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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 π , 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 cm^2 , correct to the nearest 0.5 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 $x = 25$.

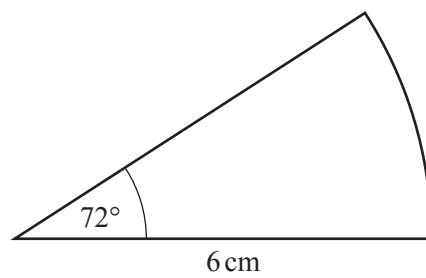
$y =$ [3]

- 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° .
The perimeter of this sector is $(p + q\pi)$ cm.

Find the value of p and the value of q .

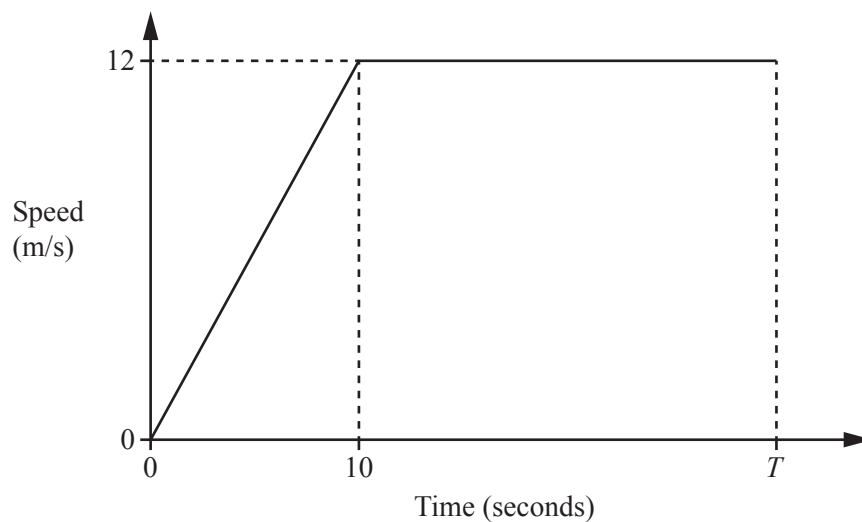
$p =$

$q =$ [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



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 .

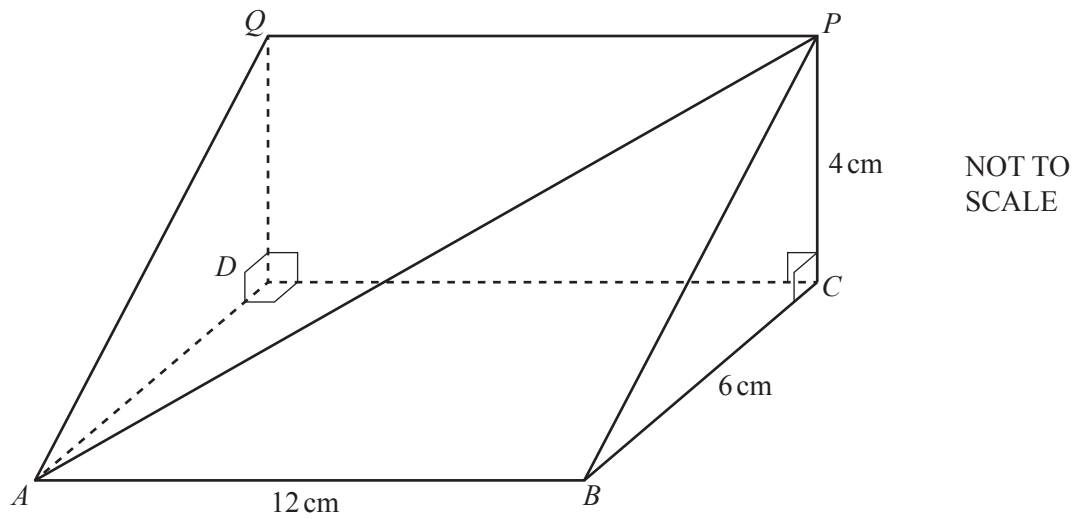
$T = \dots\dots\dots$ [3]

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.

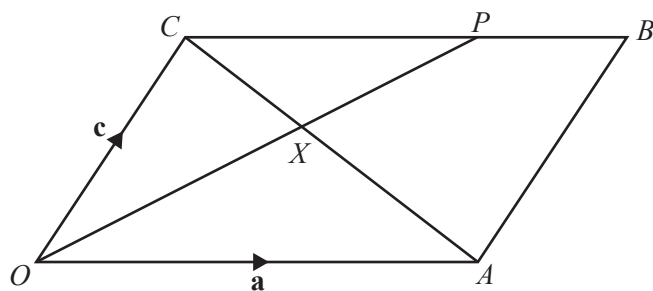
(a) $px + py - x - y$

..... [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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