



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/21**

Paper 2 (Extended)

**May/June 2021**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

## INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use either your calculator value or 3.142.

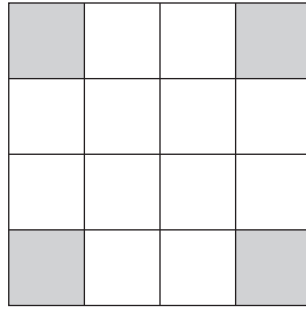
## INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Any blank pages are indicated.



1



(a) Write down the order of rotational symmetry of this diagram.

..... [1]

(b) On the diagram, draw all the lines of symmetry.

[2]

2 The probability that a train is late is 0.15 .

Write down the probability that the train is not late.

..... [1]

3 The stem-and-leaf diagram shows the number of hours that each of 16 students studied last week.

|   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1 | 2 | 5 | 6 | 8 |   |
| 2 | 0 | 1 | 1 | 7 | 9 |
| 3 | 2 | 3 | 4 | 5 |   |
| 4 | 4 | 5 | 7 |   |   |

Key: 1|2 represents 12 hours

Find

(a) the median,

..... h [1]

(b) the mode,

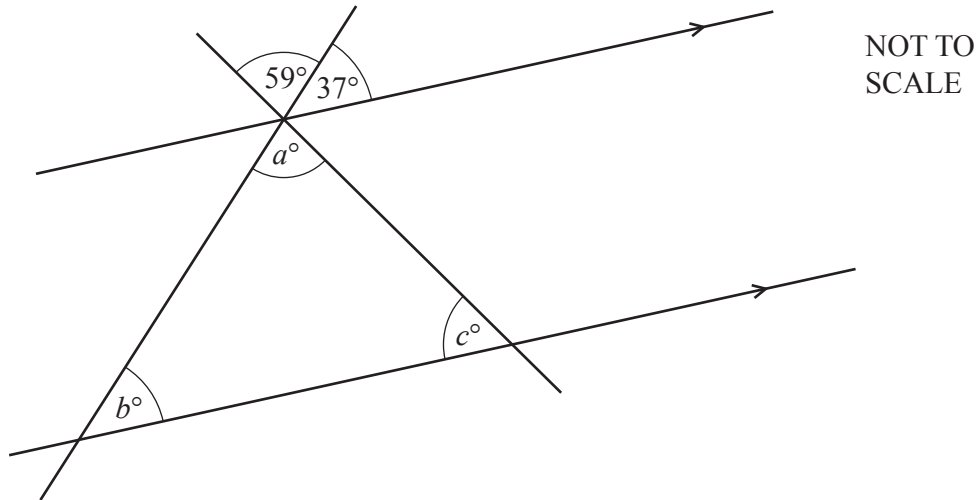
..... h [1]

(c) the range.

..... h [1]

3

4



The diagram shows two parallel lines intersected by two straight lines.

Find the values of  $a$ ,  $b$  and  $c$ .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots [3]$$

5 Work out.

(a)  $\begin{pmatrix} 6 \\ -5 \end{pmatrix} + \begin{pmatrix} 8 \\ -1 \end{pmatrix}$

$$\begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix} [1]$$

(b)  $3 \begin{pmatrix} -4 \\ 7 \end{pmatrix}$

$$\begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix} [1]$$

- 6 (a) The  $n$ th term of a sequence is  $n^2 + 3n$ .

Find the first three terms of this sequence.

....., ....., ..... [2]

- (b) These are the first five terms of a different sequence.

25    18    11    4    -3

Find the  $n$ th term of this sequence.

..... [2]

- 7 Solve the simultaneous equations.  
You must show all your working.

$$2x + y = 3$$

$$x - 5y = 40$$

$$x = .....$$

$$y = ..... [3]$$

8 Without using a calculator, work out  $1\frac{3}{8} - \frac{5}{6}$ .

You must show all your working and give your answer as a fraction in its simplest form.

..... [3]

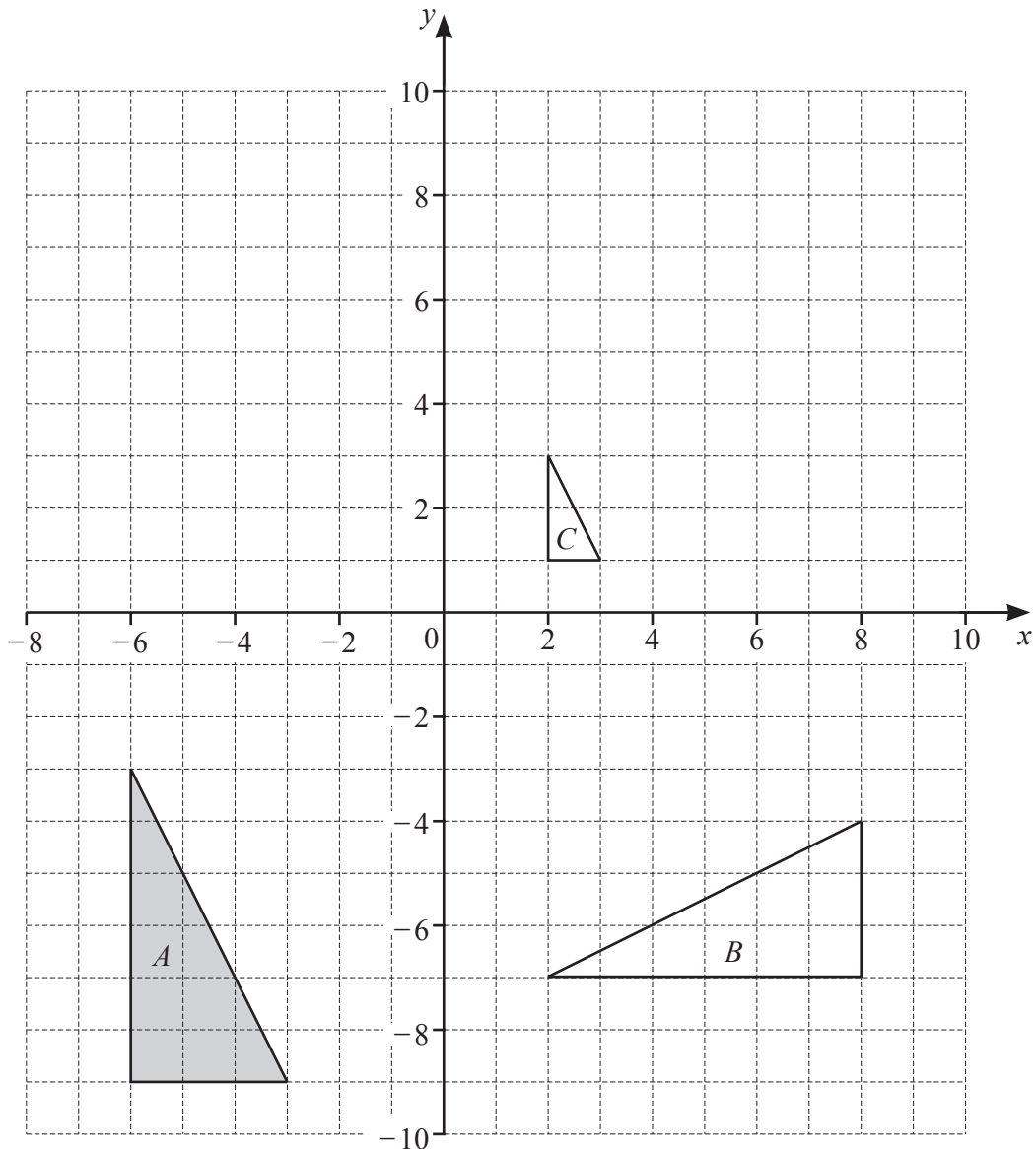
9  $A$  is the point  $(5, -5)$  and  $B$  is the point  $(9, 3)$ .

(a) Find the coordinates of the midpoint of  $AB$ .

(....., .....) [2]

(b) Find the length of  $AB$ .

..... [3]



(a) Describe fully the **single** transformation that maps

(i) triangle  $A$  onto triangle  $B$ ,

.....  
 ..... [3]

(ii) triangle  $A$  onto triangle  $C$ .

.....  
 ..... [3]

(b) Draw the image of triangle  $A$  after a translation by the vector  $\begin{pmatrix} 2 \\ 10 \end{pmatrix}$ . [2]

- 11 (a) Simplify fully.  
 $(4ab^5)^4$

..... [2]

(b)  $2p^{\frac{1}{3}} = 6$

Find the value of  $p$ .

$p =$  ..... [1]

(c)  $81^2 \div 3^t = 9$

Find the value of  $t$ .

$t =$  ..... [2]

- 12 The profit a company makes decreases exponentially at a rate of 0.9% per year.  
In 2014, the profit was \$9500.

Calculate the profit in 2019.

\$ ..... [2]

- 13 On a map, a lake has an area of  $32 \text{ cm}^2$ .  
The scale of the map is  $1 : 24\,000$ .

Calculate the actual area of the lake.  
Give your answer in  $\text{km}^2$ .

.....  $\text{km}^2$  [2]

- 14  $y$  is directly proportional to the square root of  $(x - 3)$ .  
When  $x = 28$ ,  $y = 20$ .

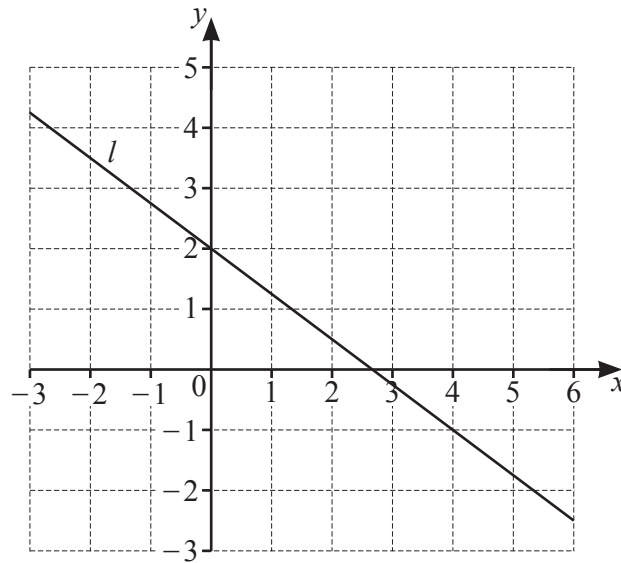
Find  $y$  when  $x = 39$ .

$y =$  ..... [3]

- 15 Make  $h$  the subject of the formula  $2mh = g(1 - h)$ .

$h =$  ..... [4]





- (a) Find the gradient of line  $l$ .

..... [2]

- (b) Find the equation of line  $l$  in the form  $y = mx + c$ .

$y =$  ..... [2]

- (c) Find the equation of the line that is perpendicular to line  $l$  and passes through the point  $(12, -7)$ .  
Give your answer in the form  $y = mx + c$ .

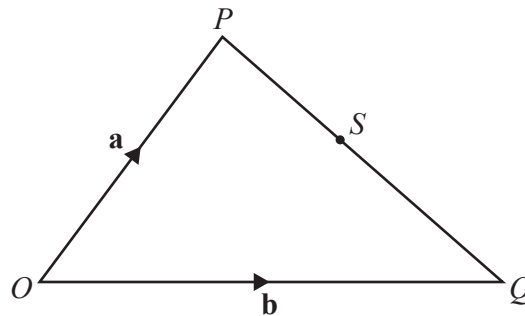
$y =$  ..... [3]

- 17 A bag contains 3 blue buttons, 8 white buttons and 5 red buttons.  
Two buttons are picked at random from the bag, without replacement.

Work out the probability that the two buttons are either both red or both white.

..... [3]

18



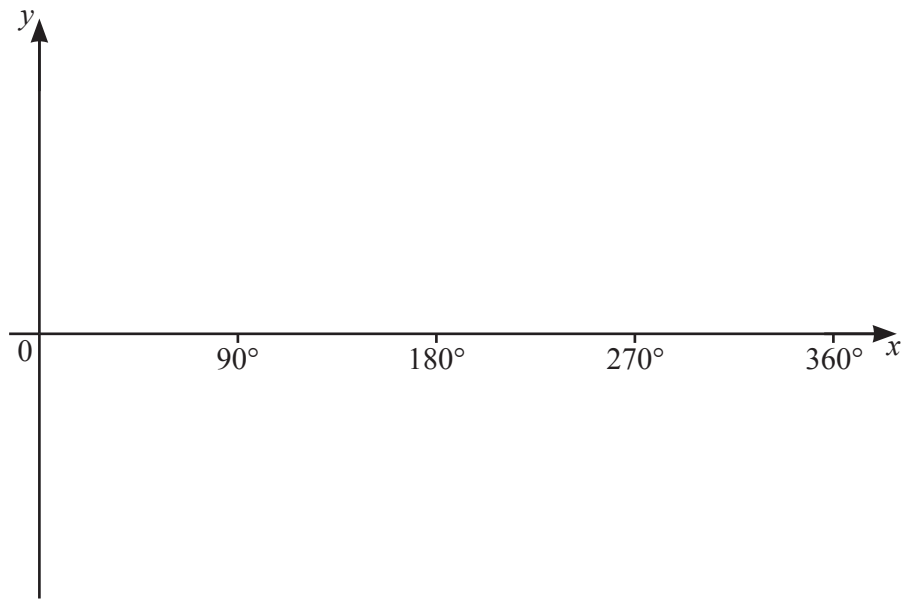
NOT TO  
SCALE

$S$  is a point on  $PQ$  such that  $PS : SQ = 4 : 5$ .

Find  $\overrightarrow{OS}$ , in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , in its simplest form.

$\overrightarrow{OS} = \dots\dots\dots$  [2]

- 19 (a) Sketch the graph of  $y = \tan x$  for  $0^\circ \leq x \leq 360^\circ$ .



[2]

- (b) Solve the equation  $5 \tan x = 1$  for  $0^\circ \leq x \leq 360^\circ$ .

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

- 20 The distance between two towns is 600 km, correct to the nearest 10 km.  
A car takes 8 hours 40 minutes, correct to the nearest 10 minutes, to travel this distance.

Calculate the lower bound for the average speed of the car in km/h.

$\dots\dots\dots$  km/h [3]

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