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## 0580/23

October/November 2018

**1 hour 30 minutes**

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

**READ THESE INSTRUCTIONS FIRST**

DO **NOT** WRITE IN ANY BARCODES.

For  $\pi$ , use either your calculator value or 3.142.

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  $x = 25$ .

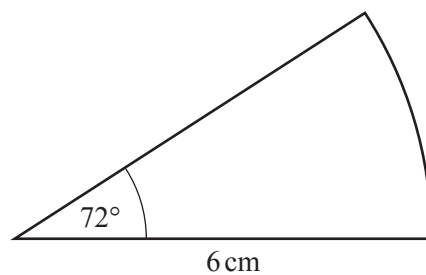
$y =$  ..... [3]

- 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  $q$ .

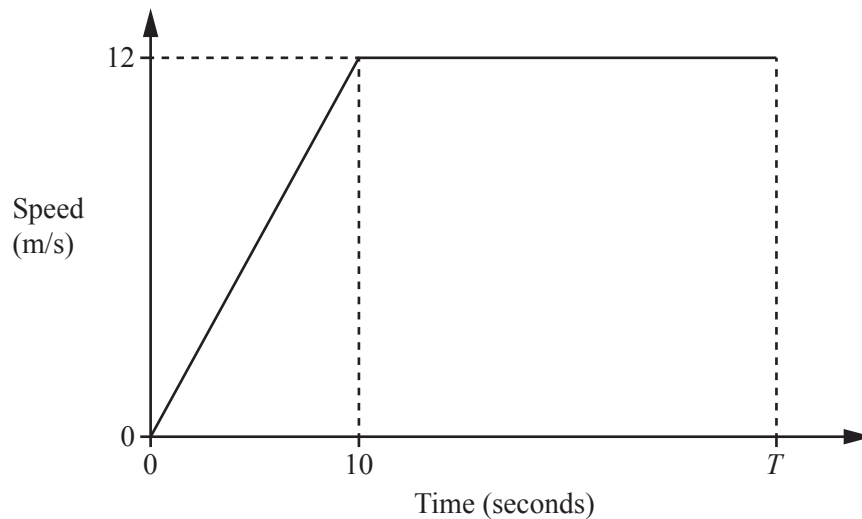
$p =$  .....

$q =$  ..... [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  $T$ .

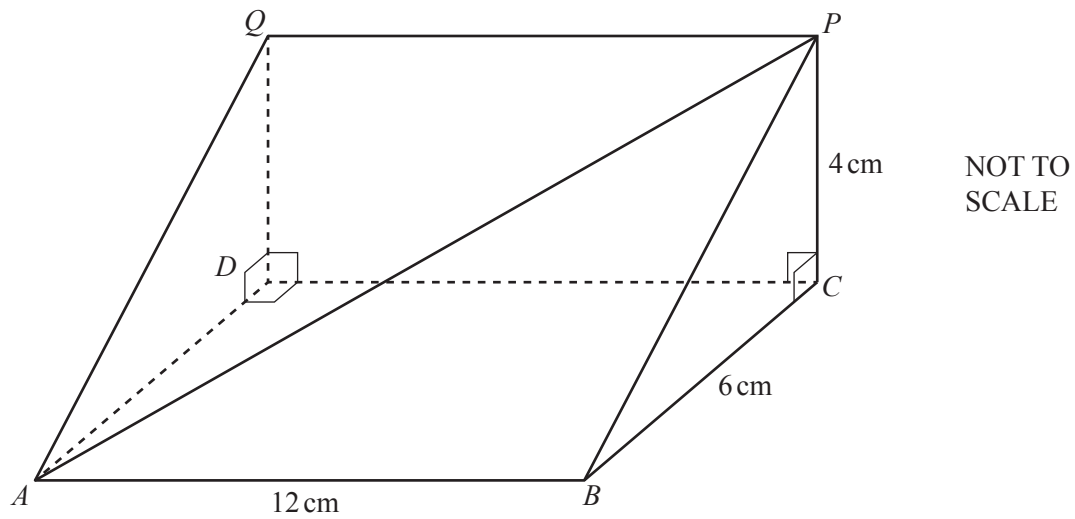
$T = \dots\dots\dots$  [3]

22 Simplify.

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

..... [4]

23



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

Find

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

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

**(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.

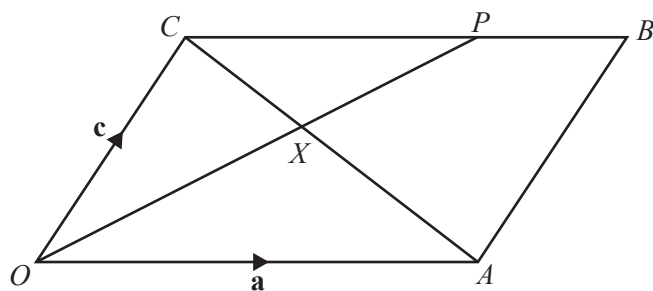
(a)  $px + py - x - y$

..... [2]

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

..... [3]

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  $\mathbf{a}$  and  $\mathbf{c}$ , in its simplest form.

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

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

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

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

- (ii) Find  $OX : XP$ .

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

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