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0580/22

May/June 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 **12** printed pages.

- 1 Write down a prime number between 50 and 60.

..... [1]

- 2 Use your calculator to work out $\sqrt{1 - (\sin 33^\circ)^2}$.

..... [1]

- 3 Write the recurring decimal $0.\dot{7}$ as a fraction.

..... [1]

- 4 Complete each statement.

(a) A quadrilateral with only one pair of parallel sides is called a [1]

(b) An angle greater than 90° but less than 180° is called [1]

- 5 The distance between Prague and Vienna is 254 kilometres.
The local time in Prague is the same as the local time in Vienna.
A train leaves Prague at 15 20 and arrives in Vienna at 19 50 the same day.

Calculate the average speed of the train.

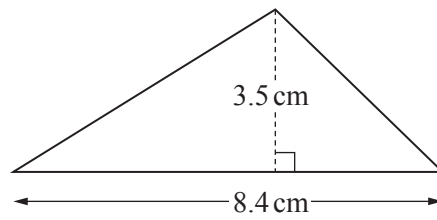
..... km/h [2]

- 6 Solve the equation.

$$9f + 11 = 3f + 23$$

$f =$ [2]

7

NOT TO
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Calculate the area of this triangle.

..... cm^2 [2]

- 8 (a) Write 0.047 883 correct to 2 significant figures.

..... [1]

- (b) Write 0.005 27 in standard form.

..... [1]

- 9 Find the highest common factor (HCF) of 90 and 48.

..... [2]

- 10 On a map with scale 1 : 25 000, the area of a lake is 33.6 square centimetres.

Calculate the actual area of the lake, giving your answer in square kilometres.

..... km^2 [2]

- 11 Write down the matrix that represents an enlargement, scale factor 3, centre (0, 0).

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

- 12 Simplify.

(a) $5m^2 \times 2m^3$

..... [2]

(b) $(x^8)^3$

..... [1]

- 13 Without using a calculator, work out $2\frac{1}{4} \div \frac{3}{7}$.

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

..... [3]

- 14** Solve the simultaneous equations.
You must show all your working.

$$\begin{aligned}5x + 8y &= 4 \\ \frac{1}{2}x + 3y &= 7\end{aligned}$$

$$x = \dots\dots\dots$$

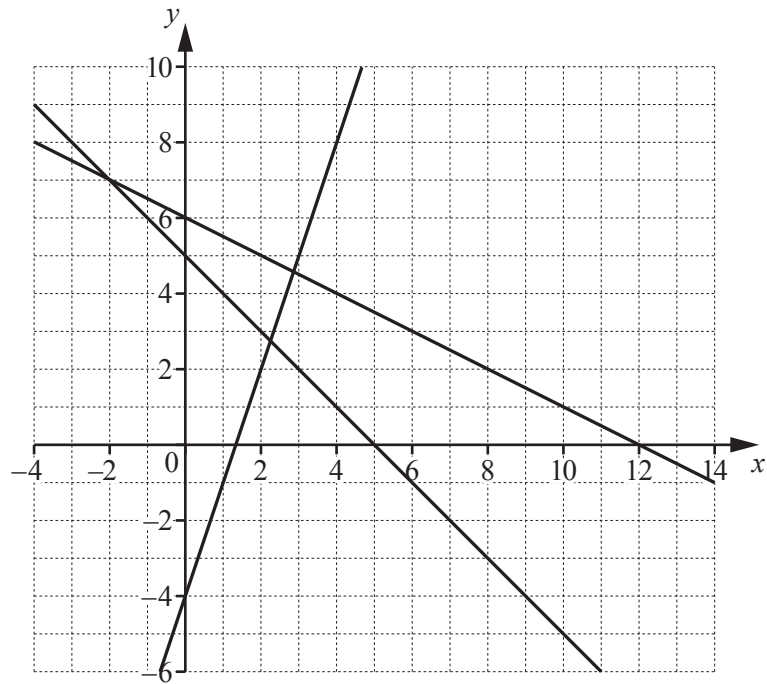
$$y = \dots\dots\dots [3]$$

- 15** Shona buys a chair in a sale for \$435.60 .
This is a reduction of 12% on the original price.

Calculate the original price of the chair.

$$\text{\$} \dots\dots\dots [3]$$

16



$$y \leq -\frac{1}{2}x + 6 \quad y \geq 3x - 4 \quad x + y \geq 5$$

- (a) By shading the **unwanted** regions of the grid, find and label the region R that satisfies the three inequalities. [2]
- (b) Find the largest value of $x + y$ in the region R , where x and y are integers.

..... [1]

17 Write as a single fraction in its simplest form.

$$\frac{2x}{x+3} + \frac{x+3}{x-5}$$

..... [3]

- 18** The table shows the number of people in different age groups at a cinema.

Age (y years)	$15 < y \leq 25$	$25 < y \leq 30$	$30 < y \leq 50$	$50 < y \leq 80$
Number of people	35	32	44	12

Dexter draws a histogram to show this information.

The height of the bar he draws for the group $15 < y \leq 25$ is 7 cm.

Calculate the height of each of the remaining bars.

$25 < y \leq 30$ cm

$30 < y \leq 50$ cm

$50 < y \leq 80$ cm [3]

- 19 Rearrange this formula to make m the subject.

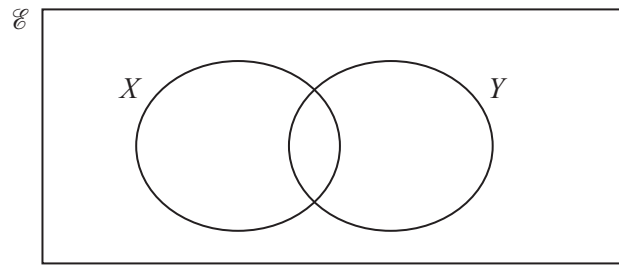
$$P = \frac{k+m}{m}$$

..... [4]

- 20 Solve the equation $3x^2 - 2x - 10 = 0$.
Show all your working and give your answers correct to 2 decimal places.

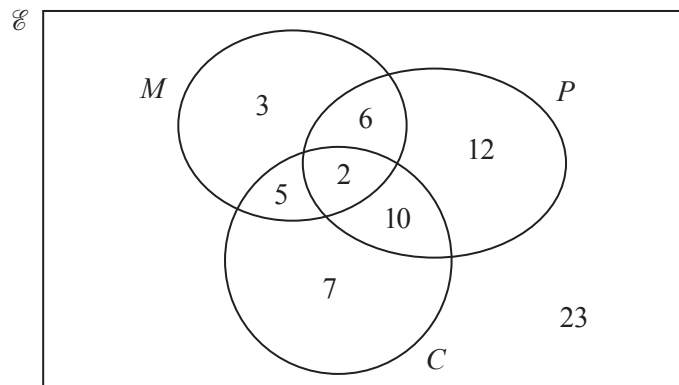
$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [4]

- 21 (a) In the Venn diagram, shade $X' \cap Y$.



[1]

- (b) The Venn diagram below shows information about the number of gardeners who grow melons (M), potatoes (P) and carrots (C).



- (i) A gardener is chosen at random from the gardeners who grow melons.

Find the probability that this gardener does not grow carrots.

..... [2]

- (ii) Find $n((M \cap P) \cup C')$.

..... [1]

22 $\mathbf{A} = \begin{pmatrix} 2 & 7 \\ 1 & 3 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 3 & 4 \\ 0 & 1 \end{pmatrix}$

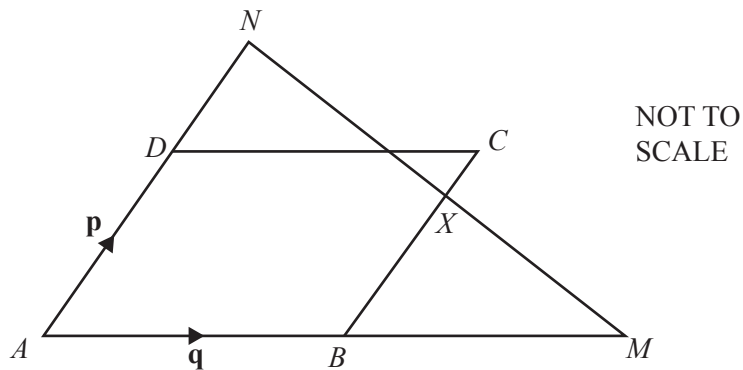
(a) Calculate $\mathbf{AB}$.

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

(b) Find $\mathbf{A}^{-1}$, the inverse of $\mathbf{A}$.

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

23



$ABCD$ is a parallelogram with $\overrightarrow{AB} = \mathbf{q}$ and $\overrightarrow{AD} = \mathbf{p}$.

ABM is a straight line with $AB : BM = 1 : 1$.

ADN is a straight line with $AD : DN = 3 : 2$.

(a) Write $\overrightarrow{MN}$, in terms of $\mathbf{p}$ and $\mathbf{q}$, in its simplest form.

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

(b) The straight line NM cuts BC at X .

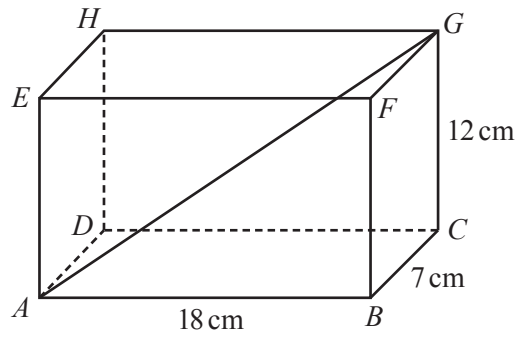
X is the midpoint of MN .

$$\overrightarrow{BX} = k\mathbf{p}$$

Find the value of k .

$$k = \dots\dots\dots [2]$$

24

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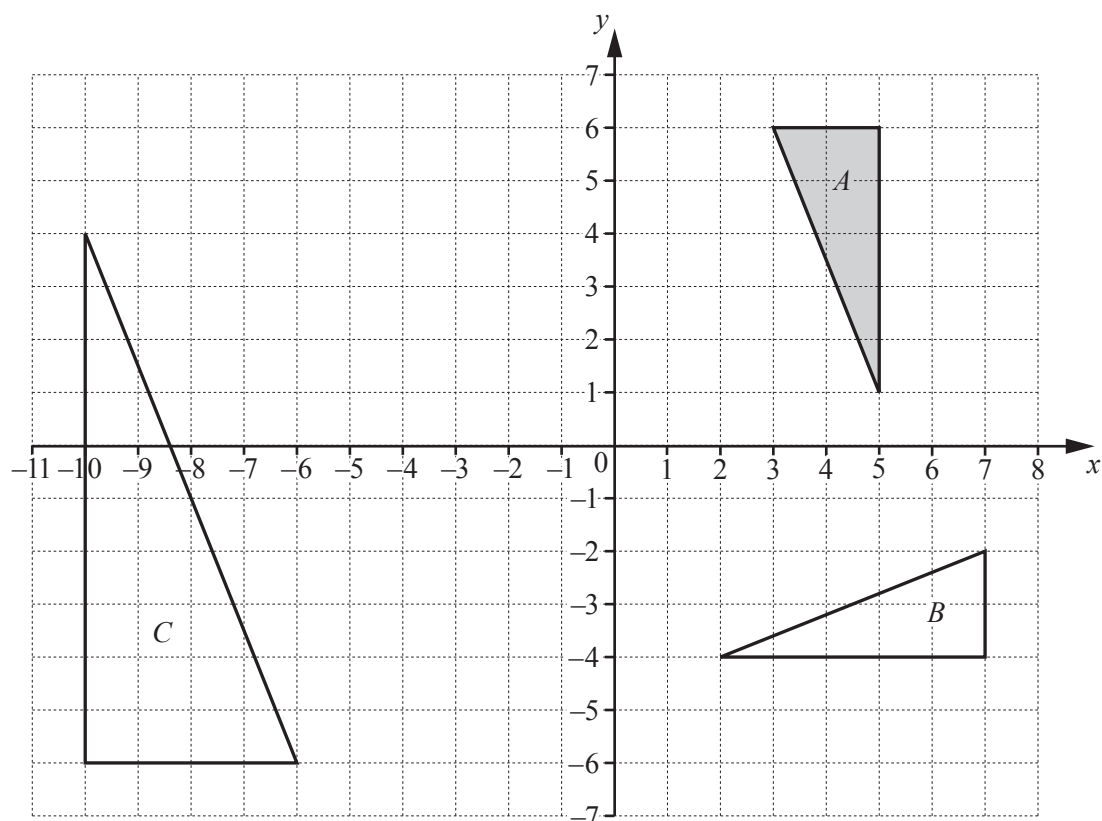
$ABCDEFGH$ is a cuboid.

$AB = 18\text{ cm}$, $BC = 7\text{ cm}$ and $CG = 12\text{ cm}$.

Calculate the angle that the diagonal AG makes with the base $ABCD$.

..... [4]

Question 25 is printed on the next page.



Describe fully the **single** transformation that maps

- (a) triangle A onto triangle B ,

.....
 [3]

- (b) triangle A onto triangle C .

.....
 [3]

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