

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE – NEW**

3300U40-1



A16-3300U40-1

**MATHEMATICS  
UNIT 2: CALCULATOR-ALLOWED  
INTERMEDIATE TIER**

THURSDAY, 10 NOVEMBER 2016 – MORNING

1 hour 45 minutes

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.  
A ruler, a protractor and a pair of compasses may be required.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.  
You may use a pencil for graphs and diagrams only.  
Write your name, centre number and candidate number in the spaces at the top of this page.  
Answer **all** the questions in the spaces provided.  
If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.  
Take  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

**INFORMATION FOR CANDIDATES**

You should give details of your method of solution when appropriate.  
Unless stated, diagrams are not drawn to scale.  
Scale drawing solutions will not be acceptable where you are asked to calculate.  
The number of marks is given in brackets at the end of each question or part-question.  
In question 9, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	3	
3.	3	
4.	5	
5.	3	
6.	3	
7.	4	
8.	2	
9.	6	
10.	6	
11.	7	
12.	3	
13.	4	
14.	6	
15.	5	
16.	4	
17.	5	
18.	7	
<b>Total</b>	<b>80</b>	

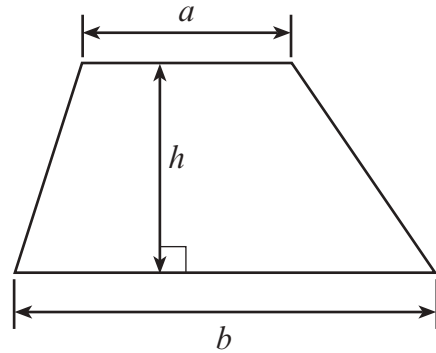
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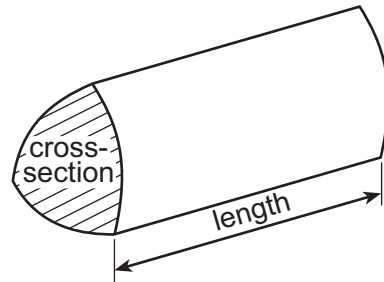
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## Formula List – Intermediate Tier

**Area of trapezium**  $= \frac{1}{2} (a + b)h$



**Volume of prism** = area of cross-section  $\times$  length



1. Using only the numbers in the following list,

57    58    59    60    61    62    63    64    65

write down

(a) a prime number, [1]

.....

(b) a cube number, [1]

.....

(c) a factor of 186, [1]

.....

(d) a multiple of 7.25. [1]

.....

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

(a) One angle in a right-angled triangle is  $60^\circ$ .  
One of the other angles must be

$180^\circ$      $30^\circ$      $120^\circ$      $60^\circ$      $360^\circ$ . [1]

.....

(b) Three of the angles in a quadrilateral add up to  $250^\circ$ .  
The size of the fourth angle is

$70^\circ$      $360^\circ$      $180^\circ$      $110^\circ$      $125.5^\circ$ . [1]

.....

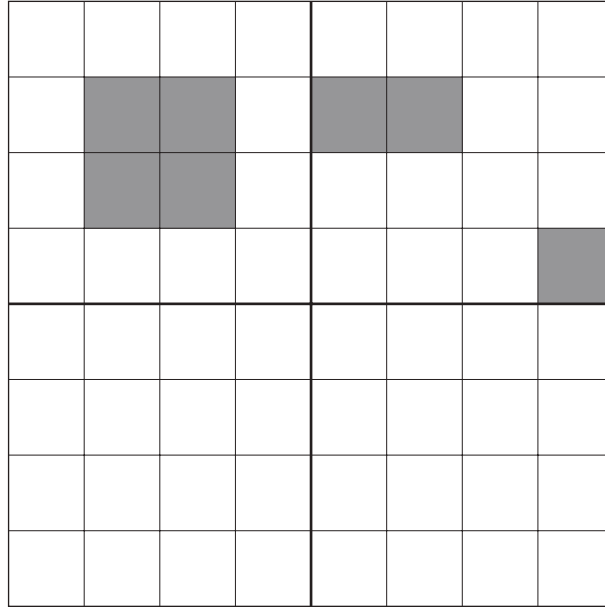
(c) Huw is facing North.  
He turns **clockwise** until he is facing West.  
He has turned through an angle of

$270^\circ$      $3^\circ$      $90^\circ$      $0.75^\circ$      $9^\circ$ . [1]

.....



3. Shade the least number of squares in the lower two quadrants so that the grid has rotational symmetry of order 2. [3]



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

[2]

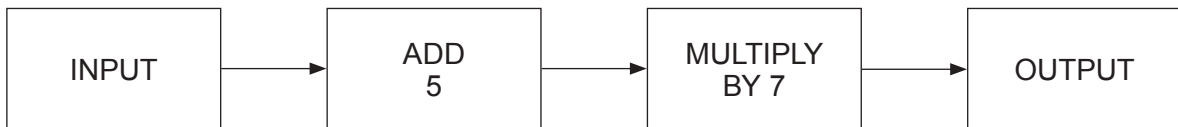
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(b) A number machine is shown below.



(i) Calculate the OUTPUT when the INPUT is  $-2$ .

[1]

.....

.....

(ii) Write down an expression for the OUTPUT when the INPUT is  $n$ .

[2]

.....

.....

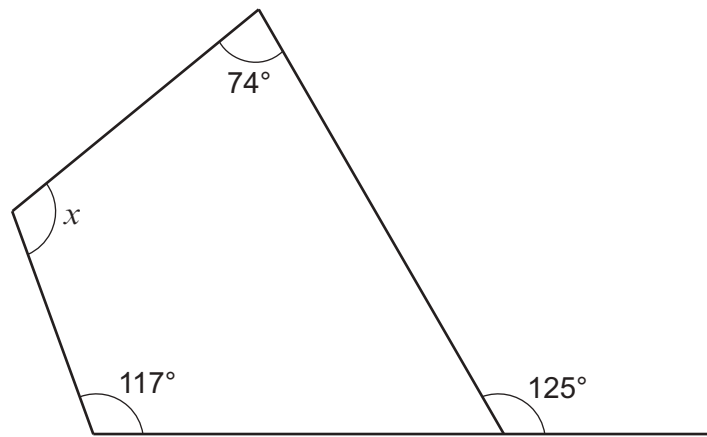


5. Complete each row of the following table.  
The first row has been done for you.

[3]

Place	Temperature at midday	Change	Temperature at following midday
Holyhead	$-1^{\circ}\text{C}$	Up $3^{\circ}\text{C}$	$2^{\circ}\text{C}$
Dolgellau	$-3^{\circ}\text{C}$		$1^{\circ}\text{C}$
Cardigan	$2^{\circ}\text{C}$	Down $3^{\circ}\text{C}$	
Newport		Up $2^{\circ}\text{C}$	$-2^{\circ}\text{C}$

- 6.



*Diagram not drawn to scale*

Find the size of angle  $x$ .

[3]

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$$x = \text{.....}^{\circ}$$

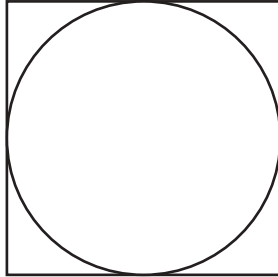




9. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

A square has a perimeter of 80 cm.

A circle fits exactly inside the square, as shown in the diagram.



Calculate the circumference of the circle.

Give your answer correct to 1 decimal place.

You must show your working.

[4 + 2 OCW]

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10. (a) Write down the  $n$ th term of the following sequence. [2]

3, 4, 5, 6, .....

.....  
.....  
.....  
.....

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

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

.....  
.....  
.....

1<sup>st</sup> term = ..... 2<sup>nd</sup> term = ..... 3<sup>rd</sup> term = .....

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

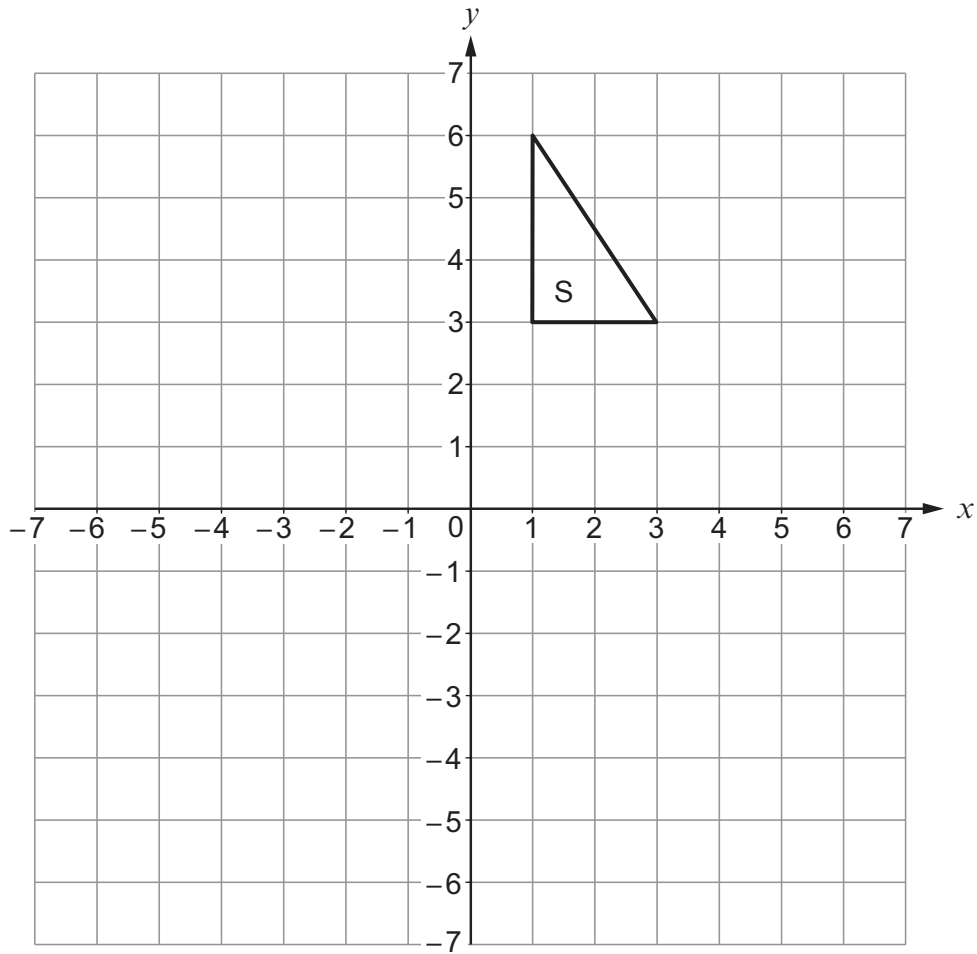
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Answer = ..... term.

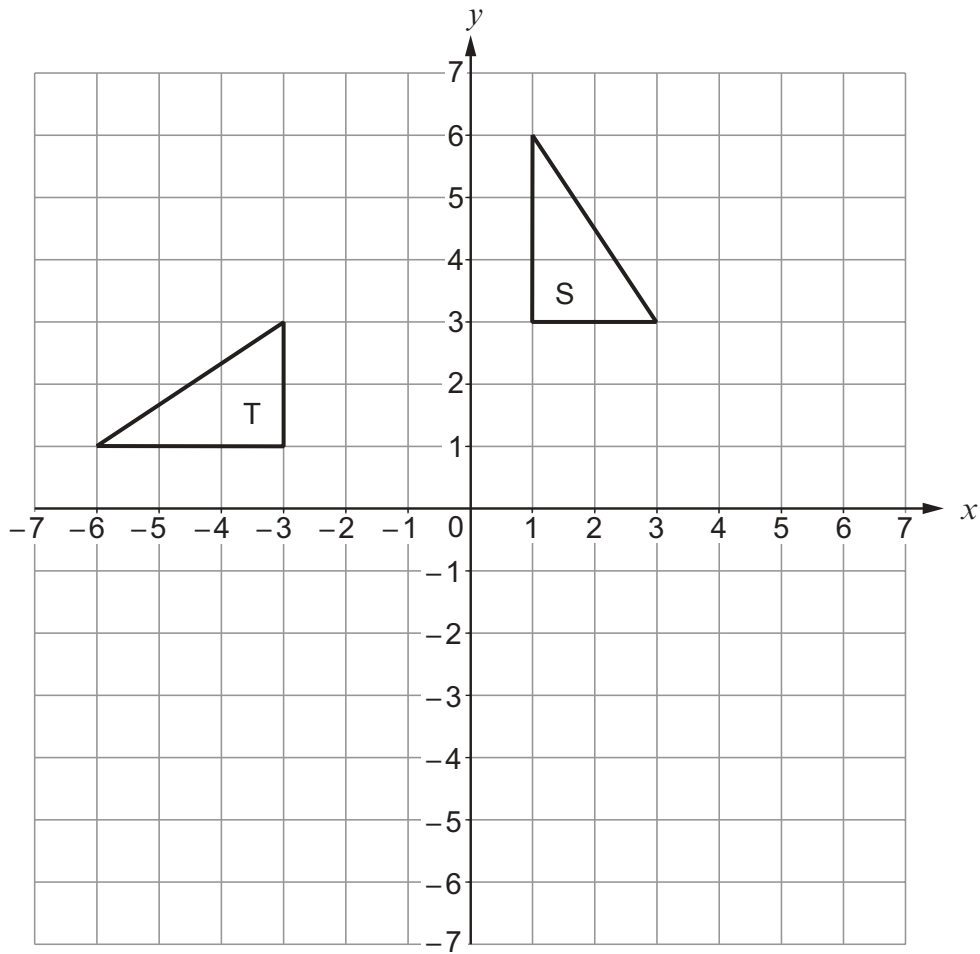


11. (a) Reflect the triangle S in the line  $y = 2$ .

[2]



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



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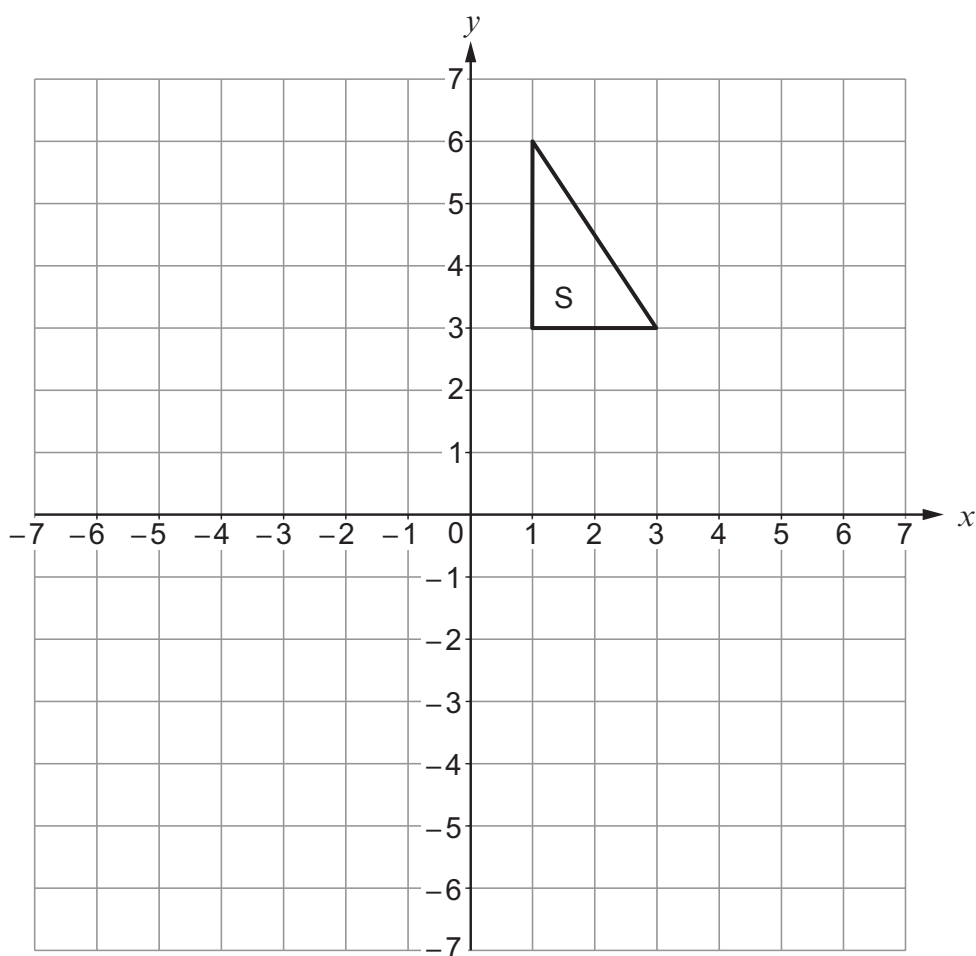
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- (c) (i) Translate the triangle S using the column vector  $\begin{pmatrix} -5 \\ -4 \end{pmatrix}$ .

[1]

Examiner  
only

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

[1]

.....



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]

$\frac{x}{2}$

$\frac{x}{30}$

$2x$

$\frac{2}{x}$

$30x$

.....

.....





14. At a college, a total of 28 students study one or more of the science subjects: Biology, Chemistry and Physics.

The 28 students form the universal set,  $\mathcal{E}$ .

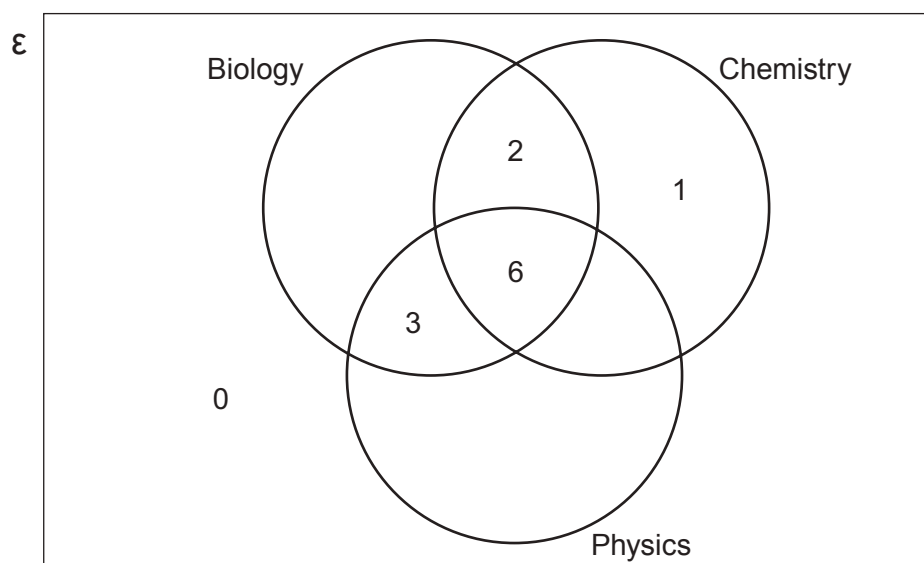
Some parts of the Venn diagram below have already been completed.

It is also known that:

- 5 students study only Biology
- 13 students study Chemistry

- (a) Complete the Venn diagram.

[3]



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- (b) How many students study Biology and Chemistry but not Physics?

[1]

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- (c) One of the students is chosen at random.  
What is the probability that this student studies Biology?

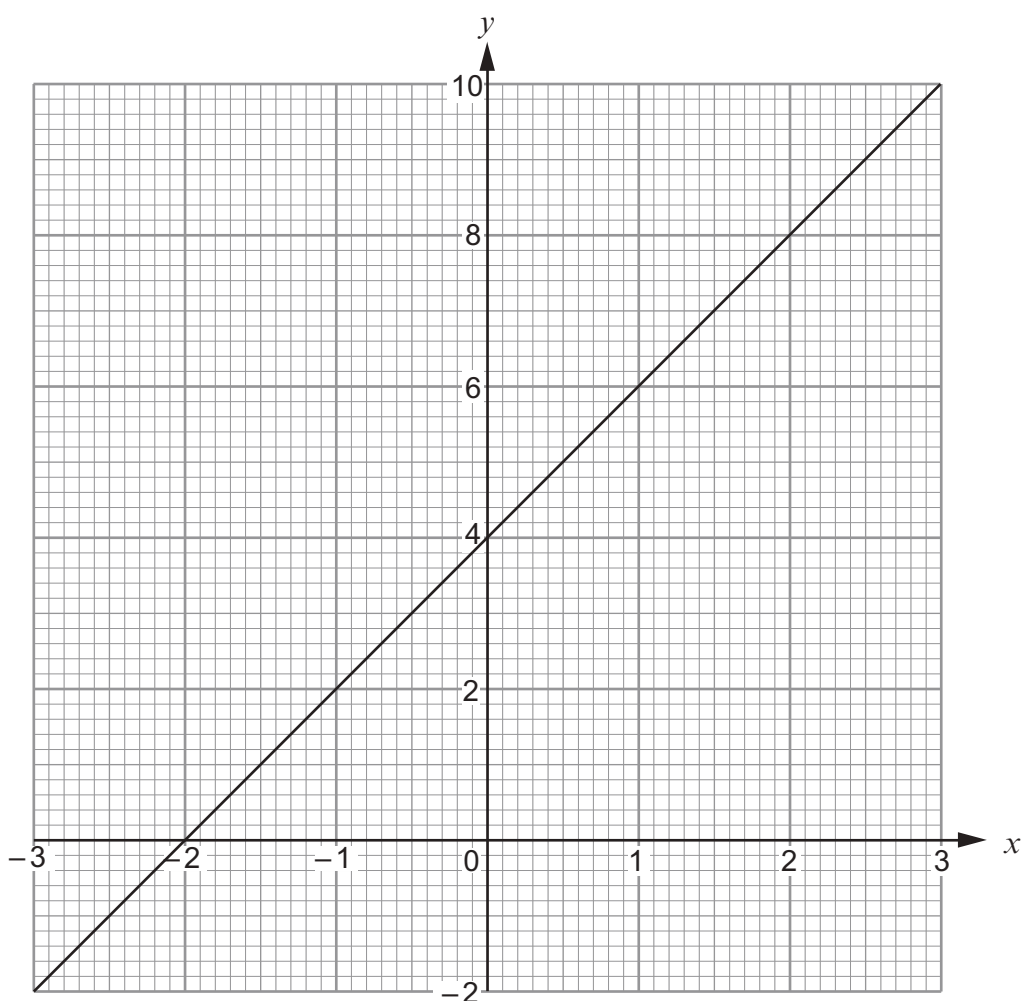
[2]

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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]

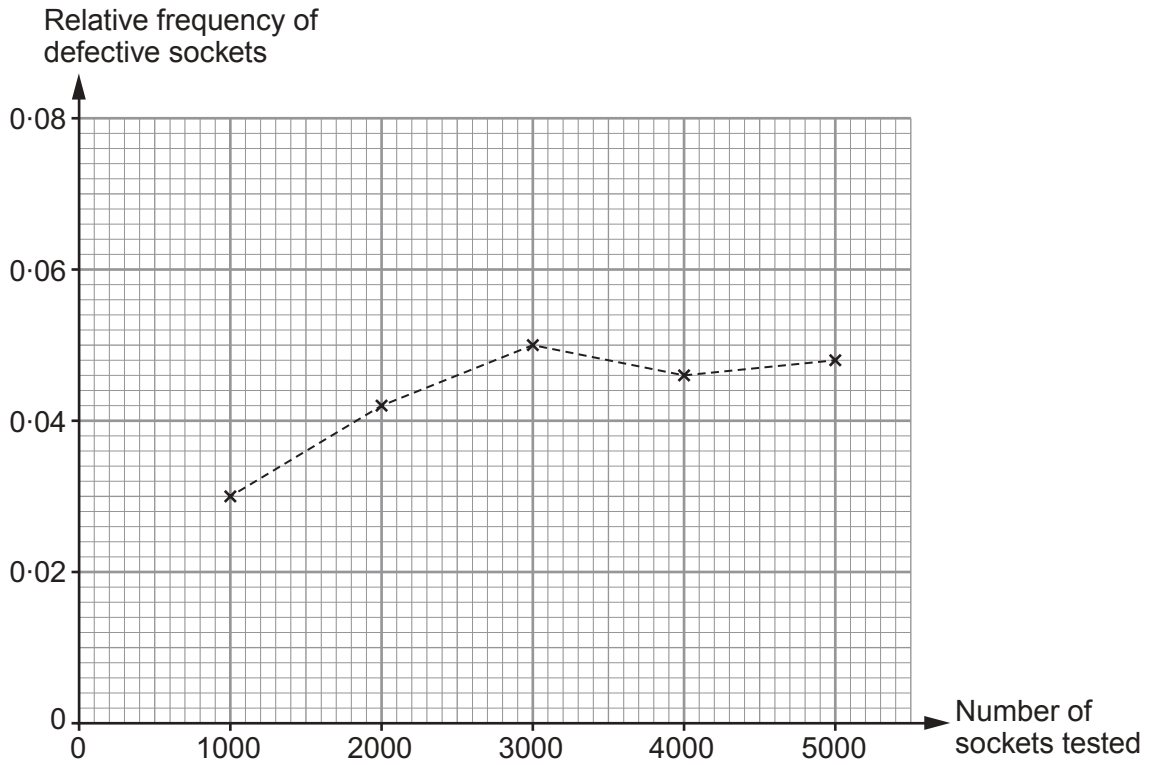
- (b) Without drawing, show that the line  $2y = 5x - 3$  is parallel to the line  $4y = 10x + 7$ . You must show working to support your answer. [2]





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]

.....

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- (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: .....

.....





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

[3]

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

[4]

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**END OF PAPER**

