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0580/21

October/November 2019

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 5% of \$25.

\$ [1]

- 2 Factorise $5p + pt$.

..... [1]

- 3 Calculate.

$$\frac{16.379 - 0.879}{4.2} \times 1.241$$

Give your answer correct to 2 significant figures.

..... [2]

- 4 Write 15 060

(a) in words,

..... [1]

(b) in standard form.

..... [1]

- 5 Simplify $5c - d - 3d - 2c$.

..... [2]

- 6 Solve. $\frac{x-2}{3} = 3$

$x =$ [2]

- 7 Simplify $2x^3 \times 3x^2$.

..... [2]

- 8 **Without using a calculator**, work out $\frac{5}{16} \times 1\frac{1}{7}$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [2]

- 9 Paula invests \$600 at a rate of $r\%$ per year simple interest.
At the end of 10 years, the total interest earned is \$90.

Find the value of r .

$r =$ [2]

- 10 Simplify.

$$\left(\frac{x^3}{8}\right)^{-\frac{4}{3}}$$

..... [2]

11 $P = 2r + \pi r$

Rearrange the formula to write r in terms of P and π .

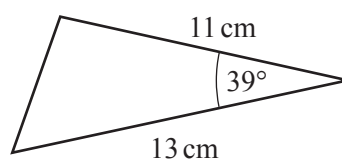
$r = \dots\dots\dots$ [2]

12 The sides of a square are 15.1 cm, correct to 1 decimal place.

Find the upper bound of the area of the square.

$\dots\dots\dots \text{ cm}^2$ [2]

13



NOT TO
SCALE

Calculate the area of the triangle.

$\dots\dots\dots \text{ cm}^2$ [2]

- 14 The scale of a map is 1 : 10 000 000.
On the map, the area of Slovakia is 4.9 cm^2 .

Calculate the actual area of Slovakia.
Give your answer in square kilometres.

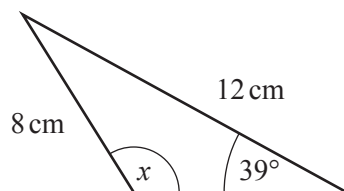
..... km^2 [3]

- 15 y is inversely proportional to x^2 .
When $x = 4$, $y = 2$.

Find y when $x = \frac{1}{2}$.

$y =$ [3]

16

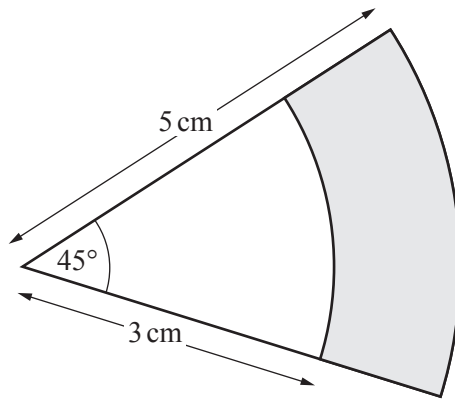


NOT TO
SCALE

Calculate the **obtuse** angle x in this triangle.

$x =$ [3]

17

NOT TO
SCALE

The diagram shows two sectors of circles with the same centre.

Calculate the shaded area.

..... cm^2 [3]

18 Write $\frac{x}{2} - \frac{2x+4}{x+1}$ as a single fraction, in its simplest form.

..... [3]

19 $\mathbf{M} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$ $\mathbf{P} = \begin{pmatrix} 5 & 6 \\ 7 & 8 \end{pmatrix}$

(a) Find $\mathbf{MP}$.

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

(b) Find $|\mathbf{M}|$.

..... [1]

20 The probability that the school bus is late is $\frac{9}{10}$.

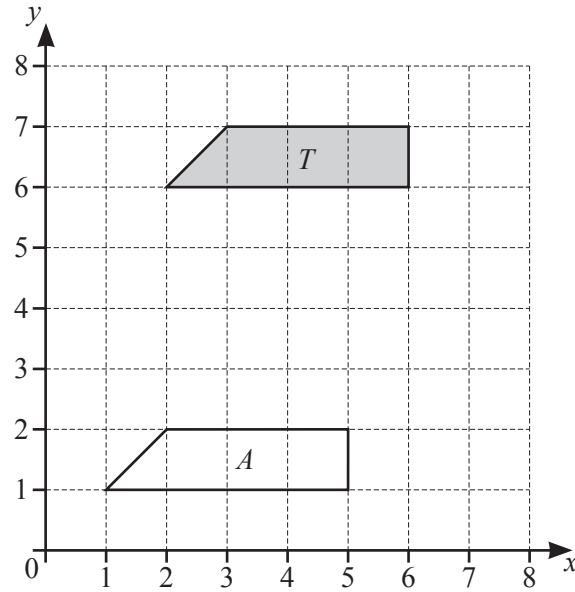
If the school bus is late, the probability that Seb travels on the bus is $\frac{15}{16}$.

If the school bus is on time, the probability that Seb travels on the bus is $\frac{3}{4}$.

Find the probability that Seb travels on the bus.

..... [3]

21



- (a) Describe fully the **single** transformation that maps shape T onto shape A .

.....

..... [2]

- (b) On the grid, reflect shape T in the line $y = x$.

[2]

- 22 A pipe is completely full of water.

Water flows through the pipe at a speed of 1.2 m/s into a tank.

The cross-section of the pipe has an area of 6 cm^2 .

Calculate the number of litres of water flowing into the tank in 1 hour.

..... litres [4]

$$23 \quad \mathcal{C} = \{0, 1, 2, 3, 4, 5, 6\}$$

$$A = \{0, 2, 4, 5, 6\}$$

$$B = \{1, 2, 5\}$$

Complete each of the following statements.

$$A \cap B = \{\dots\dots\dots\}$$

$$n(B) = \dots\dots\dots$$

$$\{0, 4, 6\} = \dots\dots\dots \cap \dots\dots\dots$$

$$\{2, 4\} \dots\dots\dots A$$

[4]

$$24 \quad f(x) = 3x - 5$$

$$g(x) = 2^x$$

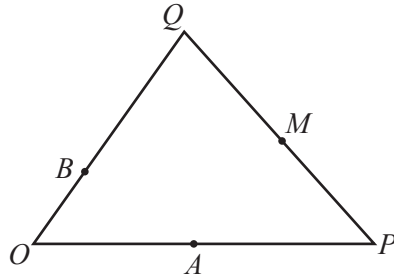
(a) Find $fg(3)$.

..... [2]

(b) Find $f^{-1}(x)$.

$$f^{-1}(x) = \dots\dots\dots [2]$$

25

NOT TO
SCALE

O is the origin, $\overrightarrow{OP} = 2\overrightarrow{OA}$, $\overrightarrow{OQ} = 3\overrightarrow{OB}$ and $\overrightarrow{PM} = \overrightarrow{MQ}$.

$\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.

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

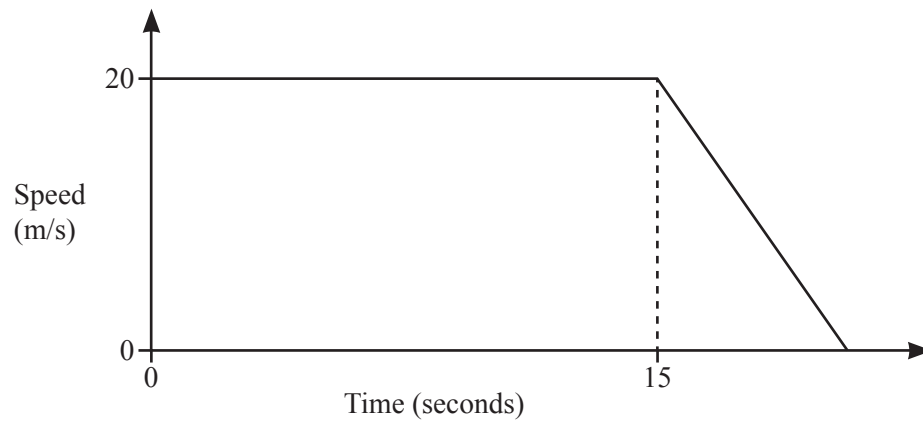
(a) $\overrightarrow{BA}$,

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

(b) the position vector of M .

$\dots\dots\dots$ [2]

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NOT TO
SCALE

A car travels at 20 m/s for 15 seconds before it comes to rest by decelerating at 2.5 m/s^2 .

Find the total distance travelled.

..... m [5]

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