Cambridge IGCSE

Cambridge Assessment International Education
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

1227953771

MATHEMATICS **0580/21**

Paper 2 (Extended) **May/June 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.

DC (NH/SW) 164910/2
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1 Work out \$1.20 as a percentage of \$16.

.....% [1]

2 Factorise $5y - 6py$.

..... [1]

3 Calculate $\sqrt[3]{8.1^2 - 1.3^{0.8}}$.

..... [1]

4 An equilateral triangle has sides of length 15 cm, correct to the nearest centimetre.

Calculate the upper bound of the perimeter of this triangle.

..... cm [1]

5 The volume of a cuboid is 180 cm^3.
The base is a square of side length 6 cm.

Calculate the height of this cuboid.

..... cm [2]

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6 Simplify.

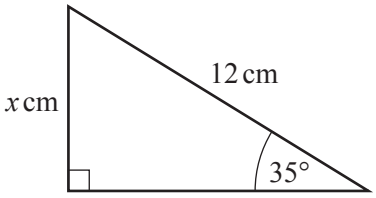
(a) $t^{21} \div t^7$

..... [1]

(b) $(u^5)^5$

..... [1]

7



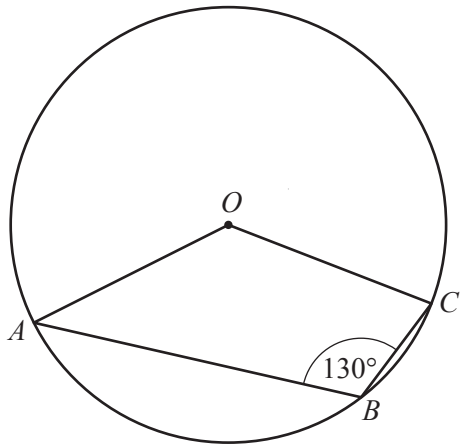
NOT TO SCALE

The diagram shows a right-angled triangle.

Calculate the value of x.

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

8



NOT TO SCALE

A, B and C are points on the circle, centre O.

Find the obtuse angle AOC.

Angle AOC = ... [2]

9 Write the recurring decimal $0.4\dot{7}$ as a fraction.
Show all your working.

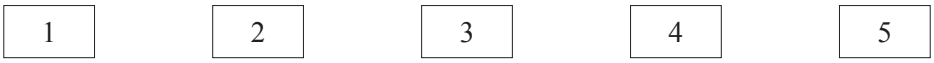
..... [2]

10 $f(x) = 2x + 3$

Find $f(1 - x)$ in its simplest form.

..... [2]

11



The diagram shows five cards.
Two of the cards are taken at random, without replacement.

Find the probability that both cards show an even number.

..... [2]

12 27 28 29 30 31 32 33

From the list of numbers, write down

(a) a multiple of 7,

..... [1]

(b) a cube number,

..... [1]

(c) a prime number.

..... [1]

13 $x^2 + 4x - 9 = (x + a)^2 + b$

Find the value of a and the value of b.

$a =$ .....

$b =$ ..... [3]

14 **Without using a calculator**, work out $\frac{5}{6}+\frac{2}{3}$.

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

..... [3]

15 Expand and simplify.

$$(x+1)(x+2)+2x(x-3)$$

..... [3]

16 y is inversely proportional to the square root of $(x + 1)$.
When $x = 8$, $y = 2$.

Find y when $x = 99$.

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

17 **(a)** Factorise $p^2 - q^2$.

..... [1]

(b) $p^2 - q^2 = 7$ and $p - q = 2$.

Find the value of $p + q$.

..... [2]

18 **(a)** Simplify $\left(81y^{16}\right)^{\frac{3}{4}}$.

..... [2]

(b) $2^3 = 4^p$

Find the value of p.

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

19 A model of a car has a scale 1 : 20.
The volume of the actual car is $12\,\text{m}^3$.

Find the volume of the model.
Give your answer in cubic centimetres.

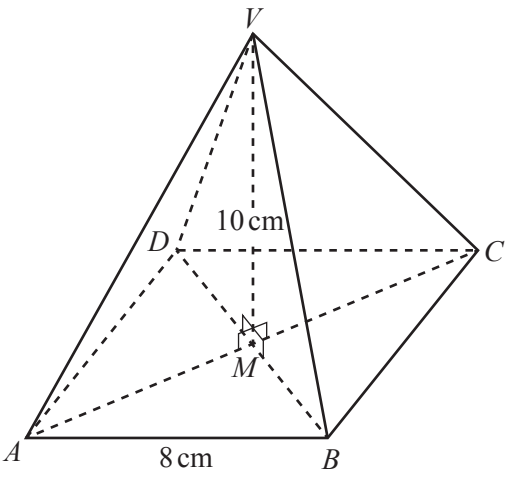
.....cm^3 [3]

20 Write as a single fraction in its simplest form.

$$\frac{1}{x+2} - \frac{2}{3x-1}$$

..... [3]

21



NOT TO SCALE

The diagram shows a pyramid with a square base $ABCD$ of side length 8 cm.
The diagonals of the square, AC and BD, intersect at M.
V is vertically above M and $VM = 10$ cm.

Calculate the angle between VA and the base.

..... [4]

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22 **(a)** These are the first four terms of a sequence.

5 8 11 14

(i) Write down the next term.

..... [1]

(ii) Find an expression, in terms of n, for the nth term.

..... [2]

(b) These are the first five terms of another sequence.

$\frac{1}{2}$ $\frac{3}{4}$ $\frac{7}{6}$ $\frac{13}{8}$ $\frac{21}{10}$

Find the next term.

..... [1]

23 $\mathbf{P} = \begin{pmatrix} 3 & 1 \\ 2 & 4 \end{pmatrix}$

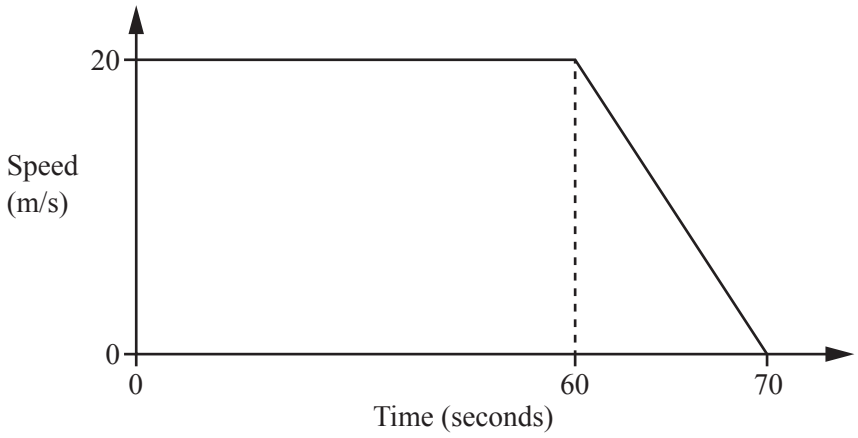
(a) Find $\mathbf{P}^2$.

( ) [2]

(b) Find $\mathbf{P}^{-1}$.

( ) [2]

24



NOT TO
SCALE

The diagram shows information about the final 70 seconds of a car journey.

(a) Find the deceleration of the car between 60 and 70 seconds.

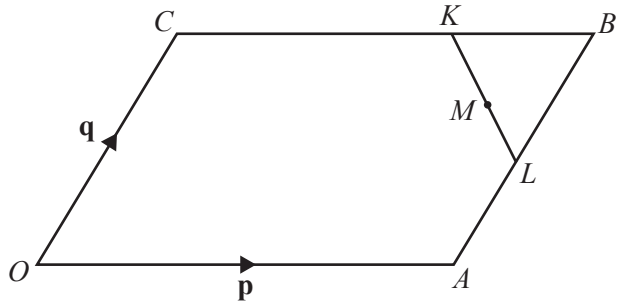
.....m/s^2 [1]

(b) Find the distance travelled by the car during the 70 seconds.

.....m [3]

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25



NOT TO SCALE

$OABC$ is a parallelogram and O is the origin.
$CK = 2KB$ and $AL = LB$.
M is the midpoint of KL.
$\overrightarrow{OA} = \mathbf{p}$ and $\overrightarrow{OC} = \mathbf{q}$.

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

(a) $\overrightarrow{KL}$,

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

(b) the position vector of M.

..... [2]

Question 26 is printed on the next page.

26 Line L passes through the points $(0, -3)$ and $(6, 9)$.

(a) Find the equation of line L.

..... [3]

(b) Find the equation of the line that is perpendicular to line L and passes through the point $(0, 2)$.

..... [2]

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