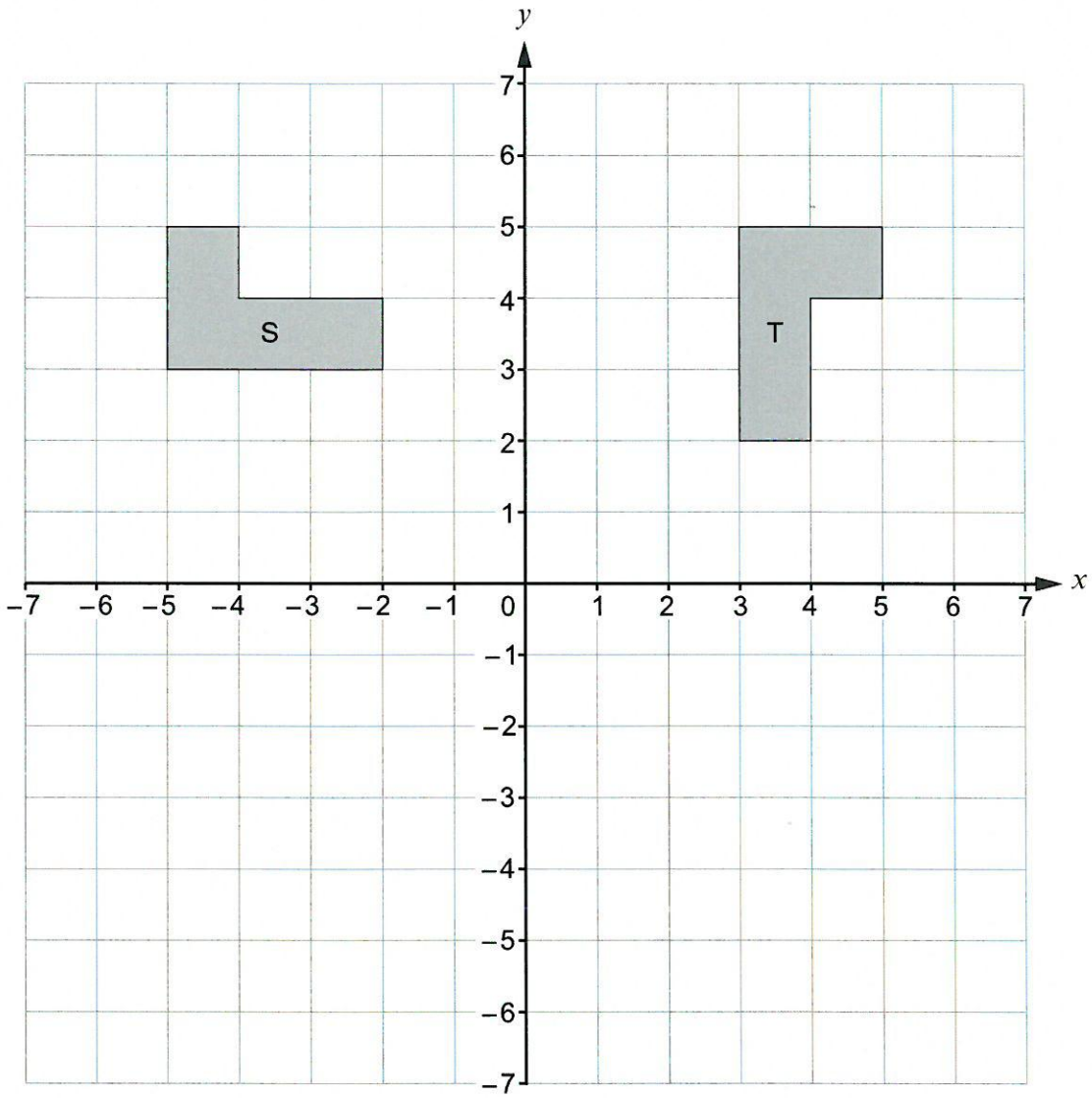
Examiner only

9. *(a)* Reflect the shape S in the line $y = 1$. [2]



Examiner only

(b) Describe **fully** the **single** transformation that transforms shape S to shape T. [3]



.....

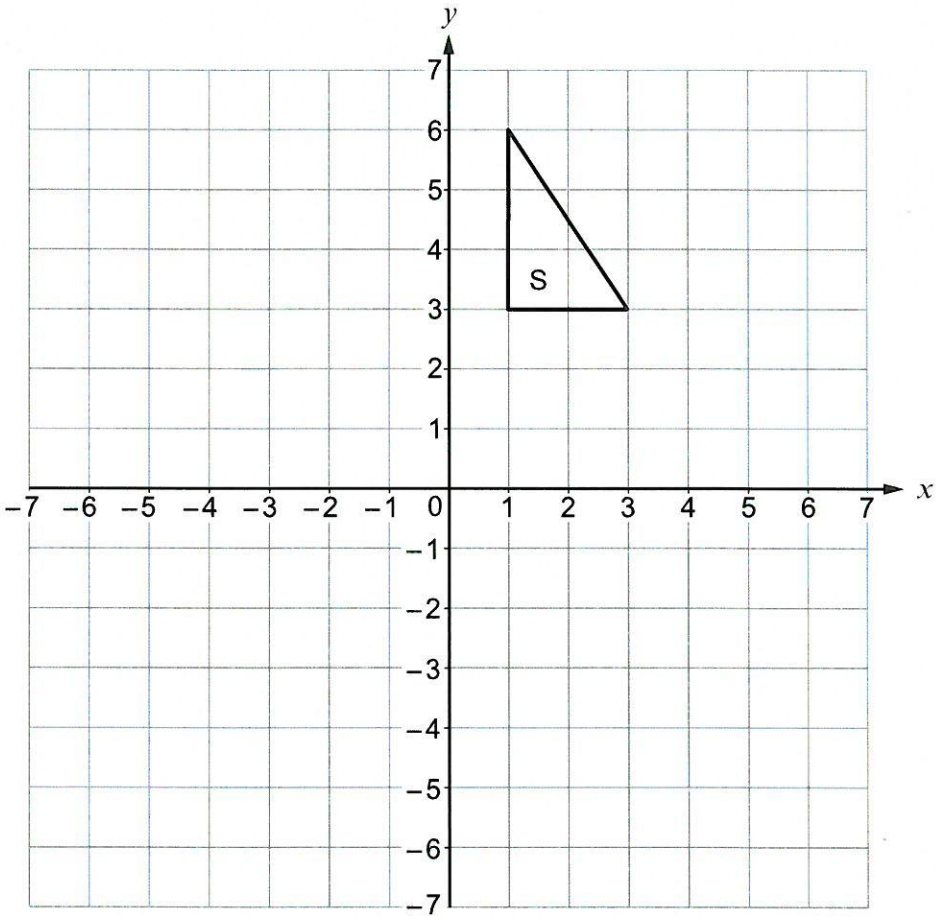
.....

.....

F+1 U2 Nov 2016

Examiner only

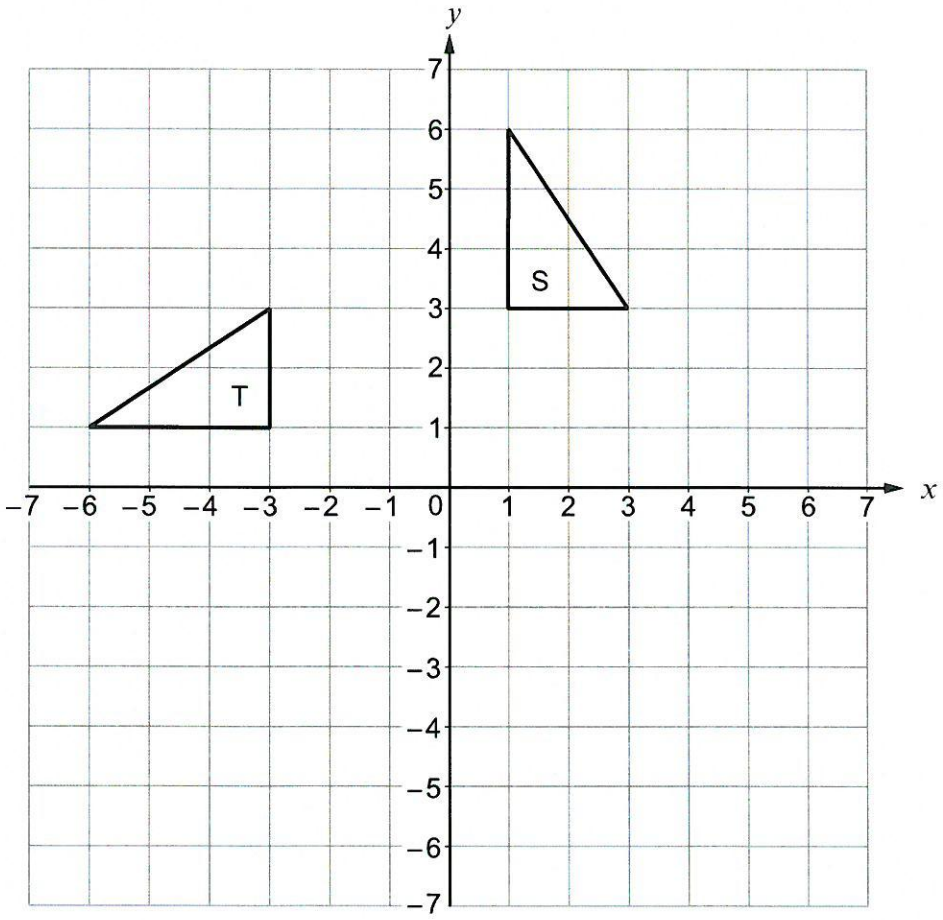
11. *(a)* Reflect the triangle S in the line $y = 2$. [2]



F+1 U2 Nov 2016

Examiner only

(b) Describe fully a single transformation that transforms triangle S onto triangle T. [3]



.....

.....

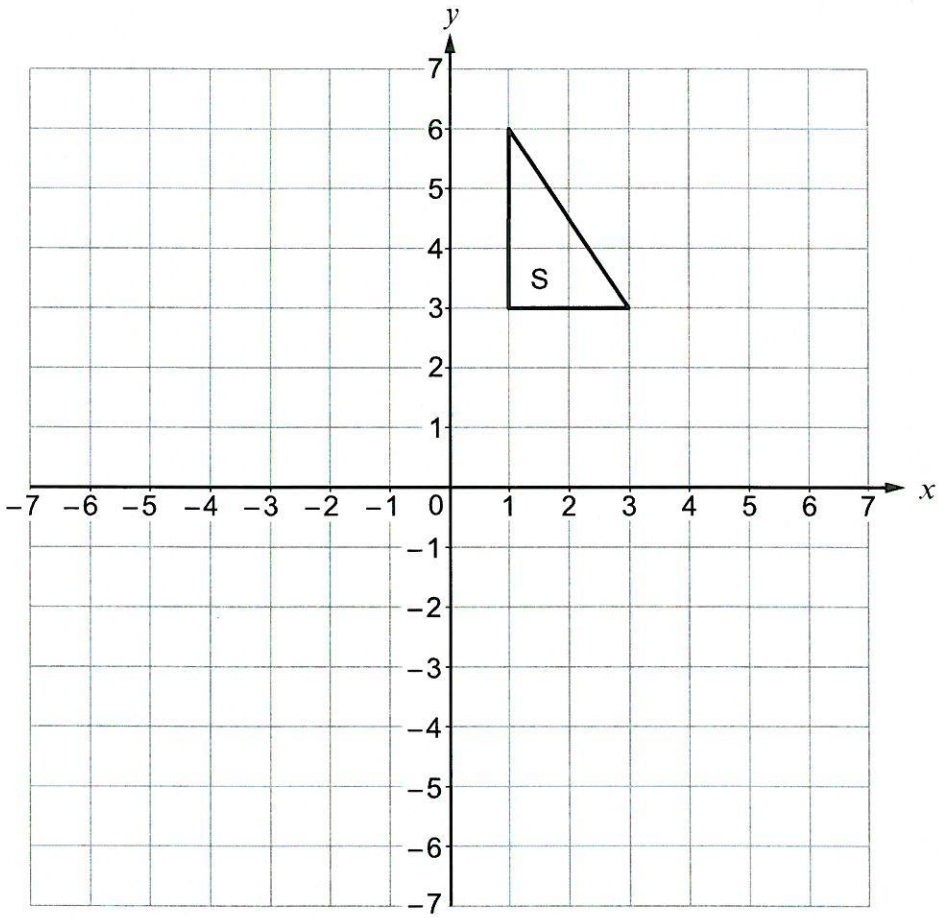
.....

.....

F+1 U2 Nov 2016

Examiner only

(c) (i) Translate the triangle S using the column vector $\begin{pmatrix} -5 \\ -4 \end{pmatrix}$. [1]



(ii) Write down the column vector that will reverse the translation in part (i). [1]

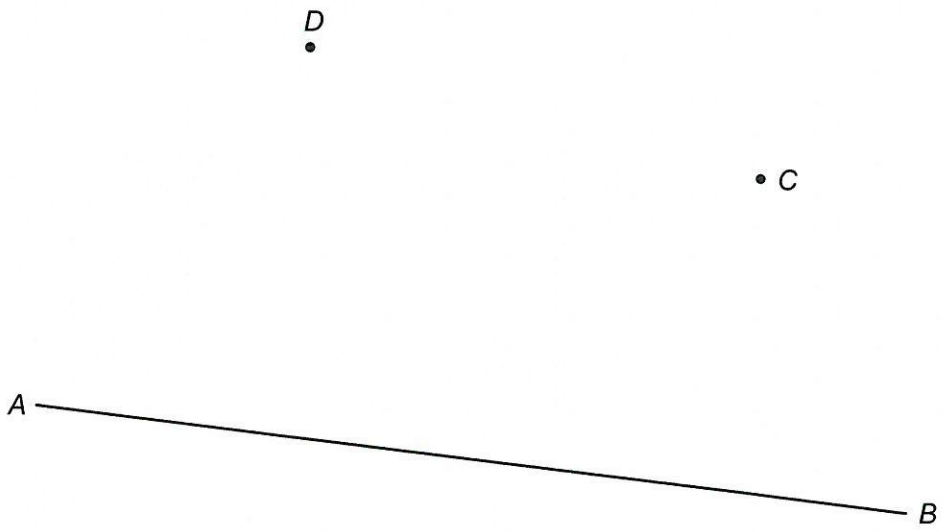
.....

Construction

F Maths Nov 2017 Q2

Examiner only

2.



(a) Draw a line parallel to *AB*, through the point *C*. [1]

(b) Draw a line perpendicular to *AB*, through the point *D*. [1]

3. *(a)* Write down the next term in the sequence below. [1]

1 5 9 13 .....

(b) Describe in words the rule for continuing the sequence. [1]

.....

Examiner only

9. Use a ruler and a protractor to make an accurate drawing of this triangle. [3]

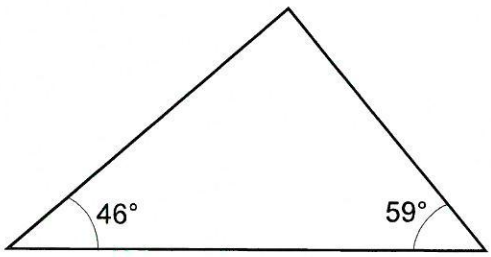


Diagram not drawn to scale

F U2 June 2017

Examiner only

15. Construct an accurate drawing of triangle ABC, where $AB = 7$ cm, $A\hat{B}C = 90°$ and $B\hat{A}C = 60°$.
Use only a ruler and a pair of compasses.
The side AB has been drawn for you.
You must show your construction arcs. [3]

Examiner only

10. A regular polygon has exterior angles of 45°.

(a) How many sides does this polygon have? [2]

.....

.....

.....

(b) Each side of this regular polygon is 7 cm.
A sketch of two sides of the polygon is shown below.
The two sides are *AB* and *BC*.

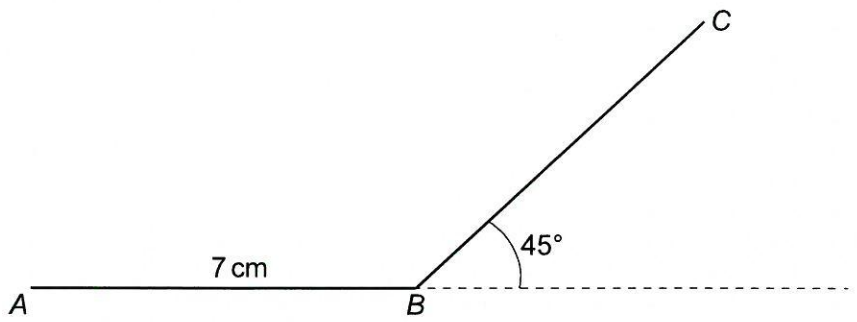


Diagram not drawn to scale

Construct an accurate drawing that shows these **two sides** of the polygon.
Use only a ruler and a pair of compasses.
The point *A* has been given.
You must show your construction arcs. [4]

A •

Probability

F Maths June 2018 U1

Examiner only

2. *(a)* Mai has a box of 60 different beads.
There are 40 red beads in the box.
Mai chooses a bead at random from the box.

Describe the chance that Mai chooses a red bead.
Circle the correct expression from those given below. [1]

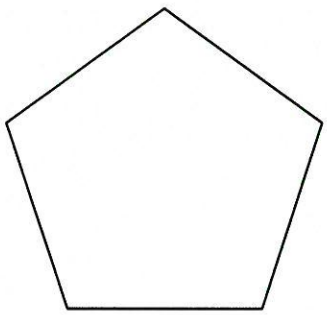
impossible **unlikely** **an even chance** **likely** **certain**

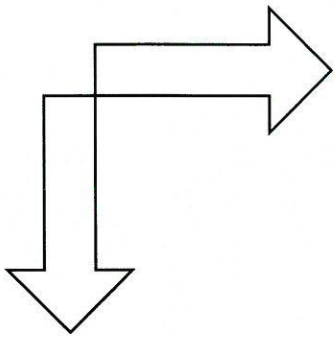
(b) Ifan has a box of 12 cakes.
There are 6 chocolate cakes and the rest are lemon cakes.
Ifan chooses a cake at random from the box.

Describe the chance that Ifan chooses a lemon cake.
Circle the correct expression from those given below. [1]

impossible **unlikely** **an even chance** **likely** **certain**

3. Draw all the lines of symmetry on the following shapes. [2]





3300U101
05

F U1 Nov 2016

Examiner only

2. *(a)* Huw has 19 coins in his pocket.
13 of these coins are 10p coins and the rest are 5p coins.
Huw chooses one coin at random from his pocket.

Circle the best expression from those given below to describe the chance that Huw chooses a 5p coin. [1]

impossible **unlikely** **an even chance** **likely** **certain**

(b) Catrin has 10 pieces of fruit in her bag.
She has 4 oranges and 6 apples.

Catrin chooses one piece of fruit at random from her bag.

Circle the best expression from those given below to describe the chance that Catrin chooses a banana from her bag. [1]

impossible **unlikely** **an even chance** **likely** **certain**

.....

.....

3. *(a)* Kate thought of a number.
She multiplied her number by 9 and got the answer 54.

What number did Kate think of? [1]

.....

.....

(b) Write **a positive whole number** in each empty box to make this statement true. [1]

$\square \times 8 + \square = 21$

.....

.....

.....

Examiner only

5. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

A class has 32 pupils.
18 are boys.
The others are girls.

12 pupils from this class went on a trip.
One of these 12 pupils is chosen at random.
There is an **even chance** that the chosen pupil is a girl.

How many **girls** stayed in class? [3 + 2 OCW]

The number of girls who stayed in class is .....

Examiner only

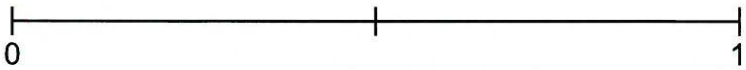
6. Arjuna has the 10 cards shown below.

2	4	7	8	9	11	15	16	18	19

He puts the cards in a box and then chooses one at random.

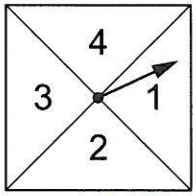
On the probability scale shown below, mark the points A and B where:

- A is the probability of Arjuna choosing a number that is greater than 16,
- B is the probability of Arjuna choosing a number that is less than 20. [2]



Examiner only

7. *(a)* Gareth is running a game stall at his school fete.
In his game, a player must flip a coin and spin a fair 4-sided spinner.
The sections of the spinner are labelled 1, 2, 3 and 4, as shown below.



(i) Write down all the possible outcomes.
One has been done for you. [2]

Head, 1

(ii) A player wins a prize if the coin lands on tails and the spinner shows the number 4.
Azi plays the game once.

What is the probability that Azi wins a prize? [2]

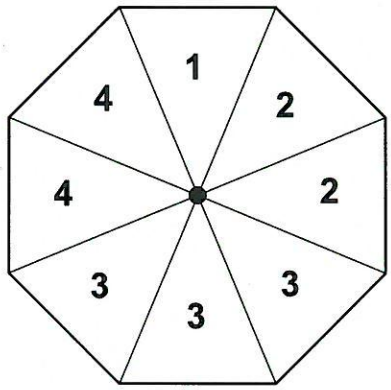
(b) Cerys says:

"The chance of throwing a three on an ordinary 6-sided dice is higher than the chance of throwing a six, because six is the hardest number to get."

Is Cerys correct?
Explain your reasoning fully. [1]

Examiner only

11. Seren has a fair 8-sided spinner.
The sections of the spinner are numbered 1, 2, 2, 3, 3, 3, 4, 4.



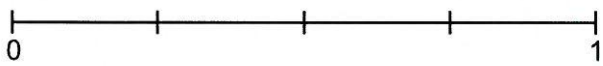
(a) Which number is the spinner most likely to land on? [1]

.....

(b) Circle one term from the list below that describes the probability of the spinner landing on a 2. [1]

impossible **unlikely** **even chance** **likely** **certain**

(c) On the probability scale below, mark with an arrow the probability of the spinner landing on a 3. [1]



3300U201 09

F+I Maths June 2015 U2

Examiner only

3. A travel company offers the following holiday options.

Time	Accommodation	Transport
Summer or Winter	Cottage or Hotel	Train or Bus or Car

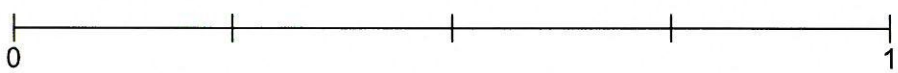
(a) List all the possible different combinations of holiday options that the company offers. One has been done for you. [3]

Time	Accommodation	Transport
Summer	Cottage	Train

(b) A holiday is chosen at random from all the different combinations on offer. **P** is the probability that the chosen holiday is a

Summer holiday, staying in a Cottage and travelling by Train.

Mark the point **P** on the probability scale shown below. [1]



F+I U1 June 2017

Examiner only

4. *(a)* A fair, six-sided dice is rolled.
What is the probability that a 4 is shown on the dice?
Circle your answer. [1]

6% $\frac{1}{5}$ $\frac{1}{4}$ 6:1 $\frac{1}{6}$

(b) 50 raffle tickets were sold at a charity event.
Sian has a 20% chance of winning the top prize.
How many tickets did Sian buy?
Circle your answer. [1]

1 2 4 10 20

.....

.....

(c) A bag contains a mixture of blue beads, yellow beads and pink beads.
One bead is taken at random from the bag.

The probability that the bead is pink is $\frac{1}{5}$.

Which of the following sets of beads could have been in the bag?
Circle your answer. [1]

.....

.....

.....

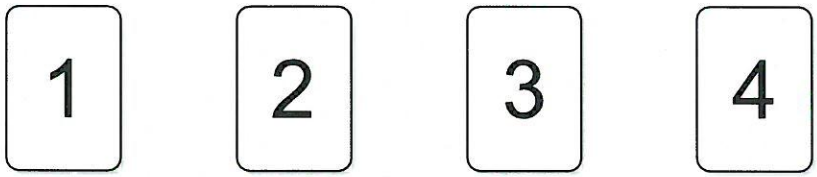
.....

F+I U1 Nov 2016

Examiner only

5. Three **red** cards have the following numbers written on them.

Four **green** cards have the following numbers written on them.



In a game, the cards are turned face down.
A player chooses one red card and one green card at random.
The player's score is the sum of the two numbers.

(a) Complete the following table. [1]

		Score		
Red card	9	.....	11	.....	.....
	6	.....	8	.....	.....
	3	4	5	6	7
		1	2	3	4

Green card

(b) A player wins a prize if the score is **more** than 9.
Safira plays the game once. What is the probability that she wins a prize? [2]

.....

.....

(c) 60 people play the game once.
Approximately how many people would you expect to win a prize? [2]

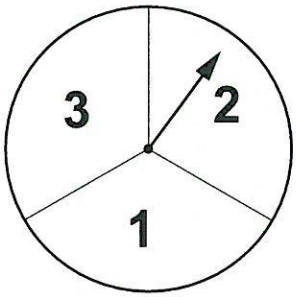
.....

.....

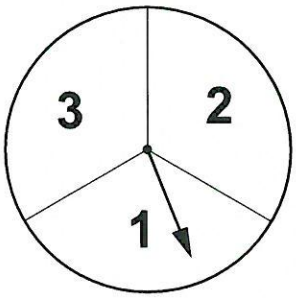
Examiner only

6. Sara is in charge of a game at her school's Christmas party.

Two fair spinners are spun as shown in the example below.



1st Spinner



2nd Spinner

People can make a two-digit number using the numbers shown on the spinners using the following rule:

> Multiply the number on the first spinner by 10 and then add the number on the second spinner.

One example, as shown above, makes the number 21, because $2 \times 10 + 1 = 21$.

(a) How many different numbers can be made playing this game? [1]

.....

.....

.....

(b) Write down all the prime numbers that can be made playing this game. [2]

.....

.....

.....

(c) What is the probability that a person makes a prime number when playing the game once? [2]

.....

.....

Examiner only

(d) Sara charges each person £1 to play the game once.
Each player who makes a prime number from their spins wins £2.
How much profit would the school expect to make when 180 people play the game? [4]

F+I U1 June 2017

Examiner only

6. David, Jane and Mary are beach inspectors.
Three beaches, Harlech, Rhyl and Porthcawl, are all to be inspected on a certain day.
It is decided to share the work so that the inspectors will visit one beach each, chosen at random.

(a) List all the possible different ways they could share the work.
One has been done for you. [2]

David ⟶ Harlech, Jane ⟶ Rhyl and Mary ⟶ Porthcawl

(b) What is the probability that one of the female inspectors will visit Rhyl? [2]

.....

.....

Examiner only

7. The following cards spell out the name Ystradgynlais.

Y	S	T	R	A	D	G	Y	N	L	A	I	S

In an experiment, the cards are turned face down and rearranged.
A card is selected at random and the letter on the card is recorded.

The experiment is carried out 325 times.

How many times would you expect the letter **Y** to be recorded? [3]

f+I U2 June 2017

Examiner only

7. A dice is thrown 50 times.
The number shown on the dice is recorded after each throw.
The table below shows the results recorded.

Number shown on dice	1	2	3	4	5	6
Frequency	9	7	8	7	6	13

(a) The relative frequency of throwing a 1 was calculated as $\frac{9}{50} = 0{\cdot}18$.

What was the relative frequency of throwing a 6?
Give your answer as a decimal. [1]

.....

.....

.....

(b) The number 4 was thrown 7 times in the first 50 throws.
Using **this fact**, calculate how many times you would expect a 4 to be thrown when this dice is thrown 3000 times. [2]

.....

.....

.....

(c) How many times would you expect a 4 to be thrown when a **fair** dice is thrown 3000 times? [2]

.....

.....

.....

.....

.....

3300U401
07

Turn over.

F+I maths June 2018 U2

Examiner only

10. A box contains many discs, identical in shape and size.
A picture of one of four Welsh castles is printed on each disc.

(a) A disc is chosen at random from the box.
Complete the table below to find the probability of choosing a disc showing Dinefwr Castle. [2]

Picture	Caernarfon Castle	Harlech Castle	Rhuddlan Castle	Dinefwr Castle
Probability	0·36	0·12	0·24	

.....

.....

.....

.....

(b) In the box, there were 522 discs showing a picture of Caernarfon Castle.
How many of the discs showed a picture of Harlech Castle? [2]

.....

.....

.....

.....

Examiner only

10. Ceri has a set of cards.
Each of her cards is labelled North, East, South or West.

(a) Ceri chooses one card at random from her set of cards.
Complete the table below to find the probability of Ceri choosing a card labelled West. [2]

Label	North	East	South	West
Probability	0·4	0·25	0·2	

.....

.....

.....

(b) Ceri chooses one card at random from her set of cards.

What is the probability that the card is labelled East or South? [2]

.....

.....

(c) Sasha has an identical set of cards.
Ceri and Sasha each choose one card at random from their set of cards.

What is the probability that they both choose a card labelled North? [2]

.....

.....

Examiner only

12. A fair six-sided dice and a fair coin are thrown together once.

Circle the correct answer for each of the following statements.

(a) The number of possible outcomes is [1]

2 6 8 12 24.

(b) The probability of getting a **4** on the dice and a **tail** on the coin is [1]

$\frac{1}{8}$ $\frac{1}{12}$ $\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{24}$.

(c) The probability of getting a **multiple of 3** on the dice and a **head** on the coin is [1]

$\frac{1}{8}$ $\frac{1}{12}$ $\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{24}$.

Space for working:

Examiner only

16. Alwyn often drives from Bangor to Cardiff.
He always chooses one of two routes for these journeys.
He either travels through Rhayader or through Hereford.
The probability that he travels through Rhayader is 0·7.

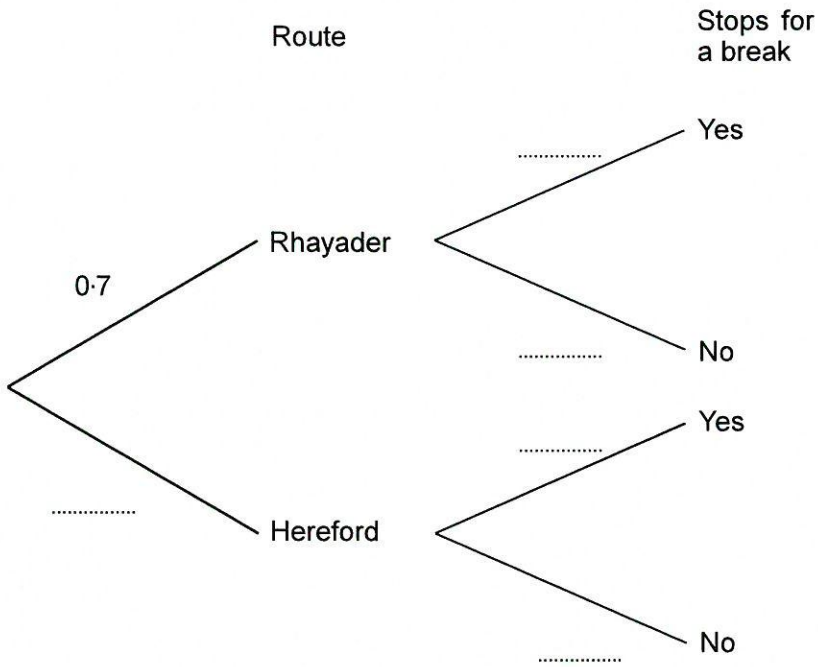
Sometimes he decides to stop for a break during his journey.
His decision is independent of the route he takes.

The probability that he travels through Rhayader **and** stops for a break is 0·42.

(a) Complete the following tree diagram. [4]

.....

.....



(b) Calculate the probability that Alwyn travels through Hereford but **does not** stop for a break. [2]

.....

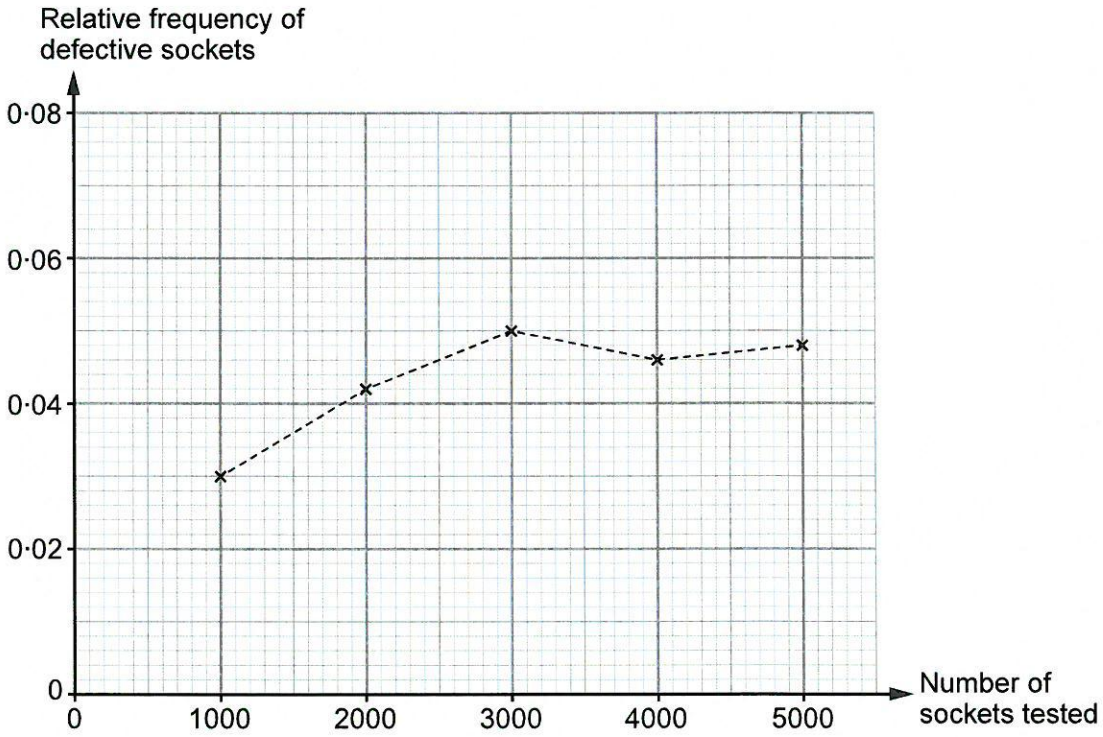
.....

.....

Examiner only

16. A factory uses a machine to produce electrical sockets.
The manager carries out a survey to investigate the probability of the machine producing a defective socket.

The relative frequency of defective sockets produced was calculated after testing a total of 1000, 2000, 3000, 4000 and 5000 sockets.
The results are plotted on the graph below.



(a) How many of the first 3000 sockets tested were defective? [2]

.....

.....

(b) Write down the best estimate for the probability that one socket, selected at random, will be defective.
You must give a reason for your choice. [2]

Probability: .....

Reason: .....

.....

Examiner only

17. 100 boxes each contain 10 balls.

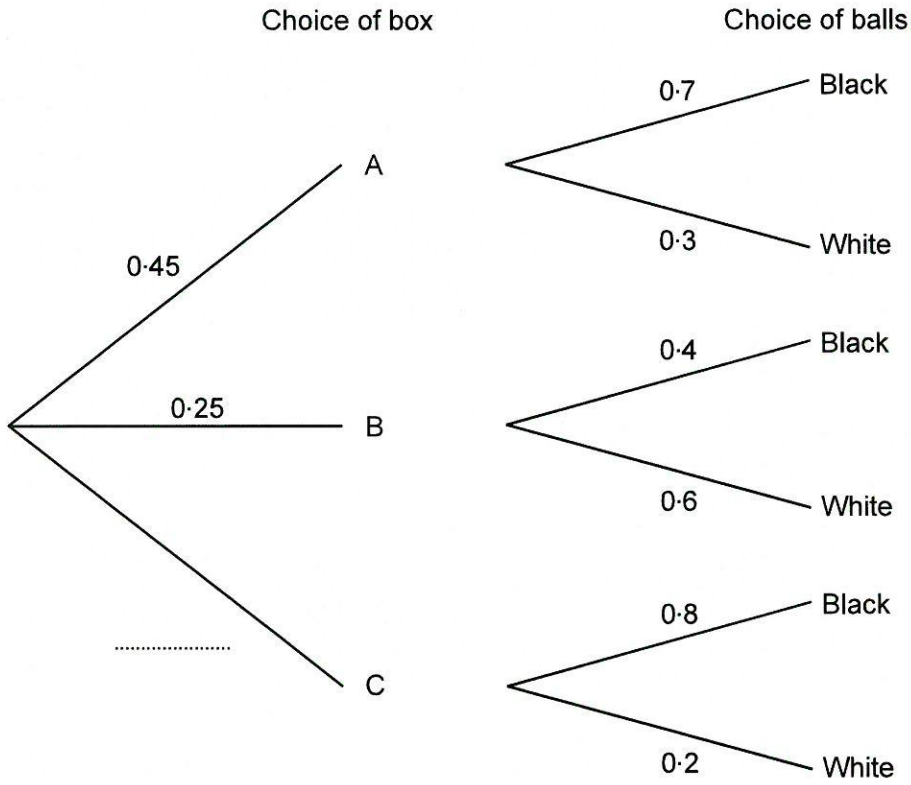
45 of the boxes are labelled A.
They each contain 7 black balls and 3 white balls.

25 of the boxes are labelled B.
They each contain 4 black balls and 6 white balls.

The rest of the boxes are labelled C.
They each contain 8 black balls and 2 white balls.

In a game, a player chooses a box at random, and then chooses a ball at random from that box.

(a) Complete the tree diagram shown below. [1]



(b) What is the probability that a player will select a black ball? [3]

.....

.....

.....

.....

.....

.....

Examiner only

(c) If a large number of people played the game, approximately what fraction of them would you expect to choose a white ball?
Circle your answer. [1]

$\frac{1}{10}$ $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$

.....

.....

18. (a) Factorise $x^3 - 5x$. [1]

.....

(b) Expand and simplify $(2x - 3)(x + 4)$. [2]

.....

.....

.....

(c) Factorise $x^2 - 3x - 28$. [2]

.....

.....

.....

Graphs

F U1 June 2017

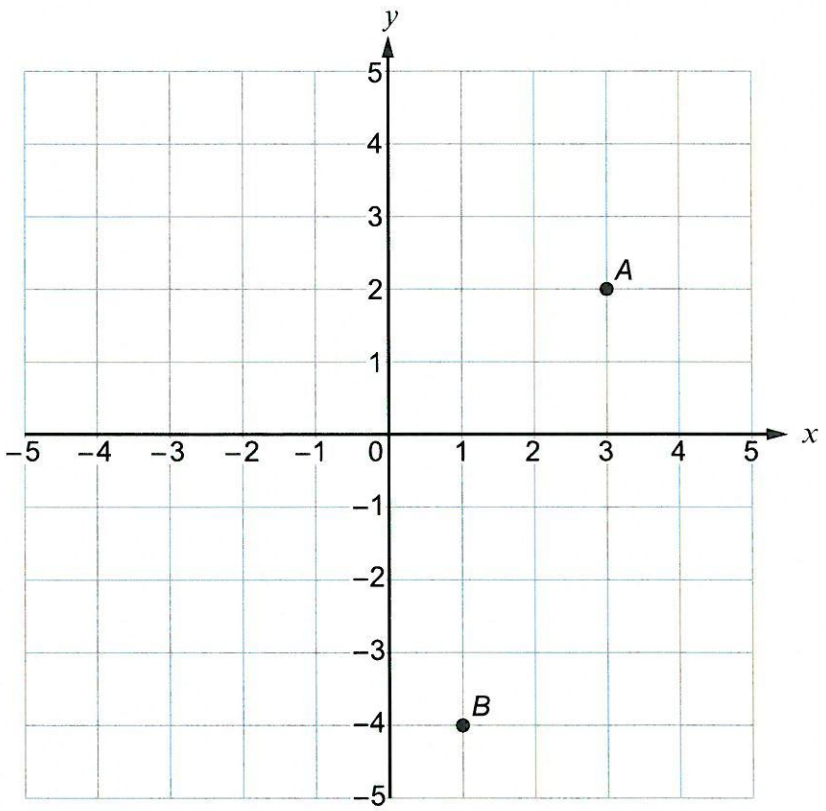
Examiner only

6. *(a)* The points *A* and *B* are plotted on the grid below.
Write down the coordinates of *A* and *B*. [2]

A (..... , ...) *B* (..... , ...)

(b) The point *C* is the midpoint of the line *AB*.
Find the coordinates of *C*. [2]

C (..... , ...)



F U1 Nov 2016

Examiner only

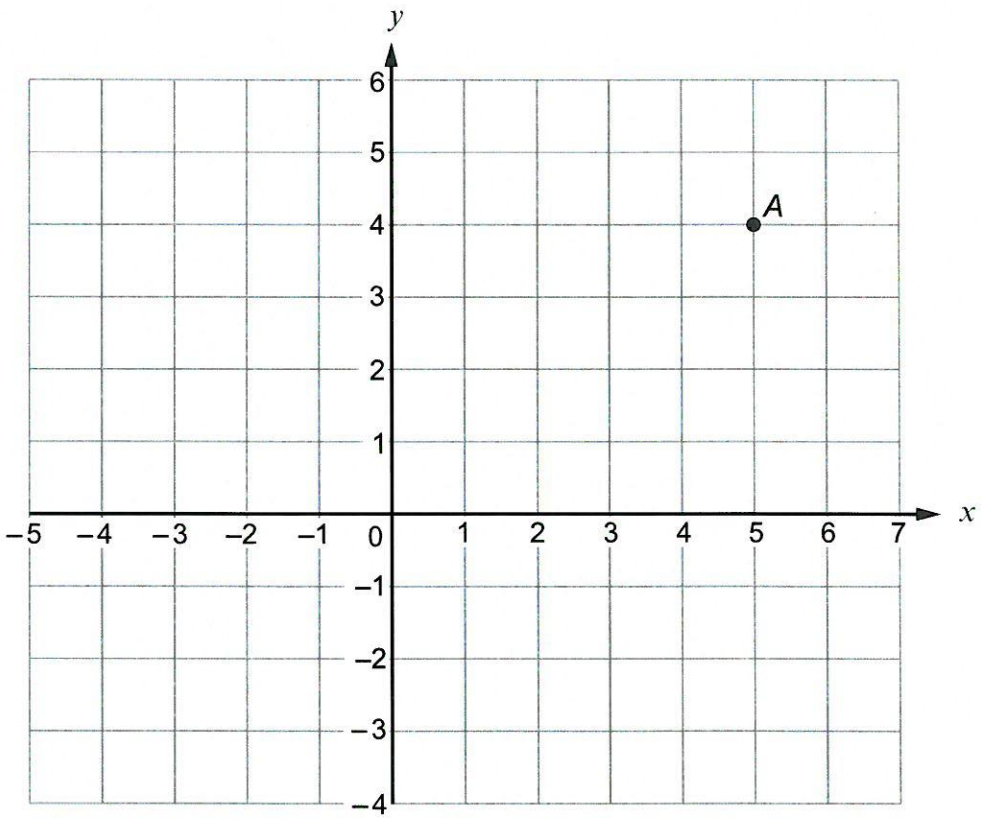
9. *(a)* The point A is plotted on the grid below.

Write down the coordinates of A. ..... [1]

(b) Plot the points $B(5, -2)$ and $C(-3, -2)$ on the grid. [2]

(c) $ABCD$ is a rectangle.

Write down the coordinates of D. ..... [1]

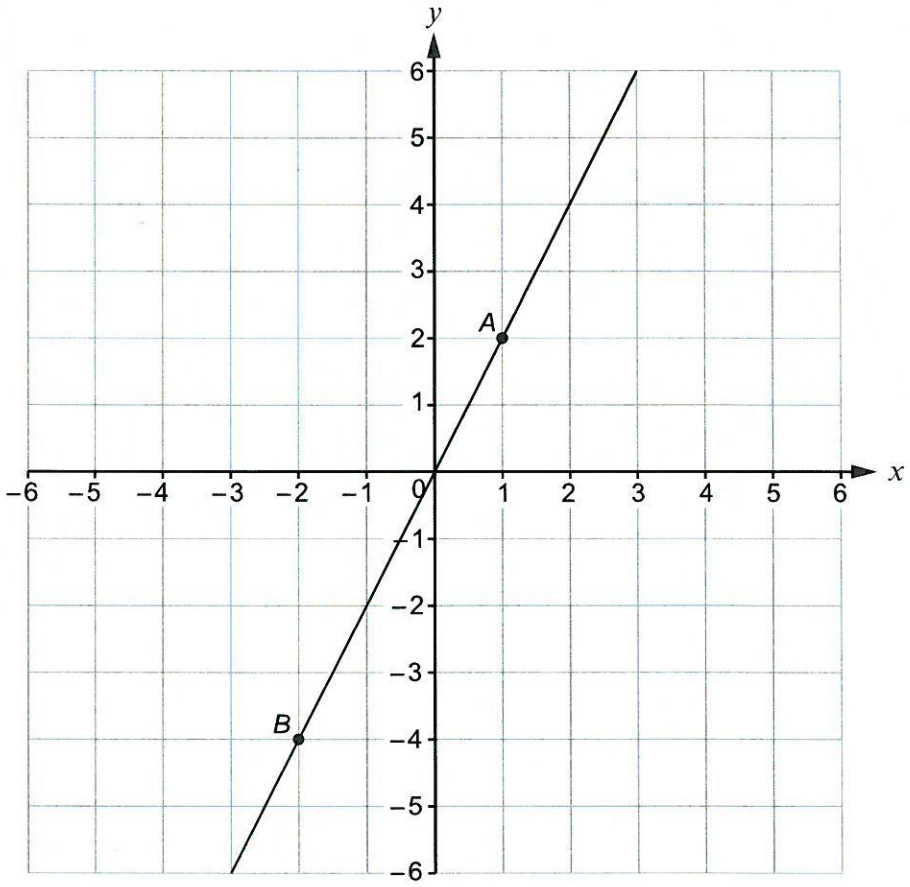


3300U101
09

Turn over.

Examiner only

6. The grid shows part of a straight line that passes through the points *A* and *B*.



(a) What are the coordinates of point *A*? [1]

.....

(b) What are the coordinates of point *B*? [1]

.....

(c) Rhys thinks that the line would go through the point (6, 9).

Is Rhys correct? YES ☐ NO ☐

Explain your reasoning. [1]

.....

.....

.....

3300U201
07

Examiner only

3. The table below shows some values of $y = x - 3$ for values of x from -4 to 6.

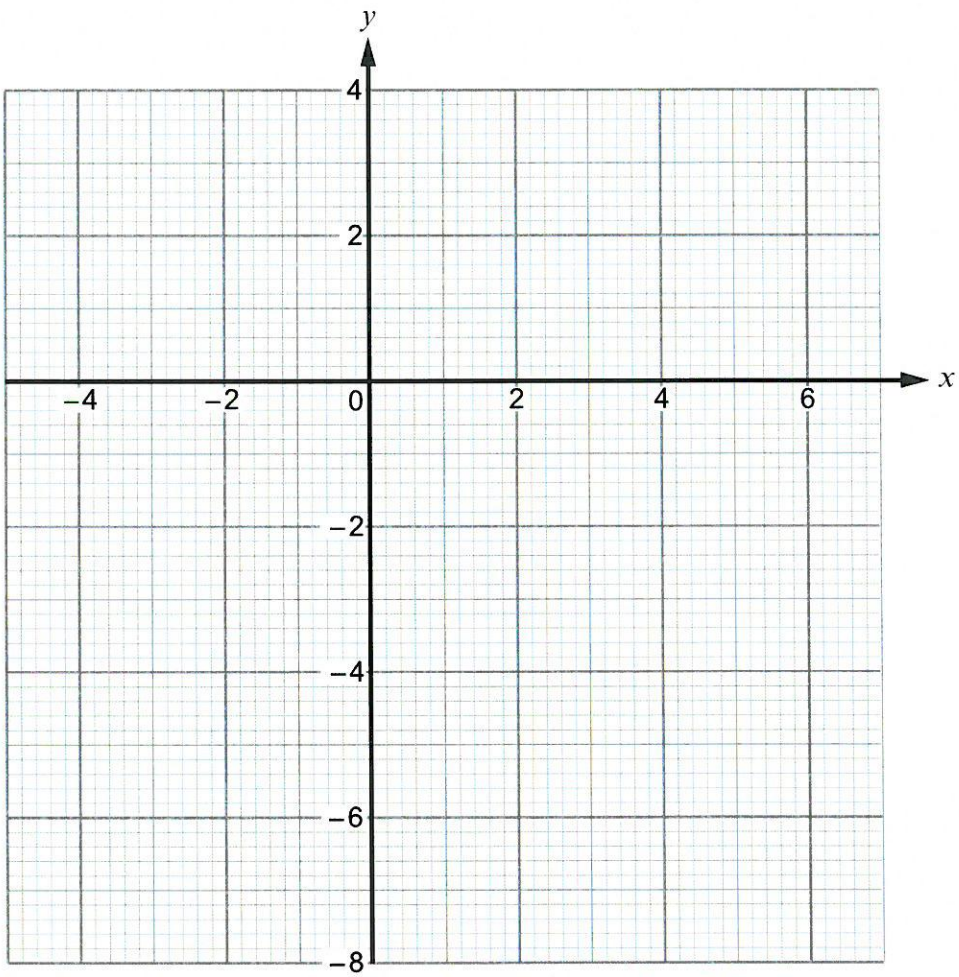
x	-4	-2	0	2	4	6
$y = x - 3$	-7		-3			3

(a) Complete the table above. [2]

.....

.....

(b) On the graph paper below, draw the graph of the straight line $y = x - 3$ for values of x **from -4 to 6 only.** [2]



Examiner only

(c) The straight line you have drawn on the graph for values of x **from –4 to 6** is a diagonal of a square.

Write down the coordinates of the four corners of this square. [2]

(..... , ...) (..... , ...) (..... , ...) (..... , ...)

4. A bag contains a number of different coloured balls.
A ball is selected at random from the bag.
The probability of selecting a blue ball is 0·3.

(a) Why is the following statement incorrect?
Explain your answer clearly. [1]

'More than half the balls in the bag are blue.'

.....

.....

(b) What is the probability that a ball selected at random from the bag is not blue? [1]

.....

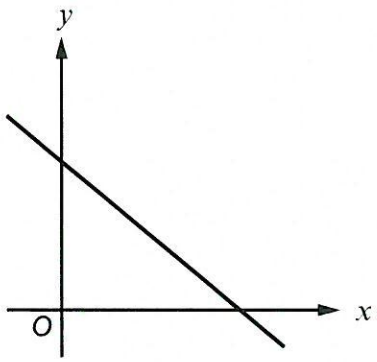
(c) There are 50 balls in the bag.
How many of them are blue? [2]

.....

.....

Examiner only

13. *(a)*



Which **one** of the following equations could represent the line shown in the graph above?
Circle your answer. [1]

$y = -x - 2$ $y = -x + 2$ $y = x + 2$ $y = x - 2$ $y = -x.$

(b) Which **one** of the following points lies on the line $2y = 3x + 4$?
Circle your answer. [1]

(2, –5) (5, 2) (–2, 5) (2, 5) (–2, –5)

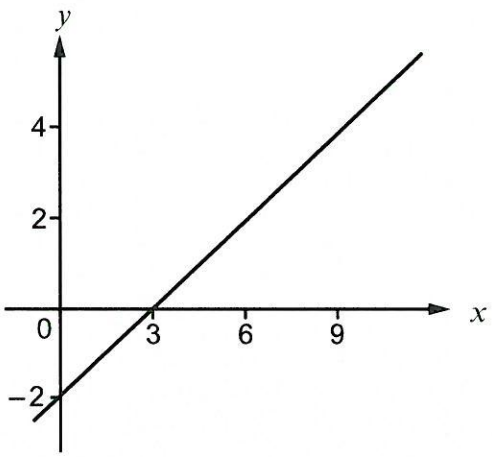
.....

.....

.....

.....

(c)

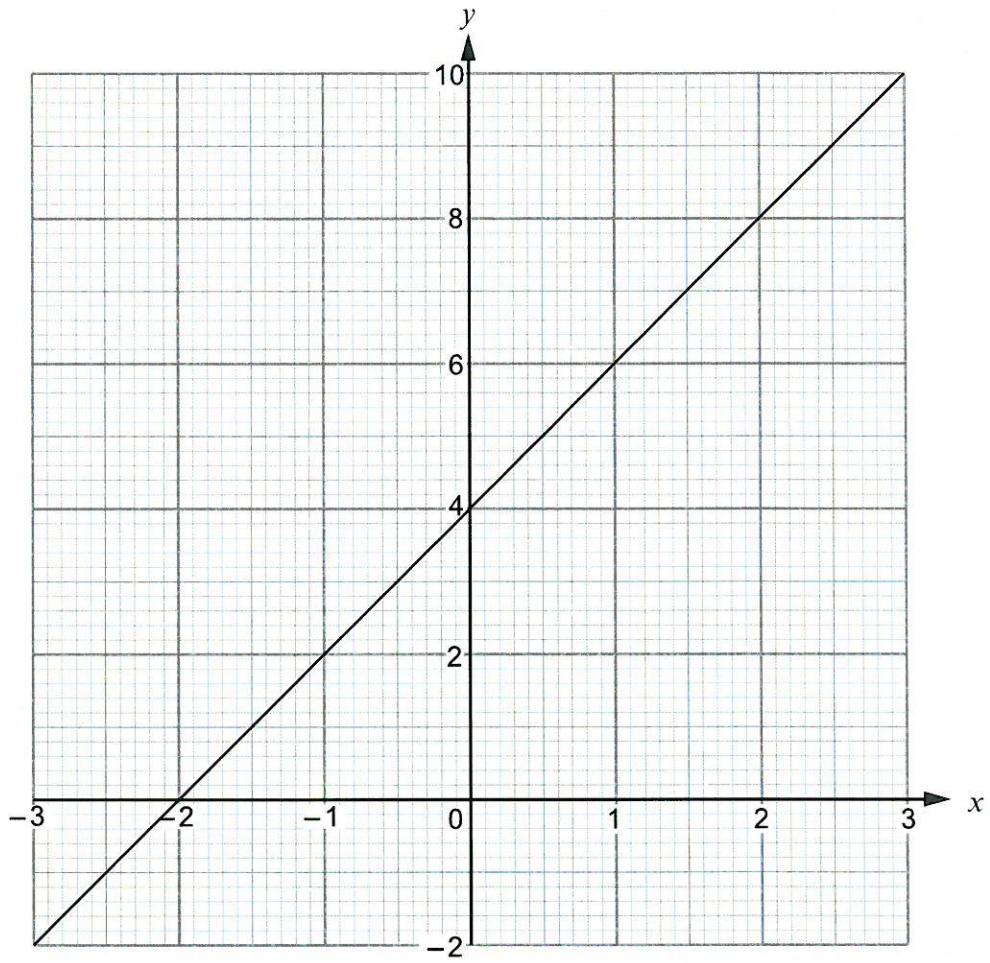


What is the gradient of the line shown in the graph above?
Circle your answer. [1]

$\frac{3}{2}$ $-\frac{3}{2}$ $\frac{2}{3}$ $-\frac{2}{3}$ -6

Examiner only

15. *(a)* The diagram below shows the graph of a straight line for values of x from −3 to 3.



(i) Write down the gradient of the above line. [1]

.....

(ii) Write down the equation of the line in the form $y = mx + c$, where m and c are whole numbers. [2]

.....

(b) Without drawing, show that the line $2y = 5x - 3$ is parallel to the line $4y = 10x + 7$. You must show working to support your answer. [2]

.....

.....

.....

.....

Examiner only

11. The table below shows some of the values of $y = x^2 - 5x + 2$, for values of x from -1 to 5.

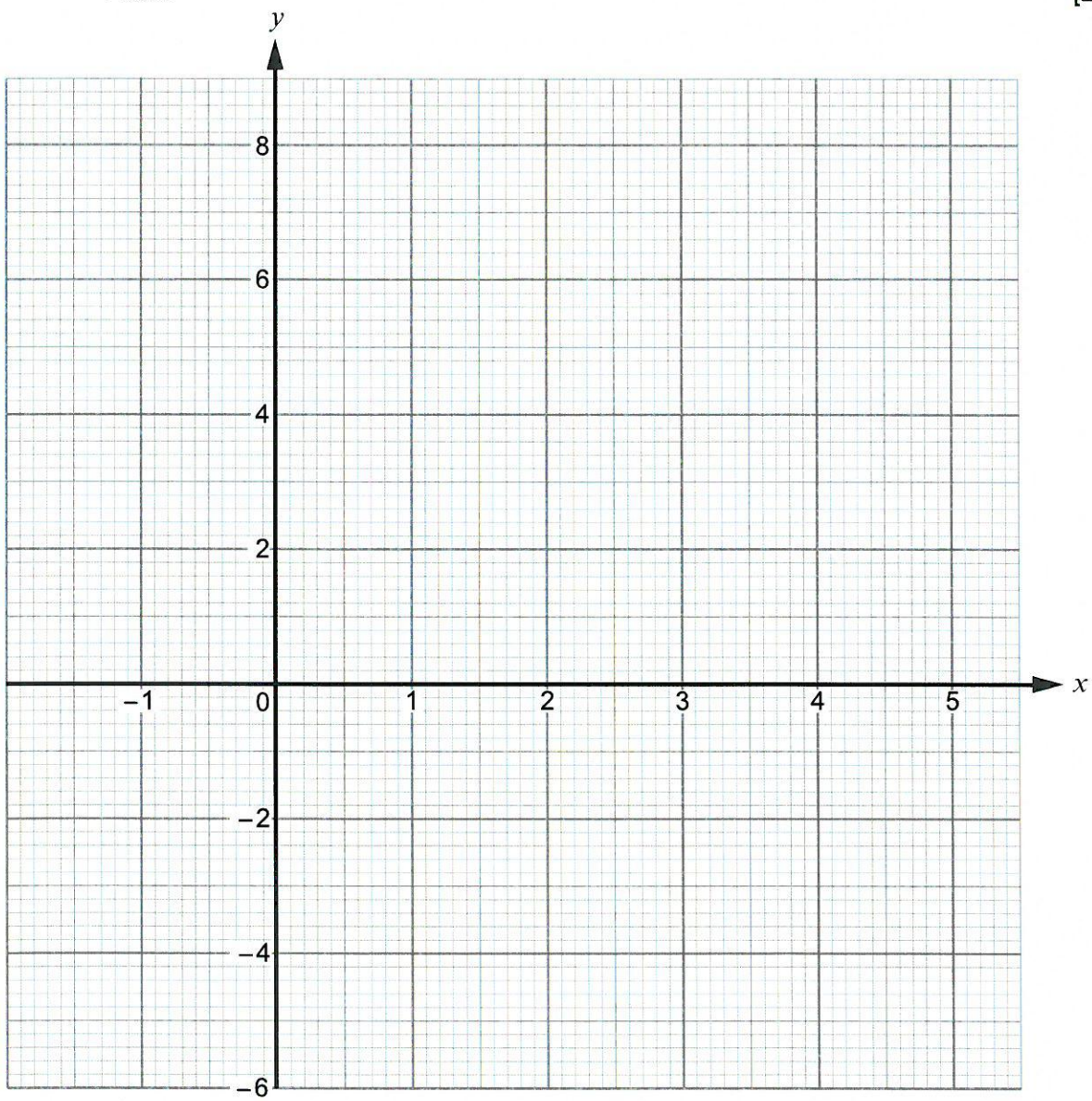
x	-1	0	1	2	3	4	5
$y = x^2 - 5x + 2$	8	2	-2	-4		-2	2

(a) Complete the table above. [1]

.....

.....

(b) On the graph paper below, draw the graph of $y = x^2 - 5x + 2$ for values of x from -1 to 5. [2]



Examiner only

(c) Draw the line $y = -3$ on the graph paper.

Write down the values of x where the line $y = -3$ cuts the curve $y = x^2 - 5x + 2$.
Give your answers correct to 1 decimal place. [2]

Values of x are ..... and .....

12. (a) Express 700 as a product of its prime factors in index form. [3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(b) The number 33 554 432 is equal to 2^{25}.

Explain how this tells you that 33 554 432 is not a square number. [1]

.....

.....

.....

I III Nov 2016

Examiner only

11. *(a)* The table below shows some of the values of $y = 2x^2 - 5x - 1$ for values of x from –2 to 4.

Complete the table by finding the value of y for $x = -1$ and for $x = 2$. [2]

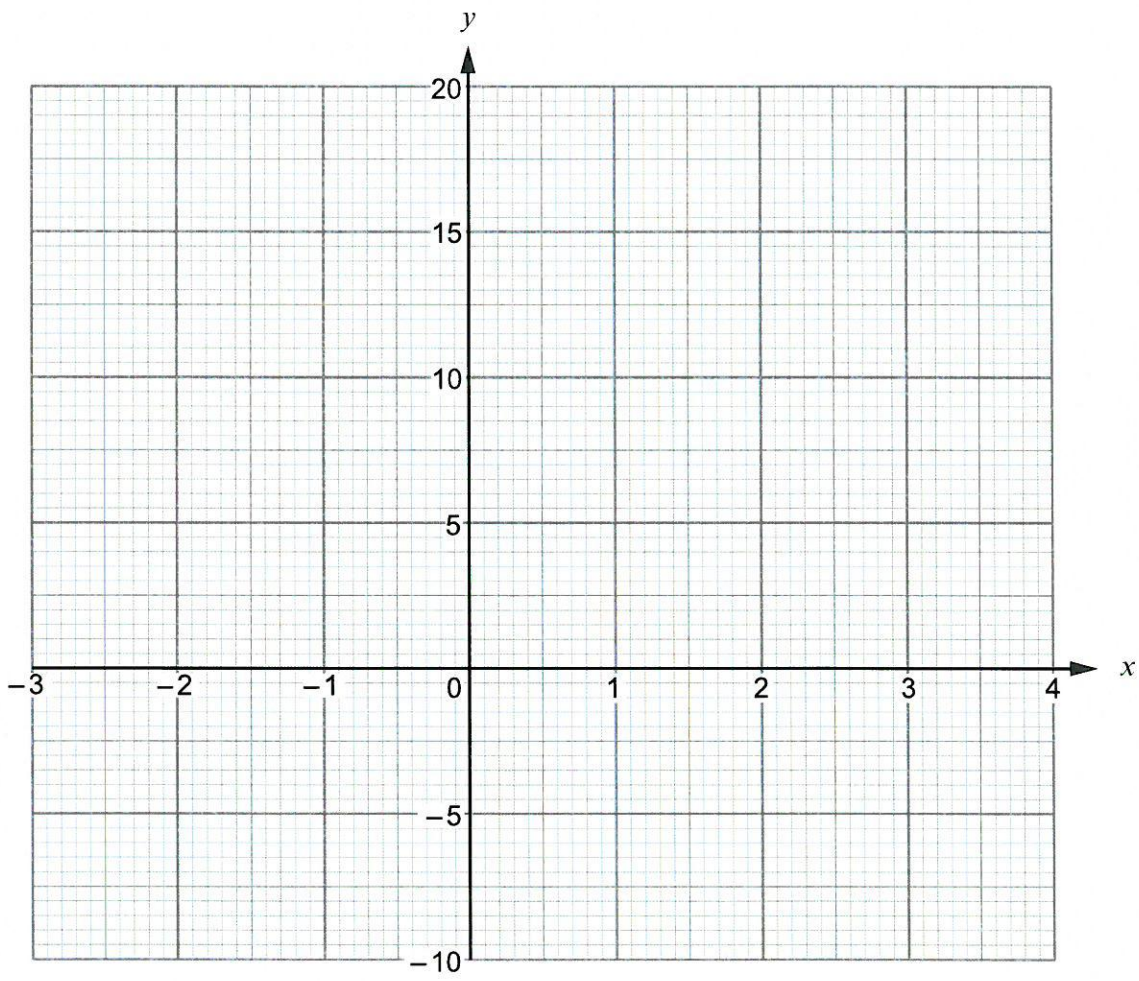
x	–2	–1	0	1	2	3	4
$y = 2x^2 - 5x - 1$	17		–1	–4		2	11

.....

.....

.....

(b) Draw the graph of $y = 2x^2 - 5x - 1$ for values of x from –2 to 4.
Use the graph paper below. [2]



Examiner only

(c) Draw the line $y = 5$ on the graph paper.

Write down the values of x where the line $y = 5$ cuts the curve $y = 2x^2 - 5x - 1$.
Give your answers correct to 1 decimal place. [2]

Values of x are ..... and .....

(d) Circle the equation below whose solutions are the values you have given in *(c)*. [1]

$2x^2 - 5x - 1 = 0$ $\quad$ $2x^2 - 5x - 6 = 0$ $\quad$ $2x^2 - 5x - 5 = 0$

$2x^2 - x - 1 = 0$ $\quad$ $2x^2 - 5x + 4 = 0$

.....

.....

.....

Algebra and Solving Equations

F U2 Nov 2016

Examiner only

5. *(a)* Circle the correct answer for the following statement. [1]

$5a + 4a - a$ can be simplified as

9 $\quad$ $5a + 4$ $\quad$ $8a$ $\quad$ 8 $\quad$ $9a$

(b) A linear sequence of numbers is shown below.
Two of the numbers are missing.

19, ... , ... , 7, 3

Fill in the missing numbers in the sequence.
Write down the rule for finding the next term in the sequence. [2]

.....

.....

Rule: .....

Examiner only

7. Solve these equations.

(a) $6x = 42$ [1]

(b) $x + 9 = 28$ [1]

(c) $14 - x = 8$ [1]

F maths NOV 2017 42

Examiner only

8. Write 4·47367 correct to:

(a) 1 decimal place [1]

.....

(b) the nearest whole number [1]

.....

9. Circle the correct answer for each of the following statements.

(a) $x + x + x + x + 2x$ can be simplified to [1]

$6x$ x^6 $2x^6$ 6^x $5x$

(b) When $t = 185$, the value of $21t$ is [1]

$185t$ 21 185 18 521 206 3 885

3300U201 09

F+I June 2017 U3

Examiner only

1. *(a)* Write down the next two numbers in the following sequence. [2]

35, 25, 16, 8, ..., ...

(b) Find the value of $2x + 7y$ when $x = -3$ and $y = 10$. [2]

(c) Simplify the expression $8k + 3m - 2k - 8m$. [2]

2. Write down 0·4, 15% and $\frac{7}{20}$ in ascending order.

You must show all your working. [3]

....

Smallest value ⟶ Greatest value

Turn over.

Examiner only

2. Circle either TRUE or FALSE for each of the following statements. [3]

The expression $g \times g \times g$ can be written as $3g$	TRUE	FALSE
The expression $7y - y$ can be written as 7	TRUE	FALSE
$\frac{a}{4} \div a = \frac{1}{4}$	TRUE	FALSE
$\frac{a}{2} + \frac{a}{2} = a$	TRUE	FALSE
When $a = 1$, $b = 2$ and $c = 3$, $a + b + c = abc$	TRUE	FALSE

Space for working:

Examiner only

1. *(a)* Solve $\frac{x}{4} = 7$. [1]

(b) Simplify $3f + 7g + f - 4g$. [2]

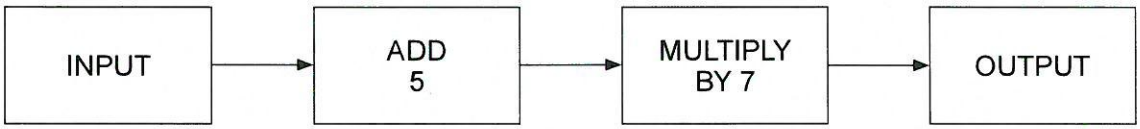
(c) Use the formula $5p + 2q = t$ to find the value of q when $p = 4$ and $t = 24{\cdot}6$. [3]

f+1 U2 Nov 2016

Examiner only

4. *(a)* Solve the equation $3x - 2 = 10$. [2]

(b) A number machine is shown below.



(i) Calculate the OUTPUT when the INPUT is −2. [1]

(ii) Write down an expression for the OUTPUT when the INPUT is n. [2]

3300U401 05

F+I maths June 2018 U1

Examiner only

6. *(a)* The table below shows the first five terms of a sequence of numbers.

Term	t_1	t_2	t_3	t_4	t_5
Value	2	5	8	11	14

Circle the correct equation that connects terms t_6 and t_7. [1]

$t_6 = t_7 + 3$ $\quad t_7 = t_6 + 14$ $\quad t_7 - t_6 = 1$ $\quad t_7 = t_6 - 3$ $\quad t_7 = t_6 + 3.$

I only

(b) The nth term of another sequence is given by $2n - 11$.

Write down the value of,

(i) the 10th term, [1]

(ii) the 3rd term. [1]

3300U301
07

F+I U2 June 2017

Examiner only

6. *(a)* Write down the first three terms of the sequence whose nth term is given by $2n - 5$. [2]

.....

.....

.....

.....

The first three terms are ..... , ... and .....

(b) Write down an expression for the nth term of the following sequence. [2]

7, 11, 15, 19, ...

.....

.....

.....

Examiner only

7. *(a)* Solve these equations.

(i) $7x = 56$ [1]

(ii) $y + 19 = 83$ [1]

(b) Simplify the expression $12k - 15k + 7k$. [1]

8. *(a)* Write down the value of 9^2. [1]

(b) Work out $1{\cdot}2 \times 70$. [1]

F+I U1 Nov 2016

Examiner only

7. Solve each of the following equations.

(a) $\frac{w}{5} = 10$ [1]

(b) $\frac{42}{x} = 7$ [1]

(c) $13y - 5 = 9y + 27$ [3]

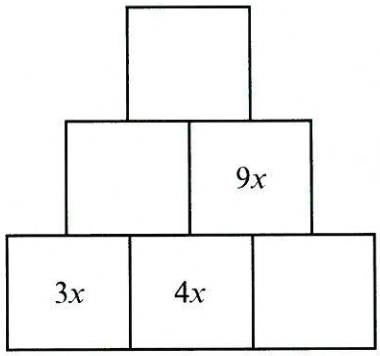
F maths June 2018 U1

Examiner only

8. Look at the diagram below.
The term in each square in the top two rows is found by using the following rule:

The term in any square is the sum of the terms in the two squares below it.

Some terms are already shown.
Use the rule to write down the missing terms in the three empty squares. [3]



Space for working:

.....

.....

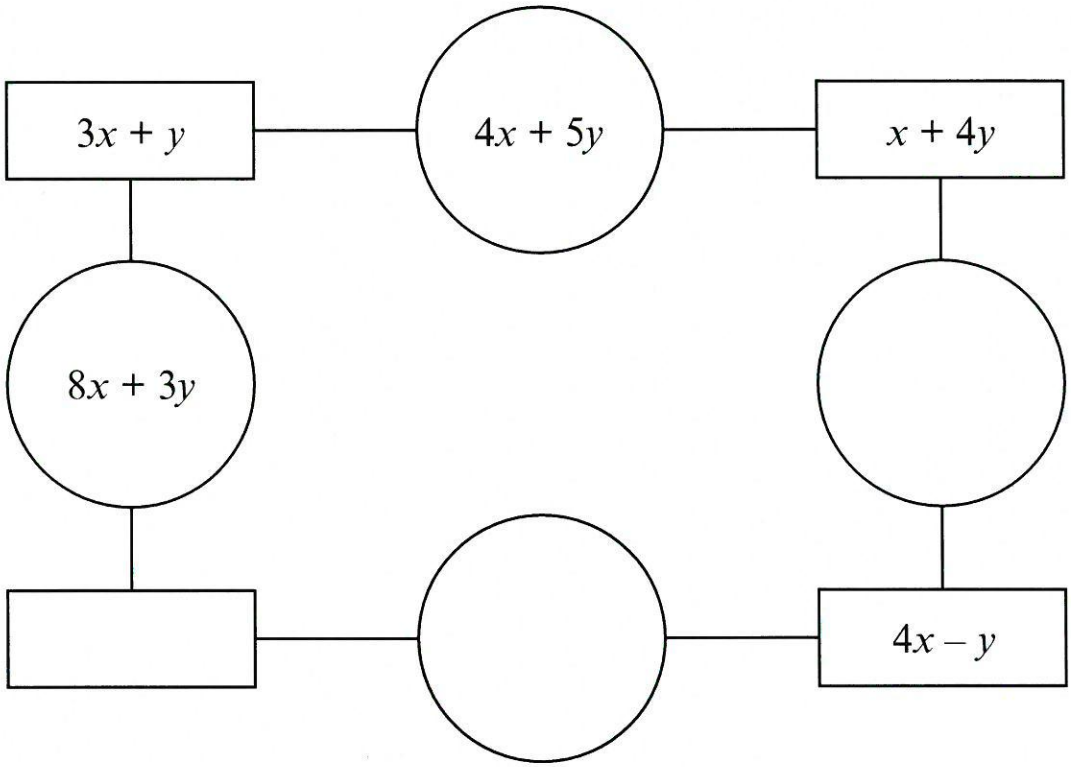
.....

3300U1101
11

f + I U2 June 2017

Examiner only

9. Look at the diagram below.
The expression in each circle is found by **adding** the expressions in the rectangles on either side of the circle.
Complete the diagram by writing expressions in the blank circles and the blank rectangle.
You must simplify your expressions. [3]



Working space: .....

.....

.....

.....

.....

.....

3300U401
09

Turn over.

F+1 U2 Nov 2016 9

Examiner only

10. *(a)* Write down the nth term of the following sequence. [2]

3, 4, 5, 6, ...

.....

.....

.....

.....

(b) The nth term of a different sequence is given by $n^2 + 7$.

(i) Write down the first three terms of this sequence. [2]

.....

.....

.....

1st term = ... 2nd term = ... 3rd term = ...

(ii) Which **term** in this sequence is the first that has a value greater than 85? [2]

.....

.....

.....

.....

Answer = ... term.

3300U401
09

Examiner only

5. *(a)* Write down the next two numbers in the following sequence. [2]

22 21 18 13 ....

.....

.....

(b) Expand $5(3x - 2)$. [1]

.....

(c) Solve $9x + 3 = 4x + 5$. [3]

.....

.....

.....

.....

.....

3300U301
07

I U2 Nov 2016

Examiner only

12. Circle the correct answer for each of the following.

(a) $x^3 \times x^6 =$ [1]

x^{36} $x^{0.5}$ x^2 x^9 x^{18}

.....

(b) $(7x - 5y) - (3x + 2y) =$ [1]

$4x - 3y$ $4x - 7y$ $4x + 3y$ $-4x + 7y$ $-4x - 7y$

.....

.....

(c) A car travels x miles in 30 minutes.
Its average speed in miles per hour is [1]

$\frac{x}{2}$ $\frac{x}{30}$ $2x$ $\frac{2}{x}$ $30x$

.....

.....

I U2 June 2017

Examiner only

13. A solution to the equation

$$x^3 - 2x - 45 = 0$$

lies between 3 and 4.

Use the method of trial and improvement to find this solution correct to 1 decimal place. You must show all your working. [4]

Examiner only

13. A solution to the equation

$$2x^3 - 3x - 17 = 0$$

lies between 2 and 3.

Use the method of trial and improvement to find this solution correct to 1 decimal place. You must show all your working. [4]

Examiner only

17. Solve the following simultaneous equations using an algebraic (not graphical) method. [4]

$$3x + 4y = 7$$
$$2x - 3y = 16$$

Examiner only

18. *(a)* Factorise $x^2 - 2x - 24$, and hence solve $x^2 - 2x - 24 = 0$. [3]

(b) Solve the equation $\frac{4x-3}{2} + \frac{7x+1}{6} = \frac{29}{2}$. [4]

END OF PAPER

Inequalities

I U1 Nov 2016

Examiner only

17. William has n marbles.
Lois had 4 times as many marbles as William, but she has now lost 23 of them.

Lois still has more marbles than William.

Write down an inequality in terms of n to show the above information.
Use your inequality to find the least number of marbles that William may have. [4]

END OF PAPER

Examiner only

18. Calculate the value of $(5{\cdot}41 \times 10^5) + (2{\cdot}3 \times 10^4)$.
Give your answer in standard form. [2]

19. Rashid owned n sheep.
Eifion had exactly 4 times as many sheep as Rashid.

Rashid buys 17 extra sheep.
Eifion sells 8 of his sheep.

Eifion still has more sheep than Rashid.

Form an inequality, in terms of n.
Solve the inequality to find the **least** value of n.
You must show all your working. [5]

END OF PAPER