Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME	

CENTRE NUMBER						CANDIDATE NUMBER				

9752153778

MATHEMATICS (SYLLABUS D) **4024/11**

Paper 1 **October/November 2023**

2 hours

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

INFORMATION

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 **(a)** Work out $6 + 4 \div 2$.

..... [1]

(b) Work out 40×0.3 .

..... [1]

2 Write these numbers in order of size, starting with the smallest.

$\frac{1}{5}$ $\frac{3}{25}$ 13% 0.1

..... , ... , ... , ... [2]
smallest

3 **(a)** Work out the temperature that is 20 degrees higher than -12 °C.

..... °C [1]

(b) Work out the difference between -4 °C and 10 °C.

..... °C [1]

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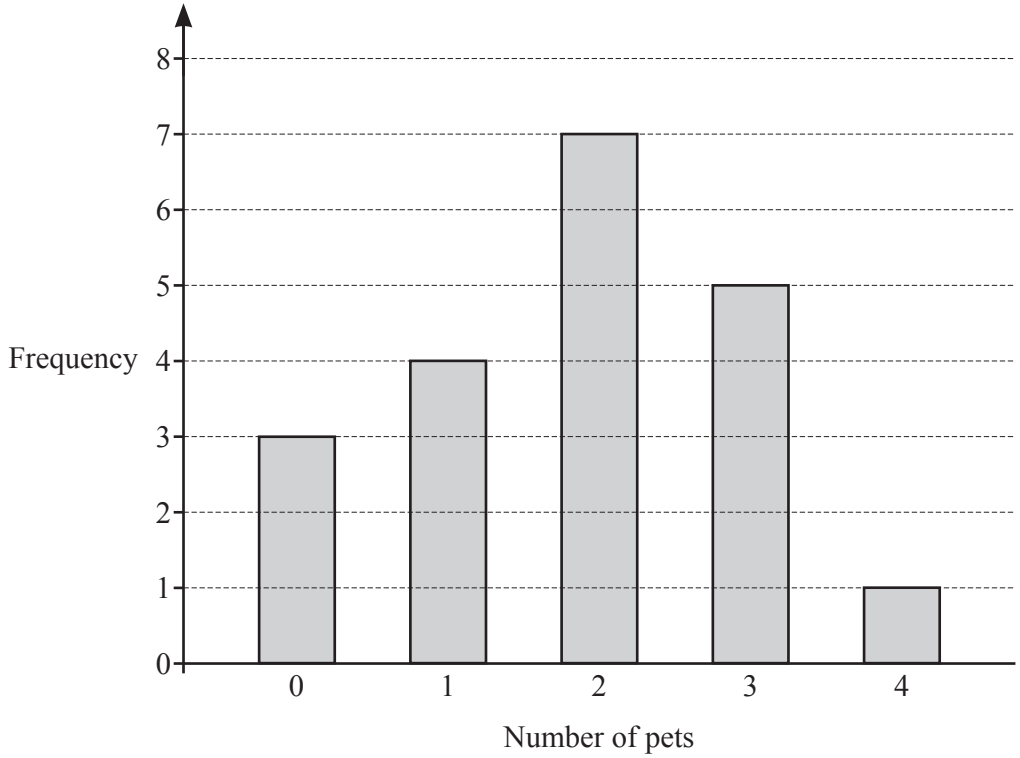
4 Kasia buys 12 apples.
Each apple costs 65 cents.

Work out how much Kasia pays.
Give your answer in dollars.

$ ..... [2]

5 Yasmin asks 20 people how many pets they own.
The results are shown in the bar chart.



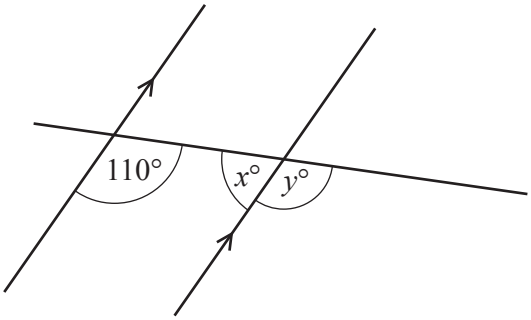
(a) Find the range.

..... [1]

(b) Find the fraction of the 20 people who own 3 pets.

..... [1]

6



NOT TO SCALE

The diagram shows a straight line crossing two parallel lines.

(a) Work out the value of x.

$x =$ ..... [1]

(b) Work out the value of y.

$y =$ ..... [1]

7 By writing each number correct to 1 significant figure, estimate the value of

$$\frac{53.7}{2.61 + 7.48}.$$

..... [2]

8 **(a)** Convert 78 mm to cm.

..... cm [1]

(b) Convert $3\,m^2$ to cm^2.

..... cm^2 [1]

9 The scatter diagram shows the ages of ten people and the time they each take to complete a task.

(a) Write down the type of correlation shown on the scatter diagram.

..... [1]

(b) By drawing a line of best fit, estimate the time taken by a person aged 50 to complete the task.

..... minutes [2]

10 **(a)** Four exterior angles of a pentagon are 150°, 100°, 45° and 35°.

Calculate the size of the remaining exterior angle.

..... [2]

(b) Calculate the interior angle of a regular decagon.

..... [2]

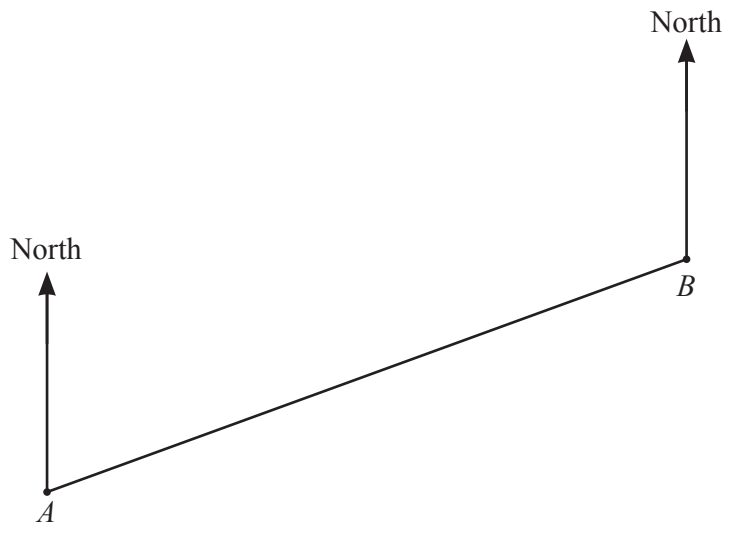
11 **(a)** Evaluate $4^2 + \sqrt[3]{27}$.

..... [1]

(b) Evaluate $5^{-1} \times 5^3$.

..... [2]

12 The scale drawing shows the positions of two boats A and B.
The scale is 1 : 20 000.



Scale 1 : 20 000

(a) Find the actual distance of boat A from boat B in kilometres.

..... km [2]

(b) **Using compasses and a straight edge only**, construct the locus of points that are equidistant from A and B. [2]

(c) A ship, S, is equidistant from A and B.
S is on a bearing of 105° from A.

Mark and label the position of S on the scale drawing. [1]

13 Work out $1\frac{3}{5} \div 1\frac{2}{3}$.

..... [2]

14 **(a)** Write 36 as a product of its prime factors.

..... [2]

(b) Bus A leaves the bus station every 36 minutes.
Bus B leaves the bus station every 48 minutes.
The two buses both leave the bus station at 09 30.

Find the next time when the two buses leave the bus station together.

..... [3]

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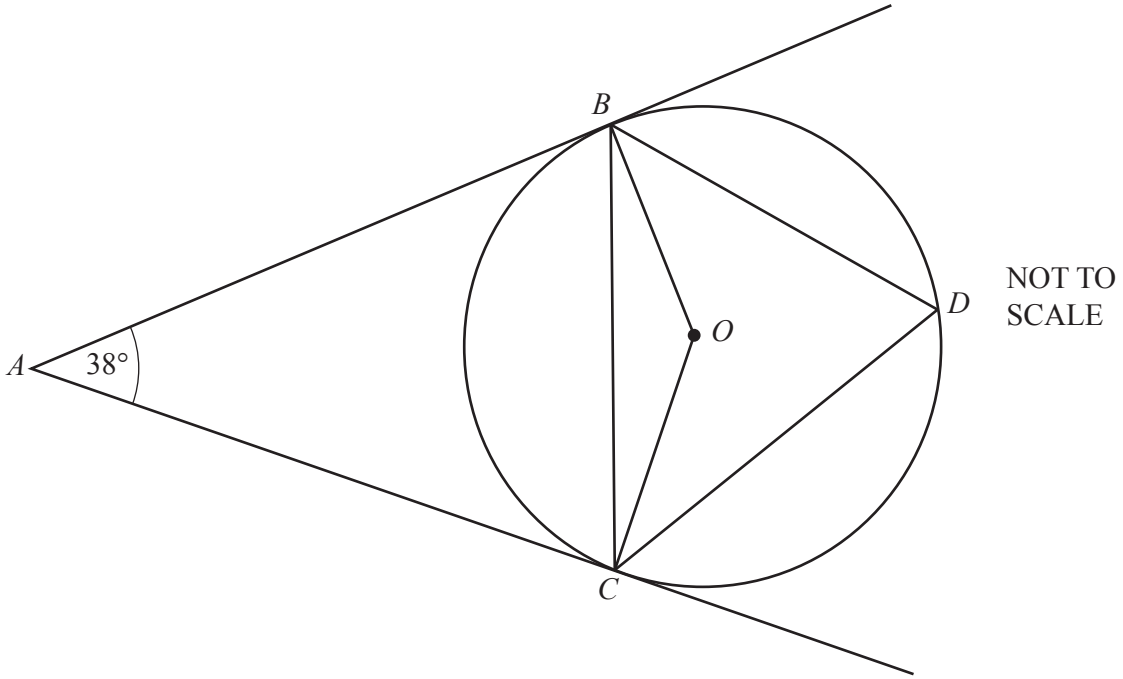
15



B, C and D are points on the circle, centre O.
AB and AC are tangents to the circle.
Angle $BAC = 38°$.

Work out

(a) angle ABC

Angle ABC = ... [1]

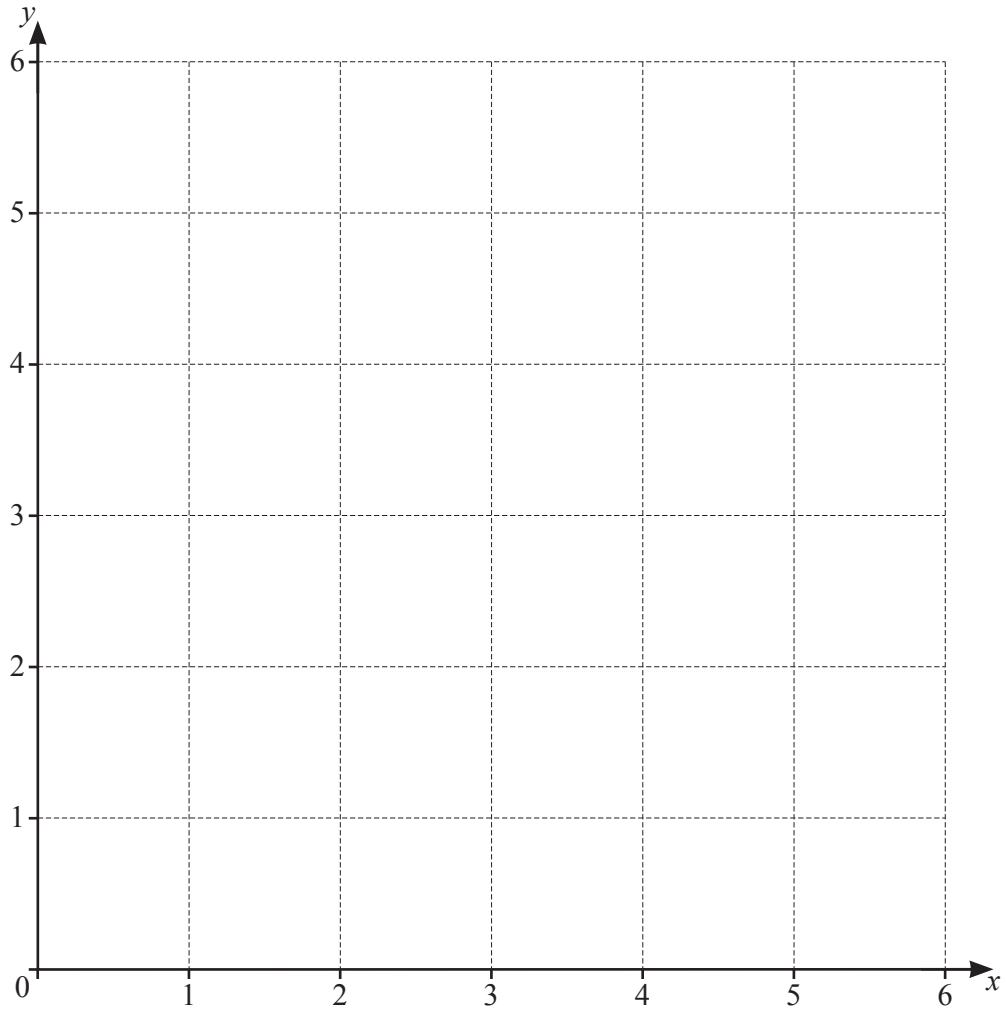
(b) angle BOC

Angle BOC = ... [2]

(c) angle BDC.

Angle BDC = ... [1]

16



The region R is defined by these inequalities.

$$1 \leqslant x \leqslant 3$$
$$2 \leqslant y \leqslant 3$$
$$y \geqslant \frac{x}{2} + 1$$

Find and label region R. [4]

17 y is directly proportional to the square root of x.
When $x = 16$, $y = 2$.

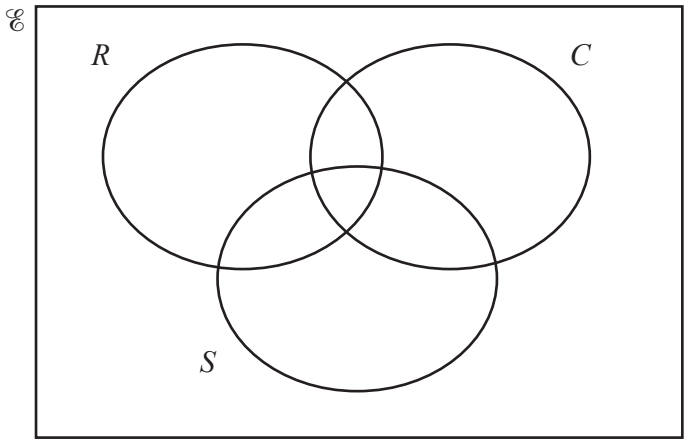
Find y when $x = 25$.

$y =$ ..... [2]

18 **(a)** In a sports club of 40 members:

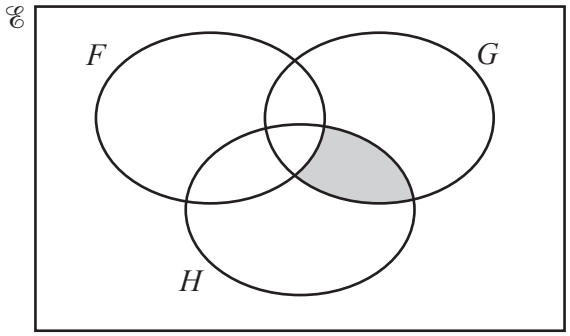
- 22 members run (R)
- 24 cycle (C)
- 14 sail (S)
- 3 cycle and sail but do not run
- 9 run and cycle but do not sail
- 5 run and sail but do not cycle
- 6 run only.

Complete the Venn diagram.



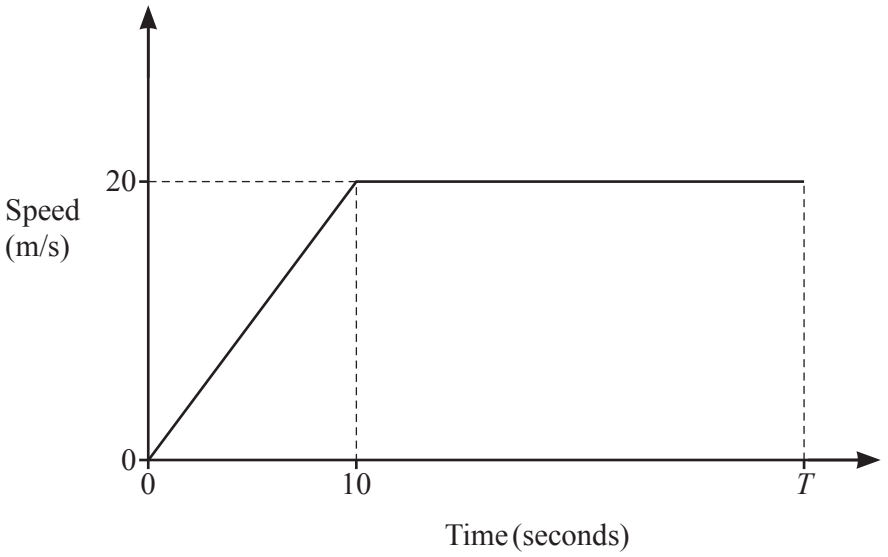
[3]

(b) Use set notation to describe the shaded subset in the Venn diagram.



..... [1]

19 The diagram shows the speed–time graph for part of a car journey.



NOT TO SCALE

(a) Calculate the acceleration of the car in the first 10 seconds of the journey.

..... m/s^2 [1]

(b) The car travels 700 m in T seconds.

Find the value of T.

$T =$ ..... [3]

20 $\mathbf{A} = \begin{pmatrix} -2 & 1 \\ 4 & 3 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 3 & 2 \\ -1 & 1 \end{pmatrix}$

(a) Find $\mathbf{A}^{-1}$.

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

(b) Find $\mathbf{AB}$.

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

21 **(a)** Factorise $6a - 9$.

..... [1]

(b) Factorise $4b^2 - 25$.

..... [1]

(c) Simplify $\dfrac{2c^2 - 8c}{2c^2 - 5c - 12}$.

..... [3]

22 $f(x) = \frac{x}{4} + 3$ $g(x) = 2(x-1)$

(a) Find $f(-8)$.

..... [1]

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

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

(c) $f(p) = g(p+5)$

Find the value of p.

$p =$ ..... [3]

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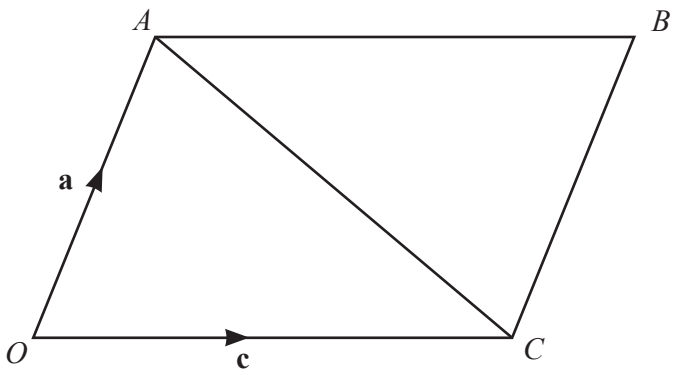
23



NOT TO SCALE

In the diagram, $OABC$ is a parallelogram.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.

X is the midpoint of AC.
Y is the point on AB where $AY : YB = 2 : 1$.

Express, as simply as possible, in terms of **a** and **c**

(a) $\overrightarrow{AC}$

$\overrightarrow{AC} =$ ..... [1]

(b) the position vector of X

..... [2]

(c) $\overrightarrow{YX}$.

$\overrightarrow{YX} =$ ..... [2]

Question 24 is printed on the next page.

24 Solve $\frac{3x}{x+1} - \frac{2}{x-1} = 3$.

$x =$ ..... [4]

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