

## **Cambridge Assessment International Education**

Cambridge International General Certificate of Secondary Education (9–1)

CANDIDATE NAME		
CENTRE NUMBER	CANDIDATE NUMBER	

261926005

MATHEMATICS 0980/21

Paper 2 (Extended) October/November 2019

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator Geometrical instruments

Tracing paper (optional)

## **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  $\pi$ , 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.

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[Turn over





1	Work	Out	50/	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,	 Г1]
	(b) in standard form.	
		 [1]
5	Simplify $5c-d-3d-2c$ .	
		 [2]

6 Solve. 
$$\frac{x-2}{3} = 3$$

$$x = \dots$$
 [2]

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7	Simplify $2x^3 \times 3x^2$ .	
		. [2]
	5 1	
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]
		. [4]
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 $r$ .	
	rind the value of r.	
		[2]
	r =	[2]
10	Simplify.	
	$\left(\frac{x^3}{8}\right)^{-\frac{4}{3}}$	
		[2]

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[Turn over

$$y = \frac{\sqrt{x}}{w^2}$$

Rearrange the formula to write x in terms of w and y.

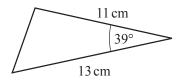
$$x =$$
 [2]

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.



13



NOT TO SCALE

Calculate the area of the triangle.

..... cm<sup>2</sup> [2]

14	The scale of a map is 1: 10000000.
	On the map, the area of Slovakia is 4.9 cm <sup>2</sup> .

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

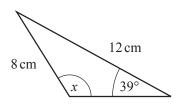
km <sup>2</sup> [3
--------------------

## 15 *y* is inversely proportional to $(x+3)^2$ . When x = 1, y = 2.

Find y when  $x = \frac{1}{3}$ .

$$y =$$
 [3]

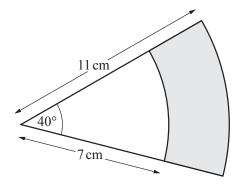
16



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

$$x =$$
 [3]

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NOT TO SCALE

The diagram shows two sectors of circles with the same centre. The shaded area is  $k\pi \, \mathrm{cm}^2$ , where k is an integer.

Find the value of *k*.

<i>k</i> =	[3]
------------	-----

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

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

(a) Find MP.

.....[2]

**(b)** Find |**P**|.

.....[1]

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

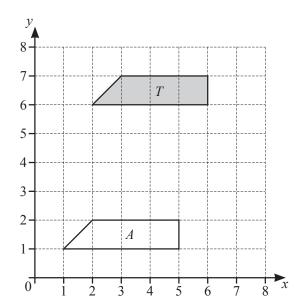
If the school bus is late, the probability that Seb travels on the bus is  $\frac{15}{16}$ .

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]

[Turn over



(a)	Describe fully the <b>single</b> 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  $1.2\,\text{m/s}$  into a tank. The cross-section of the pipe has an area of  $6\,\text{cm}^2$ .

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



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

$$A = \{0, 2, 4, 5, 6\}$$

$$B = \{1, 2, 5\}$$

Complete each of the following statements.

$$n(B) = \dots$$

$$A \cup B' = \{\dots\}$$

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

$$\{2, 4\} \dots A$$

24 
$$f(x) = 3x - 5$$

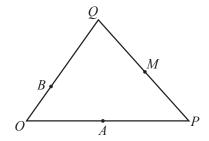
$$g(x) = 2^x$$

(a) Find fg(4) - gf(4).

	[3]
--	-----

**(b)** Find *x* when  $g^{-1}(x) = 5$ .

$$x = \dots$$
 [1]



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  $\overrightarrow{OQ} = \mathbf{q}$ .

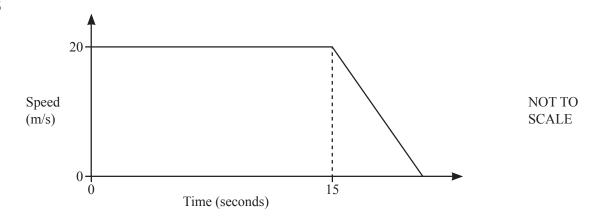
Find, in terms of  $\mathbf{p}$  and  $\mathbf{q}$ , in its simplest form

(a)  $\overrightarrow{BA}$ ,

$\longrightarrow$		
RA	=	[2]
DII		 L-

**(b)** the position vector of M.





A car travels at 20 m/s for 15 seconds before it comes to rest by decelerating at  $2.5\,\text{m/s}^2$ .

Find the total distance travelled.

m	[5]		
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