



Cambridge O Level

CANDIDATE
NAME

CENTRE
NUMBER

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MATHEMATICS (SYLLABUS D)

4024/11

Paper 1

May/June 2021

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.

ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER

1 Work out.

(a) $74.6 \times 10 - 3.89 \times 100$

..... [1]

(b) $5 + 3 \times 2 - 1$

..... [1]

2 15 125 $\sqrt{8}$ 11 $\sqrt{25}$ 14 60

From the numbers above, write down

(a) a factor of 70,

..... [1]

(b) a cube number,

..... [1]

(c) an irrational number.

..... [1]

3 (a) Work out $\frac{3}{7} + \frac{2}{5}$.

..... [1]

(b) Find $\frac{2}{3}$ of $\frac{6}{11}$, giving your answer as a fraction in its simplest form.

..... [1]

- 4 (a) A record is kept of the water level in a harbour.
One morning, the level is 5 m. That afternoon, the level is -2 m.

Find the difference between the level in the morning and the level in the afternoon.

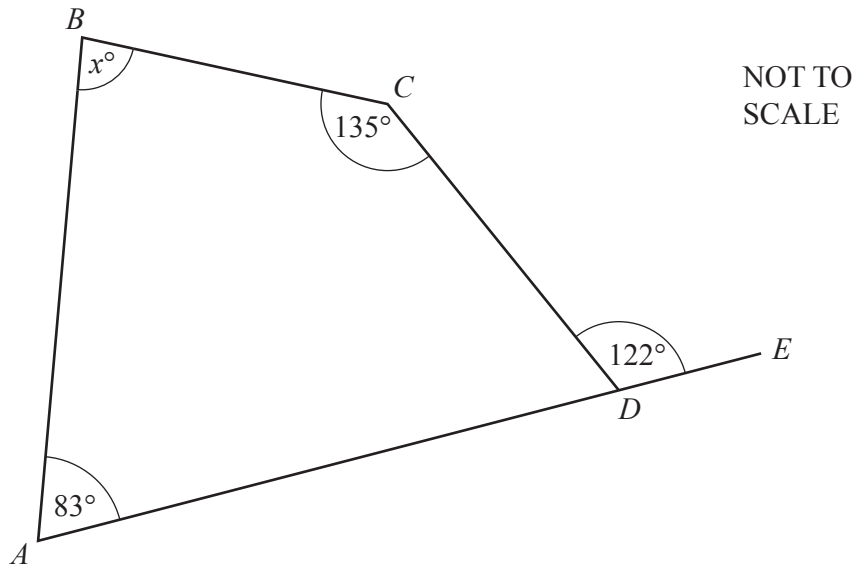
..... m [1]

- (b) One day, the temperature at midday is 9°C .
At midnight the temperature has dropped by 15.3°C .

Find the temperature at midnight.

..... $^{\circ}\text{C}$ [1]

5



The diagram shows quadrilateral $ABCD$ with AD extended to E .
Angle $BCD = 135^{\circ}$, angle $BAD = 83^{\circ}$ and angle $CDE = 122^{\circ}$.

Find the value of x .

$x =$ [2]

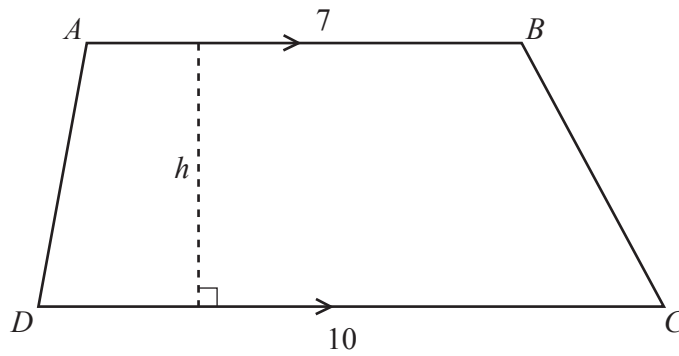
6 (a) Write 308 as a product of its prime factors.

..... [2]

(b) Find the highest common factor (HCF) of 308 and 66.

..... [1]

7



NOT TO SCALE

The diagram shows trapezium $ABCD$.
 $AB = 7$ cm and $DC = 10$ cm.
The area of $ABCD$ is 85 cm^2 .
The perpendicular height of the trapezium is h cm.

Find the value of h .

$h =$ [2]

8 (a) Simplify $6x + 15 - 2x + 8$.

..... [1]

(b) Expand and simplify $(x - 5)^2$.

..... [2]

9 Insert the correct symbol $=$, $>$ or $<$ to make each statement correct.

(a) 0.6 kg 60 g [1]

(b) 15 km $15\,000 \text{ m}$ [1]

(c) 4 m^2 400 cm^2 [1]

10 By writing each number correct to one significant figure, estimate the value of

$$\frac{362.4 - 187.2}{52.3}$$

..... [2]

- 11 (a) In a survey, 3 out of every 100 women were taller than 1.9 m.
One of these 100 women is picked at random.

Calculate the probability that she is **not** taller than 1.9 m.

..... [1]

- (b) A new housing estate is being planned.
There are three possible plans: *A*, *B* and *C*.
A survey was carried out to see which plan people preferred.
The relative frequency table shows the results.

Plan	<i>A</i>	<i>B</i>	<i>C</i>
Relative frequency	0.3	0.5	0.2

52 people preferred plan *C*.

- (i) Find how many people preferred plan *A*.

..... [2]

- (ii) Calculate the total number of people surveyed.

..... [1]

- 12 Bernard bought a game in the USA for \$15.
Alice bought the same game in Zambia and paid the equivalent price in Zambian kwacha (ZK).

<u>Exchange Rate</u>
1ZK = \$0.075

Calculate the price that Alice paid.

..... ZK [2]

- 13 Two numbers x and y are such that
- $x : y = 5 : 11$
- and
- $x + y = 112$.

Find x and y .

$x =$

$y =$ [2]

- 14 (a) This is the term-to-term rule for a sequence.

Multiply by 2 and add 3

The first three terms in this sequence are 1, 5 and 13.

Write down the next term in this sequence.

..... [1]

- (b) This is the term-to-term rule for a different sequence.

Square and subtract 5

The second and third terms in this sequence are -1 and -4 .

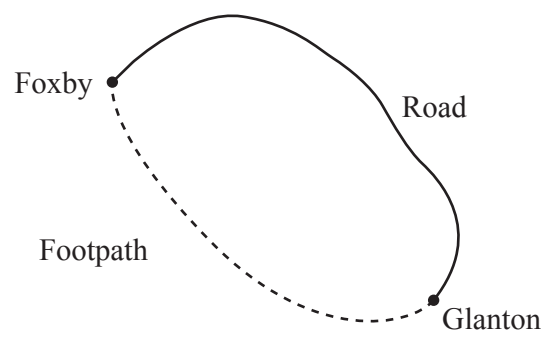
- (i) Write down the fourth term in this sequence.

..... [1]

- (ii) Write down the two possible values for the first term in this sequence.

..... or [2]

15



NOT TO SCALE

Two villages, Foxby and Glanton, are joined by a footpath and a road.

- (a) Abdul walks along the footpath from Foxby to Glanton. He walks for 2 hours 14 minutes and arrives at Glanton at 15 10.

Calculate the time Abdul left Foxby.

..... [1]

- (b) The distance, by road, between Foxby and Glanton is 15 km. A bus travels along the road between Foxby and Glanton. The bus journey takes 12 minutes.

Calculate the average speed of the bus in kilometres per hour.

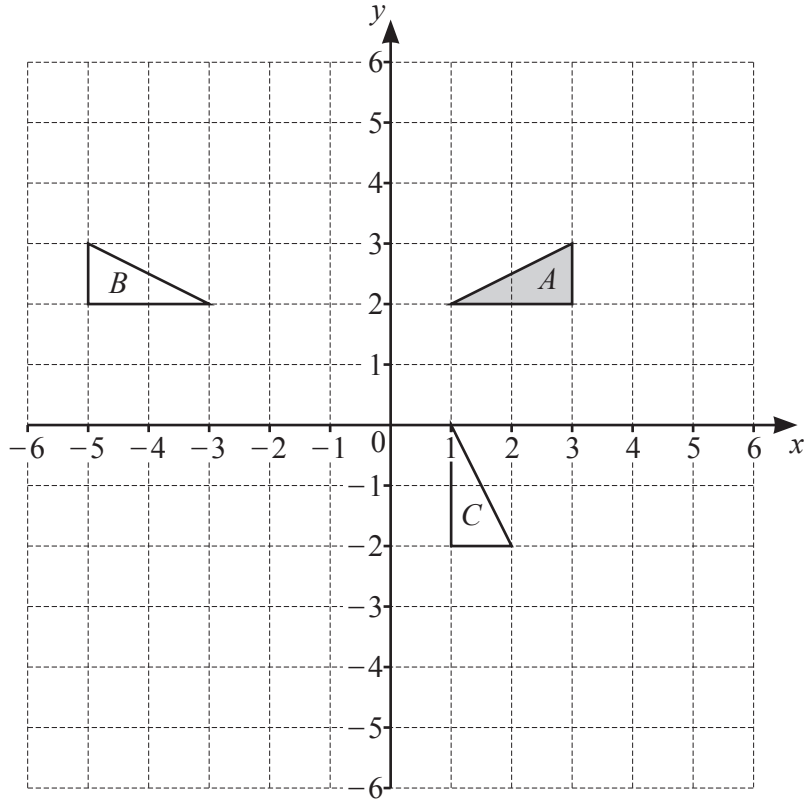
..... km/h [2]

- (c) The bearing of Glanton from Foxby is 128° .

Calculate the bearing of Foxby from Glanton.

..... [1]

16



Triangles *A*, *B* and *C* are drawn on the grid.

- (a) Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

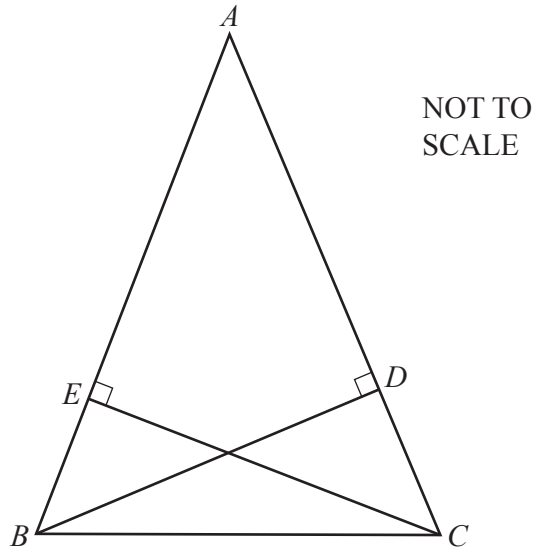
.....
 [2]

- (b) Describe fully the **single** transformation that maps triangle *A* onto triangle *C*.

.....
 [3]

- (c) Triangle *D* is the image of triangle *A* after an enlargement, scale factor 2, with centre of enlargement (1, 2).

Draw triangle *D*. [2]



The diagram shows an isosceles triangle ABC where $AB = AC$.
 D is a point on AC such that angle $ADB = 90^\circ$.
 E is a point on AB such that angle $AEC = 90^\circ$.

Show that triangles ADB and AEC are congruent.
Give a reason for each statement you make.

.....

.....

.....

.....

.....

..... [3]

- 18 Solve the simultaneous equations.
Show your working.

$$\begin{aligned}x + 6y &= 0 \\ 3x - 2y &= 10\end{aligned}$$

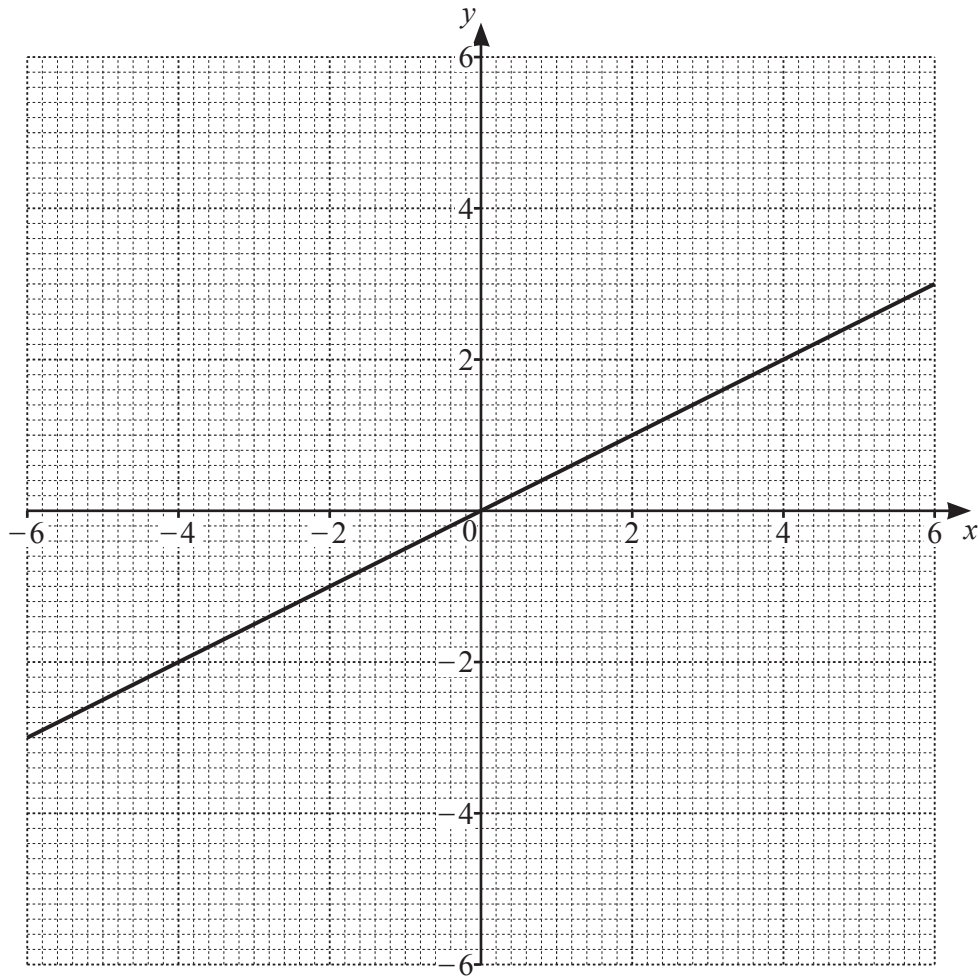
$x =$

$y =$ [3]

- 19 y is proportional to $(x - 1)^2$.

Given that $y = 18$ when $x = 4$, find y when $x = 6$.

$y =$ [2]



The line $2y = x$ is drawn on the grid.

(a) On the grid, draw the graph of

(i) $y = 2$,

[1]

(ii) $y + x = 4$.

[1]

(b) On the grid, shade and label the region **R**, defined by the following inequalities.

$$x + y \leq 4 \quad 2y \geq x \quad y \leq 2 \quad x \geq 0$$

[2]

21 Factorise.

(a) $3cx + 2bx - 6cy - 4by$

..... [2]

(b) $6x^2 + 7x - 10$

..... [2]

22 A car has a mass of 2400 kg, correct to the nearest hundred kilograms.
A caravan has a mass of 1460 kg, correct to the nearest ten kilograms.

Calculate the lower bound for the total mass of the car and caravan.

..... kg [2]

23 (a) $a = \frac{b^2 + c}{d}$

- (i) Find a when $b = 4 \times 10^2$, $c = 6 \times 10^3$ and $d = 2 \times 10^2$.
Write your answer in standard form.

$a = \dots\dots\dots$ [3]

- (ii) Rearrange the formula to make b the subject.

$b = \dots\dots\dots$ [3]

(b) $m \times 10^4 + m \times 10^2 = 36\,360$

Work out $m \times 10^4 - m \times 10^2$.

$\dots\dots\dots$ [2]

24 (a) $\mathbf{M} = \begin{pmatrix} 5 & 1 \\ 2 & 3 \end{pmatrix}$ $\mathbf{N} = \begin{pmatrix} 4 & -2 \\ 3 & 0 \end{pmatrix}$

Find $\mathbf{M} - \mathbf{N}$.

$\begin{pmatrix} & \\ & \end{pmatrix}$ [1]

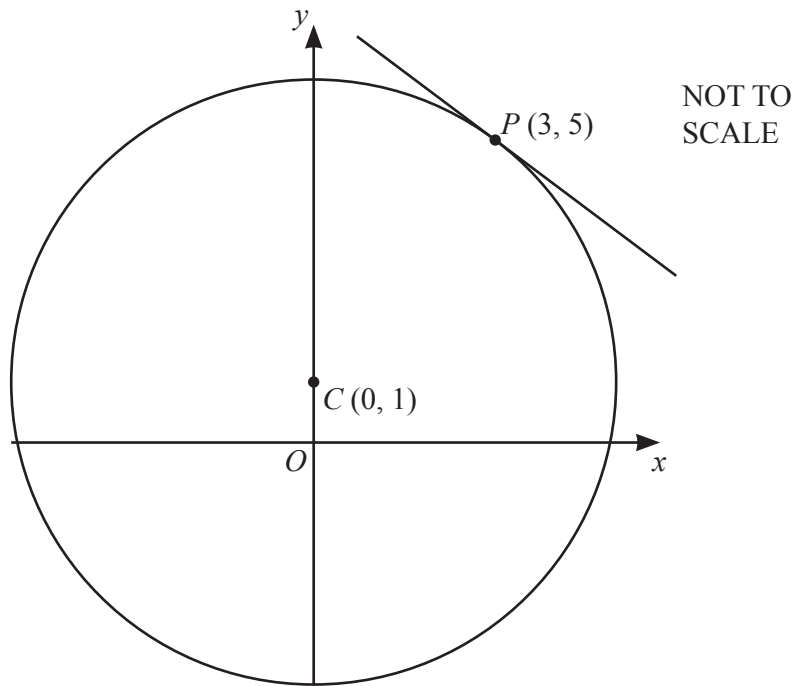
(b) $\mathbf{P} = \begin{pmatrix} 2 & 4 \\ c & -5 \end{pmatrix}$ $\mathbf{Q} = \begin{pmatrix} 3 & 2 \\ -2 & d \end{pmatrix}$ $\mathbf{PQ} = \begin{pmatrix} -2 & 0 \\ 19 & 11 \end{pmatrix}$

Find the value of c and the value of d .

$c = \dots\dots\dots$

$d = \dots\dots\dots$ [2]

Question 25 is printed on the next page.



The diagram shows a circle centre $C(0, 1)$.
 $P(3, 5)$ is a point on the circumference of the circle.

Find the equation of the tangent at P .

..... [4]

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