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Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/23**

Paper 2 (Extended) **October/November 2018**

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.

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1 Work out $\frac{7}{11}$ of 198 kg.

..... kg [1]

2 Factorise.

$y - 2y^2$

.....[1]

3 Work out \$1.45 as a percentage of \$72.50 .

..... % [1]

4 Calculate.

$$\frac{5.39 - 0.98}{0.743 - 0.0743}$$

.....[1]

5 Work out.

$$\left(\frac{125}{27}\right)^{-\frac{2}{3}}$$

.....[1]

6 **(a)** Write the number five million, two hundred and seven in figures.

.....[1]

(b) Write 0.008 13 in standard form.

.....[1]

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7 Simplify.

$$2p - q - 3q - 5p$$

..... [2]

8 Write these numbers correct to 2 significant figures.

(a) 0.076 499

..... [1]

(b) 10 100

..... [1]

9 **Without using a calculator**, work out $\frac{1}{4} \div \frac{2}{3}$.

You must show all your working and give your answer as a fraction.

..... [2]

10 Solve.

$$3w - 7 = 32$$

$w =$ ..... [2]

11 $A = \pi rl + \pi r^2$

Rearrange this formula to make l the subject.

$l =$ ..... [2]

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12 The area of a square is $42.5\,\text{cm}^2$, correct to the nearest $0.5\,\text{cm}^2$.

Calculate the lower bound of the length of the side of the square.

..... cm [2]

13 Change the recurring decimal $0.1\dot{8}$ to a fraction.
You must show all your working.

..... [2]

14 Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$.

.....

..... [2]

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15 A car travels at 108 km/h for 20 seconds.

Calculate the distance the car travels.
Give your answer in metres.

..... m [3]

16 **(a)** Simplify $\frac{w^2}{w^3}$.

..... [1]

(b) Simplify $(3w^3)^3$.

..... [2]

17 y is directly proportional to the square root of x.
When $x = 9$, $y = 6$.

Find y when $x = 25$.

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

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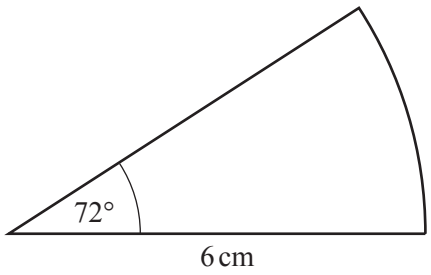
18 Write as a single fraction in its simplest form.

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

..... [3]

19



NOT TO SCALE

The diagram shows a sector of a circle with radius 6 cm and sector angle 72°.
The perimeter of this sector is $(p + q\pi)$ cm.

Find the value of p and the value of q.

p = ...

q = ... [3]

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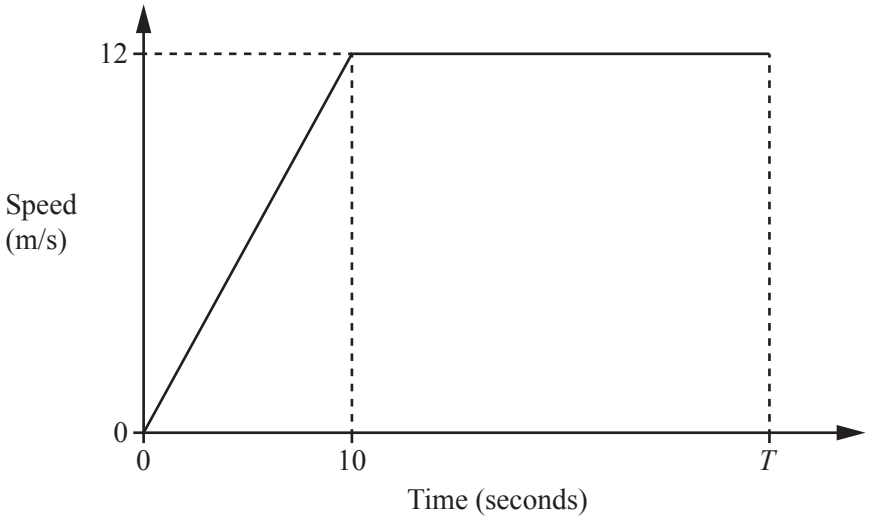
20 Solve the equation $3x^2 - 2x - 2 = 0$.
Show all your working and give your answers correct to 2 decimal places.

$x =$ ..... or $x =$ ..... [4]

21



NOT TO
SCALE

The diagram shows the speed−time graph for the first T seconds of a car journey.

(a) Find the acceleration during the first 10 seconds.

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

(b) The total distance travelled during the T seconds is 480 m.

Find the value of T.

$T =$ ..... [3]

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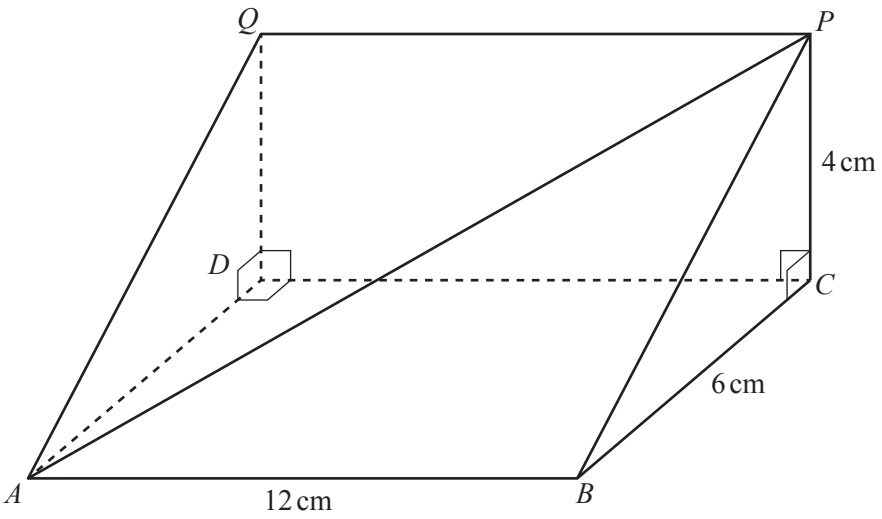
22 Simplify.

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

..... [4]

23



NOT TO SCALE

The diagram shows a triangular prism.
$AB = 12$ cm, $BC = 6$ cm, $PC = 4$ cm, angle $BCP = 90°$ and angle $QDC = 90°$.

Calculate the angle between AP and the rectangular base $ABCD$.

..... [4]

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24 $\mathbf{P} = \begin{pmatrix} 3 & 1 \\ 2 & 3 \end{pmatrix}$ $\mathbf{Q} = \begin{pmatrix} 1 & 2 \\ -1 & 4 \end{pmatrix}$

Find

(a) $3\mathbf{P}$,

$3\mathbf{P} =$ $\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

(b) $\mathbf{PQ}$,

$\mathbf{PQ} =$ $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

(c) $\mathbf{Q}^{-1}$.

$\mathbf{Q}^{-1} =$ $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

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[Turn over

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25 Factorise completely.

(a) $px+py-x-y$

..... [2]

(b) $2t^2-98m^2$

..... [3]

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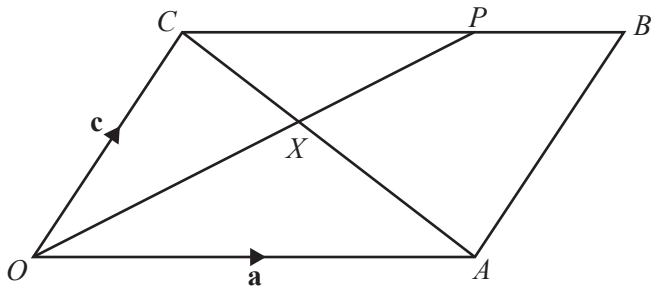
26



NOT TO SCALE

In the diagram, $OABC$ is a parallelogram.
OP and CA intersect at X and $CP : PB = 2 : 1$.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.

(a) Find $\overrightarrow{OP}$, in terms of **a** and **c**, in its simplest form.

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

(b) $CX : XA = 2 : 3$

(i) Find $\overrightarrow{OX}$, in terms of **a** and **c**, in its simplest form.

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

(ii) Find $OX : XP$.

$OX : XP =$ ..... : ..... [2]

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