

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  $\pi$ , 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.

- 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]

7 Simplify.

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

..... [2]

8 Write these numbers correct to 2 significant figures.

(a) 0.076499

..... [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  $A = \pi r l + \pi r^2$

Rearrange this formula to make  $l$  the subject.

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

- 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]

- 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  $x = 25$ .

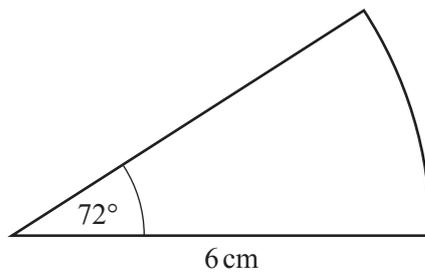
$y =$  ..... [3]

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  $72^\circ$ .  
The perimeter of this sector is  $(p + q\pi)$  cm.

Find the value of  $p$  and the value of  $q$ .

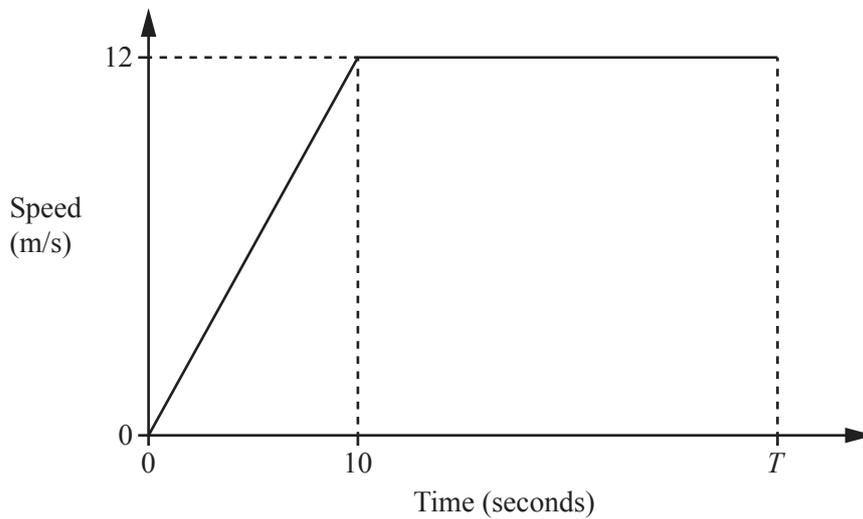
$p =$  .....

$q =$  ..... [3]

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

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [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.

$\dots\dots\dots$   $\text{m/s}^2$  [1]

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

Find the value of  $T$ .

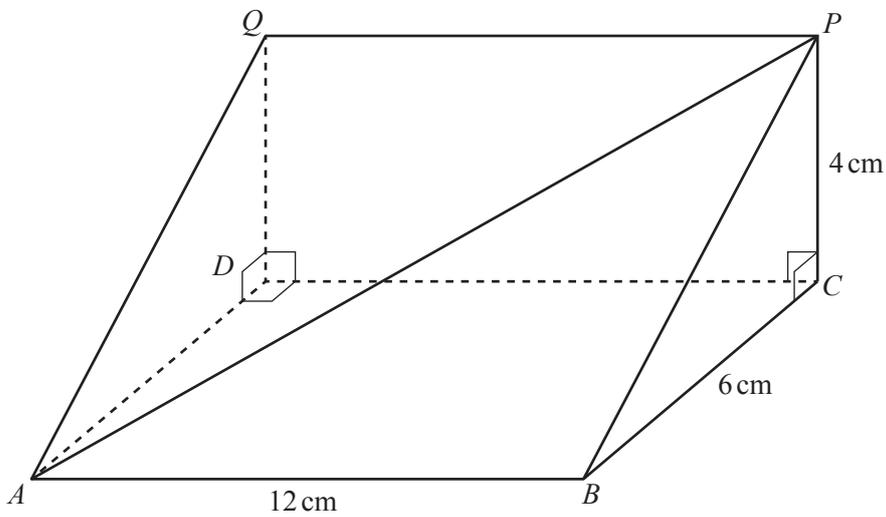
$T = \dots\dots\dots$  [3]

22 Simplify.

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

..... [4]

23



NOT TO  
SCALE

The diagram shows a triangular prism.

$AB = 12\text{ cm}$ ,  $BC = 6\text{ cm}$ ,  $PC = 4\text{ cm}$ , angle  $BCP = 90^\circ$  and angle  $QDC = 90^\circ$ .

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

..... [4]

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

Find

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

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

(b)  $\mathbf{PQ}$ ,

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

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

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

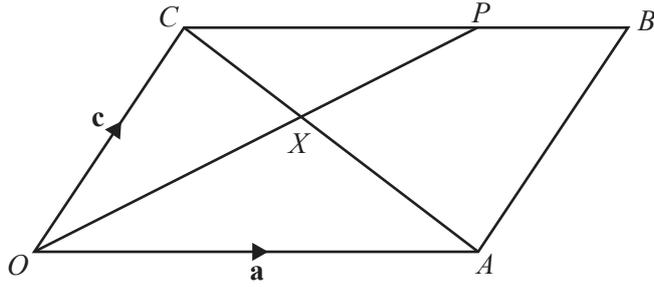
25 Factorise completely.

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

..... [2]

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

..... [3]



NOT TO SCALE

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

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

$\vec{OP} = \dots\dots\dots [2]$

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

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

$\vec{OX} = \dots\dots\dots [2]$

(ii) Find  $OX : XP$ .

$OX : XP = \dots\dots\dots : \dots\dots\dots [2]$

**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 International Examinations Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cie.org.uk](http://www.cie.org.uk) after the live examination series.

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