Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8266886780 4

MATHEMATICS **0580/21**

Paper 2 (Extended) **October/November 2019**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 70.

This document consists of **11** printed pages and **1** blank page.

1 Work out 5% of $25.

$ ..... [1]

2 Factorise $5p + pt$.

..... [1]

3 Calculate.

$$\frac{16.379 - 0.879}{4.2} \times 1.241$$

Give your answer correct to 2 significant figures.

..... [2]

4 Write 15 060

(a) in words,

..... [1]

(b) in standard form.

..... [1]

5 Simplify $5c - d - 3d - 2c$.

..... [2]

6 Solve.

$$\frac{x-2}{3} = 3$$

$x =$ ..... [2]

7 Simplify $2x^3 \times 3x^2$.

..... [2]

8 **Without using a calculator**, work out $\frac{5}{16} \times 1\frac{1}{7}$.

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

..... [2]

9 Paula invests \$600 at a rate of r% per year simple interest.
At the end of 10 years, the total interest earned is \$90.

Find the value of r.

$r =$ ..... [2]

10 Simplify.

$$\left(\frac{x^3}{8}\right)^{-\frac{4}{3}}$$

..... [2]

11 $P = 2r + \pi r$

Rearrange the formula to write r in terms of P and π.

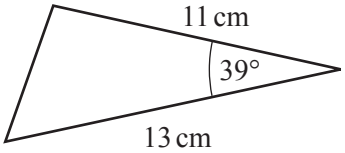
$r =$ ..... [2]

12 The sides of a square are 15.1 cm, correct to 1 decimal place.

Find the upper bound of the area of the square.

..... cm^2 [2]

13



NOT TO SCALE

Calculate the area of the triangle.

..... cm^2 [2]

14 The scale of a map is 1 : 10 000 000.
On the map, the area of Slovakia is 4.9 cm^2.

Calculate the actual area of Slovakia.
Give your answer in square kilometres.

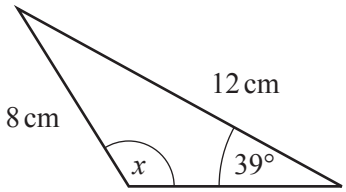
..... km^2 [3]

15 y is inversely proportional to x^2.
When $x = 4$, $y = 2$.

Find y when $x = \frac{1}{2}$.

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

16

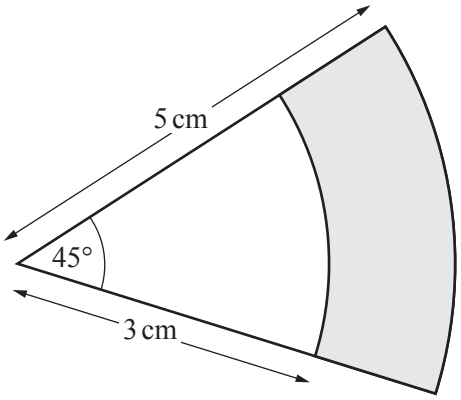


NOT TO SCALE

Calculate the **obtuse** angle x in this triangle.

$x =$ ..... [3]

17



NOT TO SCALE

The diagram shows two sectors of circles with the same centre.

Calculate the shaded area.

..... cm^2 [3]

18 Write $\frac{x}{2} - \frac{2x+4}{x+1}$ as a single fraction, in its simplest form.

..... [3]

19 $\mathbf{M} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ $\mathbf{P} = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$

(a) Find **MP**.

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

(b) Find $|\mathbf{M}|$.

..... [1]

20 The probability that the school bus is late is $\frac{9}{10}$.

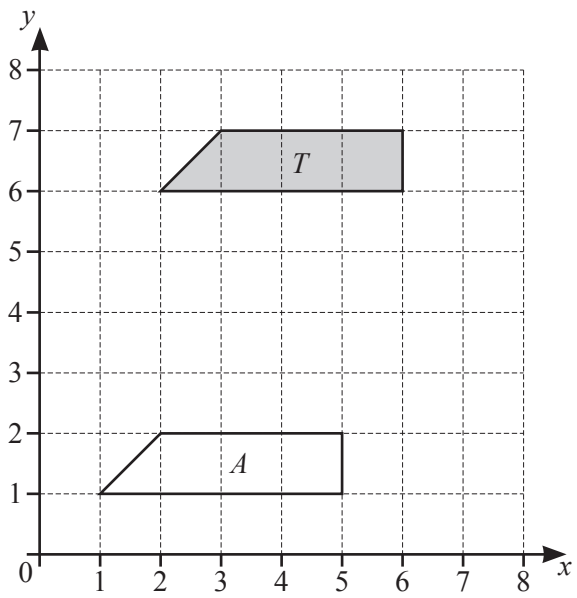
If the school bus is late, the probability that Seb travels on the bus is $\frac{15}{16}$.

If the school bus is on time, the probability that Seb travels on the bus is $\frac{3}{4}$.

Find the probability that Seb travels on the bus.

..... [3]

21



(a) Describe fully the **single** transformation that maps shape T onto shape A.

.....

..... [2]

(b) On the grid, reflect shape T in the line $y = x$. [2]

22 A pipe is completely full of water.
Water flows through the pipe at a speed of 1.2 m/s into a tank.
The cross-section of the pipe has an area of 6 cm^2.

Calculate the number of litres of water flowing into the tank in 1 hour.

..... litres [4]

23 $\mathscr{E} = \{0, 1, 2, 3, 4, 5, 6\}$ $A = \{0, 2, 4, 5, 6\}$ $B = \{1, 2, 5\}$

Complete each of the following statements.

$A \cap B =$ {.....}

$n(B) =$ .....

$\{0, 4, 6\} =$ ..... $\cap$ .....

$\{2, 4\}$ ..... A [4]

24 $f(x) = 3x - 5$ $g(x) = 2^x$

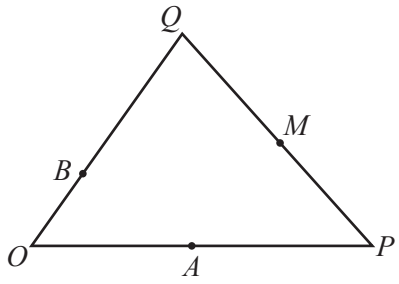
(a) Find fg(3).

..... [2]

(b) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

25



NOT TO SCALE

O is the origin, $\overrightarrow{OP} = 2\overrightarrow{OA}$, $\overrightarrow{OQ} = 3\overrightarrow{OB}$ and $\overrightarrow{PM} = \overrightarrow{MQ}$.

$\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.

Find, in terms of **p** and **q**, in its simplest form

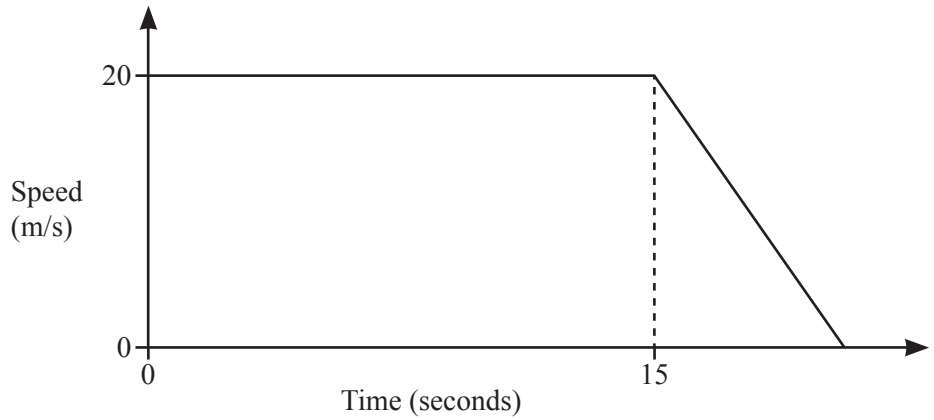
(a) $\overrightarrow{BA}$,

$\overrightarrow{BA} =$ ..... [2]

(b) the position vector of M.

..... [2]

26



NOT TO
SCALE

A car travels at 20 m/s for 15 seconds before it comes to rest by decelerating at 2.5 m/s^2.

Find the total distance travelled.

..... m [5]

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