



# Cambridge IGCSE™

CANDIDATE  
NAME

--

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



**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

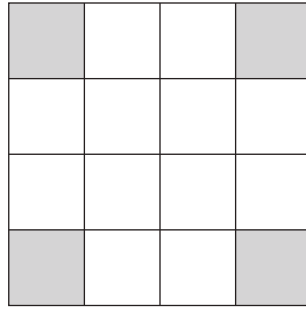
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction 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]

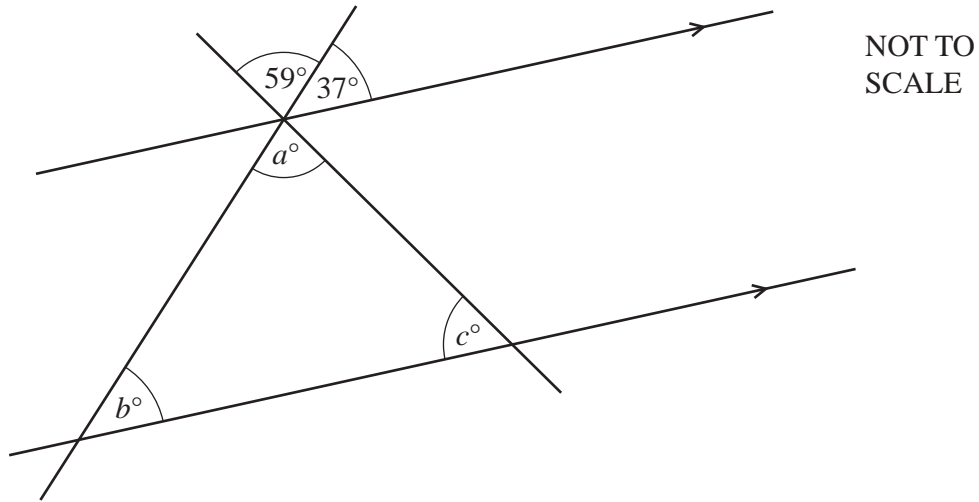
(b) the mode,

..... h [1]

(c) the range.

..... h [1]

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]

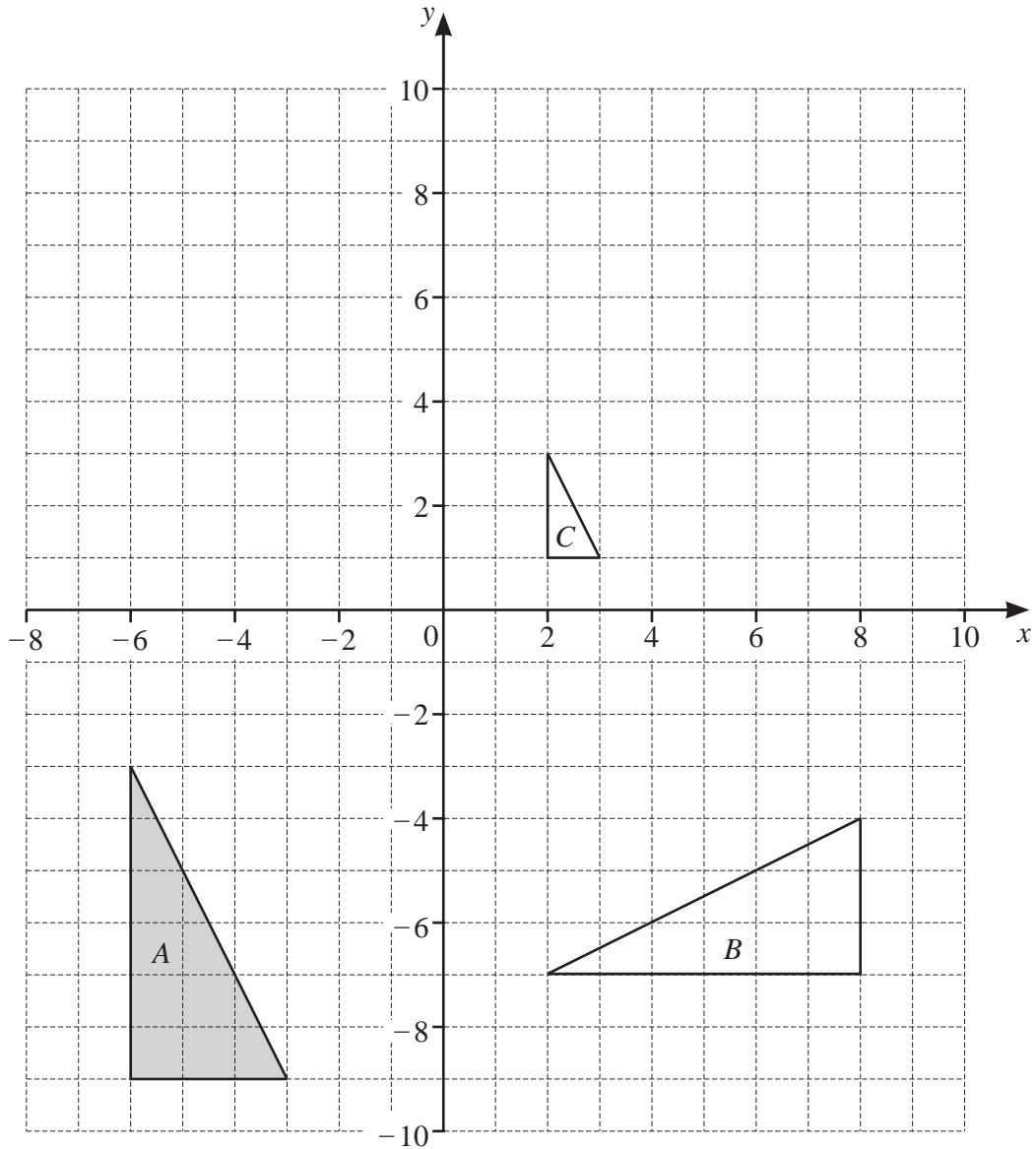
- 9  $A$  is the point  $(5, -5)$  and  $B$  is the point  $(9, 3)$ .

(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  $x = 39$ .

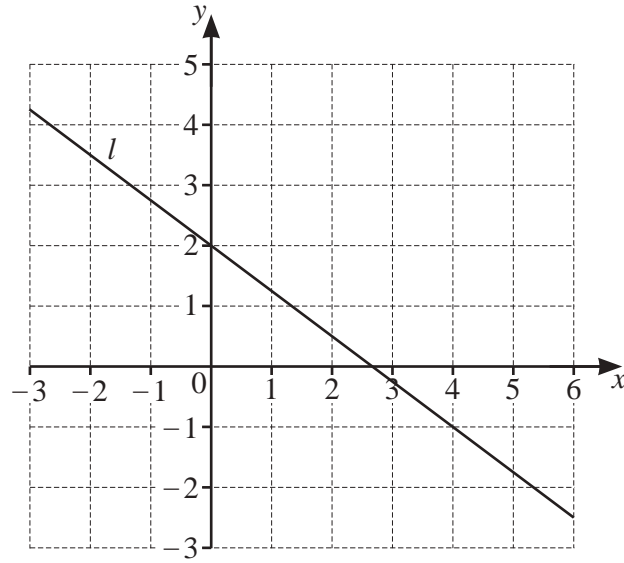
$y =$  ..... [3]

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

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



16



- (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  $y = mx + c$ .

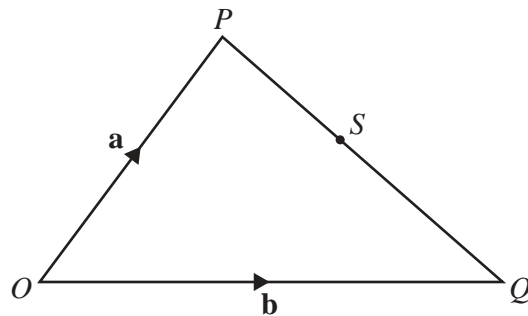
$y =$  ..... [3]

- 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



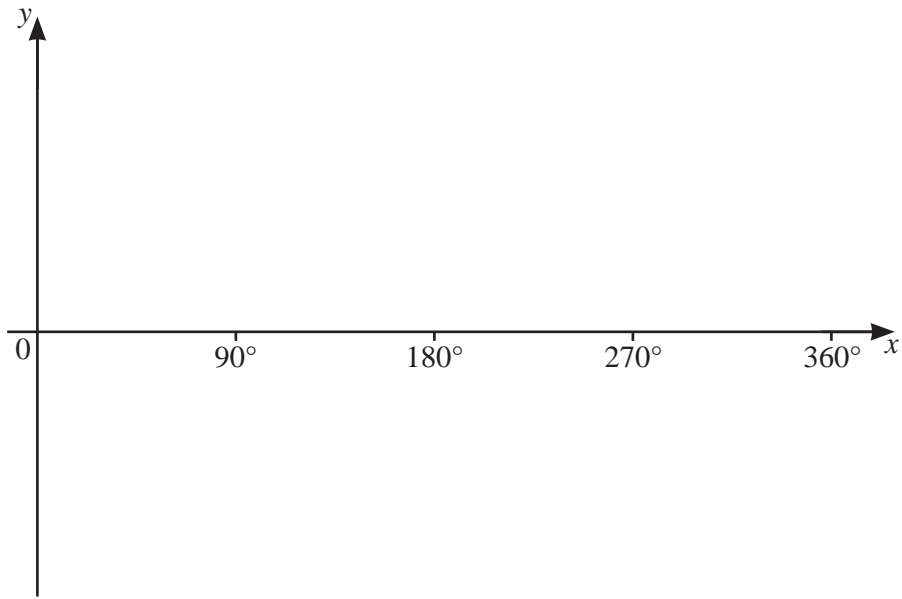
NOT TO  
SCALE

$S$  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.

$\overrightarrow{OS} =$  ..... [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]

**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.