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0580/21

May/June 2019

1 hour 30 minutes

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

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.

[Turn over

- 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]

6 Simplify.

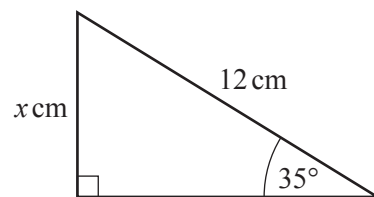
(a) $t^{21} \div t^7$

..... [1]

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

..... [1]

7



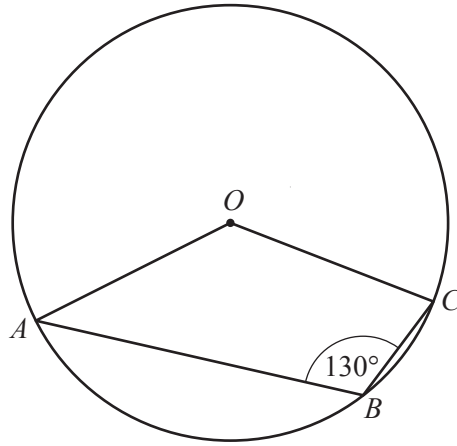
NOT TO
SCALE

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.

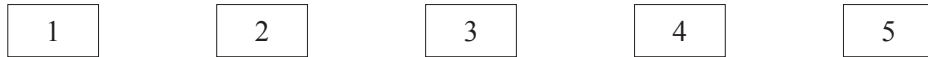
..... [2]

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 $(81y^{16})^{\frac{3}{4}}$.

..... [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 12m^3 .

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

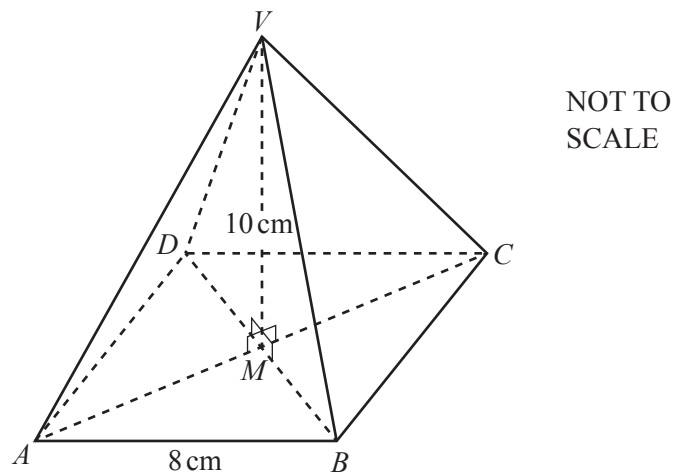
..... cm^3 [3]

- 20 Write as a single fraction in its simplest form.

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

..... [3]

- 21



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 $VM = 10\text{ cm}$.

Calculate the angle between VA and the base.

..... [4]

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

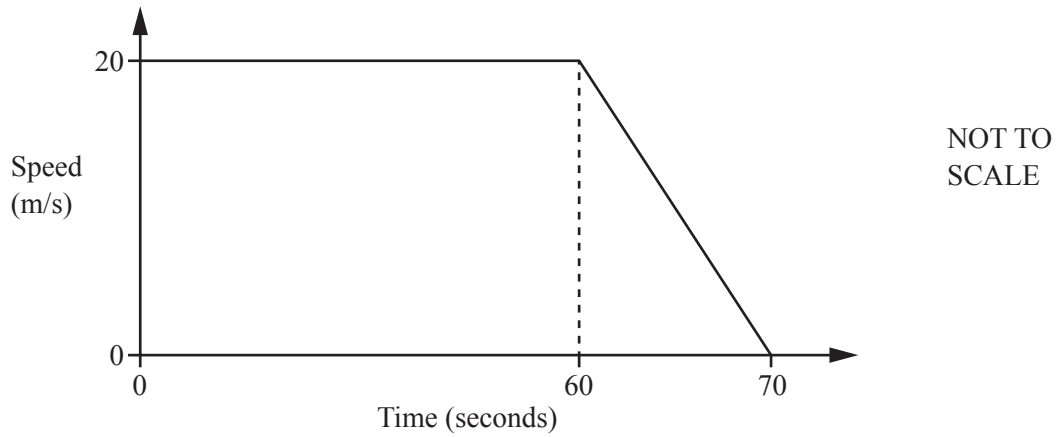
- (a) Find $\mathbf{P}^2$.

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

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

$\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

24



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

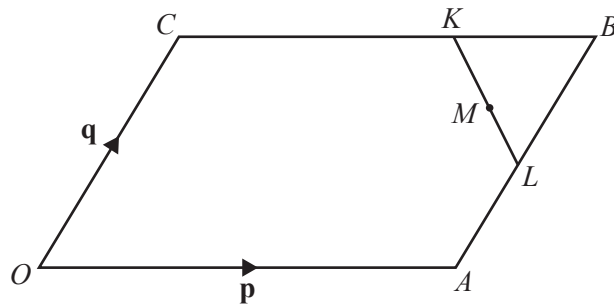
- (a) Find the deceleration of the car between 60 and 70 seconds.

.....m/s² [1]

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

.....m [3]

25

NOT TO
SCALE

$OABC$ is a parallelogram and O is the origin.

$CK = 2KB$ and $AL = LB$.

M is the midpoint of KL .

$\vec{OA} = \mathbf{p}$ and $\vec{OC} = \mathbf{q}$.

Find, in terms of $\mathbf{p}$ and $\mathbf{q}$, giving your answer in its simplest form

(a) $\vec{KL}$,

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

(b) the position vector of M .

$\dots\dots\dots$ [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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