



CANDIDATE
NAME

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CENTRE
NUMBER

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CANDIDATE
NUMBER

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4024/01

For examination from 2025

2 hours

You will need: Geometrical instruments

- 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.

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

[Turn over

List of formulas

Area, A , of triangle, base b , height h .

$$A = \frac{1}{2}bh$$

Area, A , of circle of radius r .

$$A = \pi r^2$$

Circumference, C , of circle of radius r .

$$C = 2\pi r$$

Curved surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Curved surface area, A , of cone of radius r , sloping edge l .

$$A = \pi rl$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

Volume, V , of pyramid, base area A , height h .

$$V = \frac{1}{3}Ah$$

Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of cone of radius r , height h .

$$V = \frac{1}{3}\pi r^2 h$$

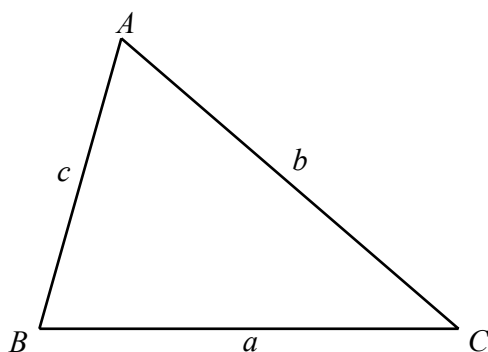
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

For the equation $ax^2 + bx + c = 0$, where $a \neq 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For the triangle shown,



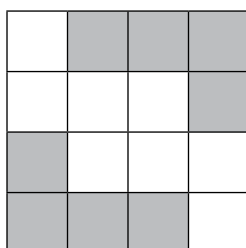
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc \cos A$$

$$\text{Area} = \frac{1}{2}ab \sin C$$

Calculators must **not** be used in this paper.

1



Write down the order of rotational symmetry of the diagram.

..... [1]

- 2 Dora records the temperature at 6 am every day for 7 days.
These are the temperatures in °C.

−4 3 0 −5 −1 −2 1

- (a) Write these temperatures in order of size, starting with the lowest.

.....,,,,,, [1]
lowest

- (b) Work out the difference between the highest and the lowest temperature.

..... °C [1]

- (c) Find the median temperature.

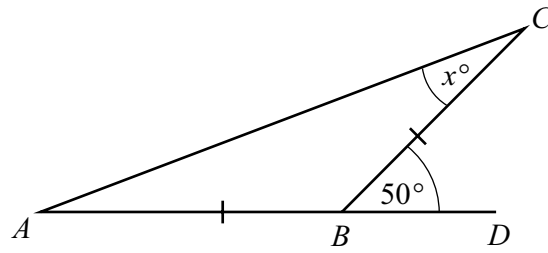
..... °C [1]

- 3 Put one pair of brackets in each statement to make it correct.

(a) $16 \div 8 + 4 \times 2 = 1$ [1]

(b) $16 \div 8 + 4 \times 2 = 12$ [1]

4

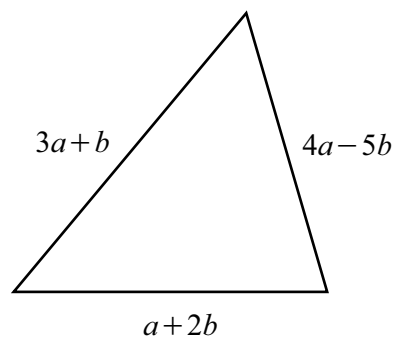
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$AB = BC$ and ABD is a straight line.

Find the value of x .

$x = \dots\dots\dots$ [2]

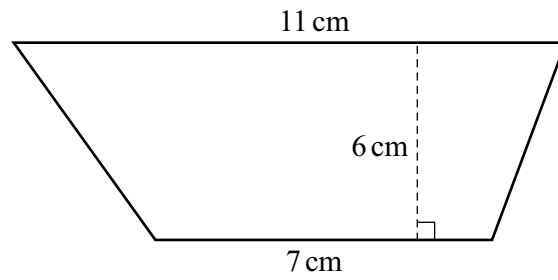
5

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Find an expression for the perimeter of this triangle.
Give your answer in its simplest form.

$\dots\dots\dots$ [3]

6

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Calculate the area of the trapezium.

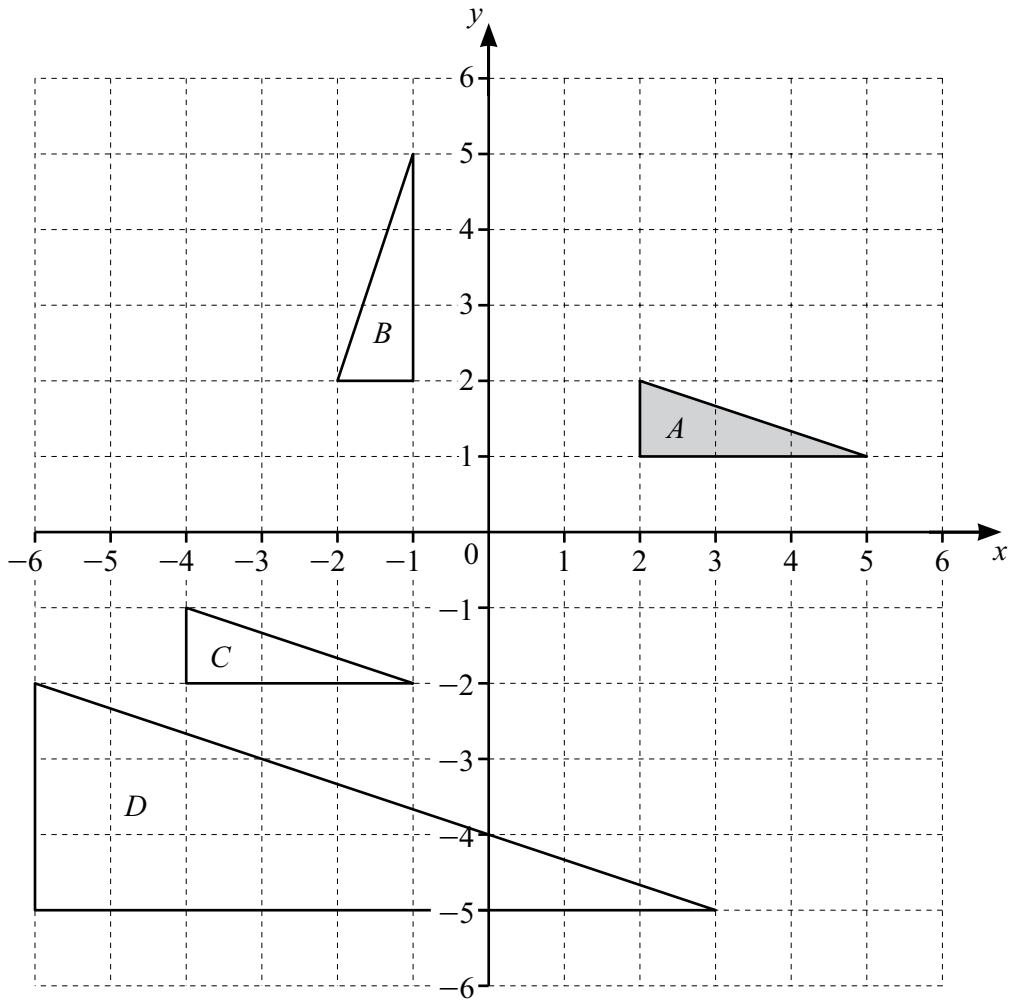
..... cm^2 [2]

7 (a) Write $\frac{1}{20}$ as a percentage.

..... % [1]

(b) Write 0.2 as a fraction.

..... [1]



(a) Describe fully the **single** transformation that maps

(i) triangle A onto triangle B

.....
 [3]

(ii) triangle A onto triangle C

.....
 [2]

(iii) triangle A onto triangle D .

.....
 [3]

(b) On the grid, draw the image of triangle A after a reflection in the line $y = -1$. [2]

- 9 Roberto buys a toy for \$5.00 .
He sells the toy for \$4.60 .

Calculate his percentage loss.

.....% [2]

- 10 Work out $1\frac{3}{4} - \frac{11}{12}$.

Give your answer as a fraction in its simplest form.

..... [3]

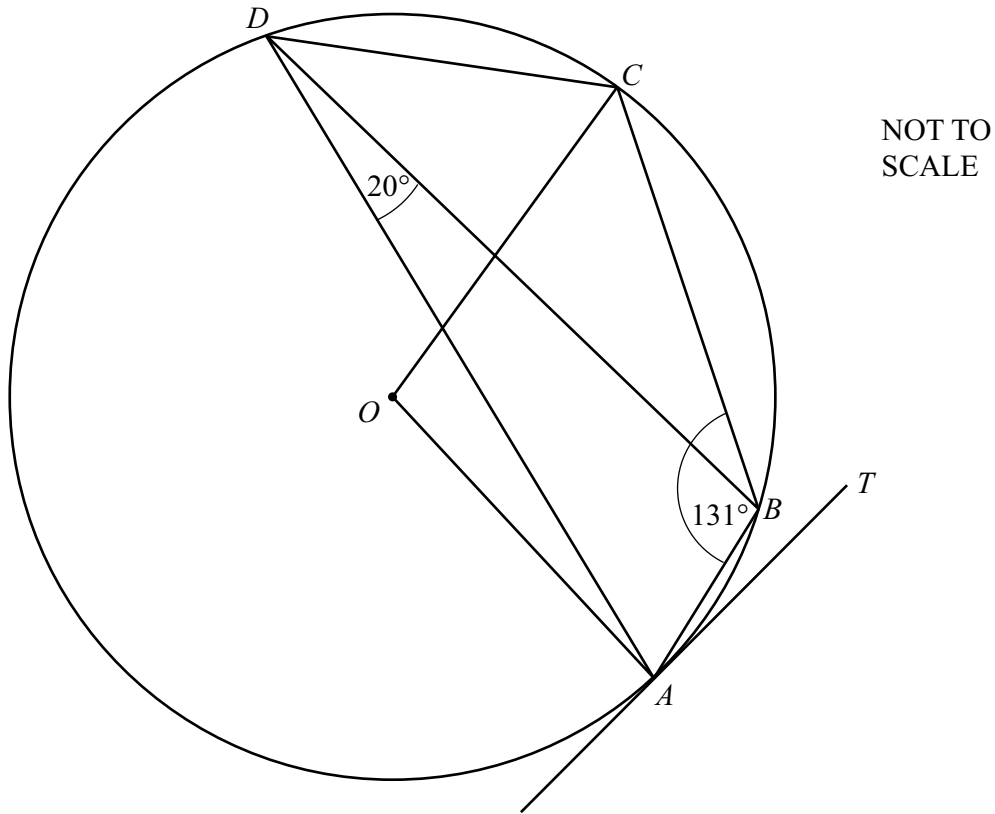
- 11 (a) Write 216 as a product of its prime factors.

..... [2]

- (b) Two positive integers are each greater than 25.
The lowest common multiple (LCM) of the two integers is 216.
The highest common factor (HCF) of the two integers is 18.

Find the two integers.

..... and [2]



A, B, C and D lie on the circle, centre O .
 TA is a tangent to the circle at A .
 Angle $ABC = 131^\circ$ and angle $ADB = 20^\circ$.

Find

(a) angle ADC

Angle $ADC = \dots\dots\dots$ [1]

(b) angle AOC

Angle $AOC = \dots\dots\dots$ [1]

(c) angle BAT

Angle $BAT = \dots\dots\dots$ [1]

(d) angle OAB .

Angle $OAB = \dots\dots\dots$ [1]

- 13 (a)** Write 1.48×10^5 as an ordinary number.

..... [1]

- (b)** Calculate $(3 \times 10^{-3})^3$.
Give your answer in standard form.

..... [2]

14 $\mathbf{p} = \begin{pmatrix} 4 \\ 6 \end{pmatrix}$ $\mathbf{q} = \begin{pmatrix} -2 \\ 7 \end{pmatrix}$

- (a)** Find $2\mathbf{p} + \mathbf{q}$.

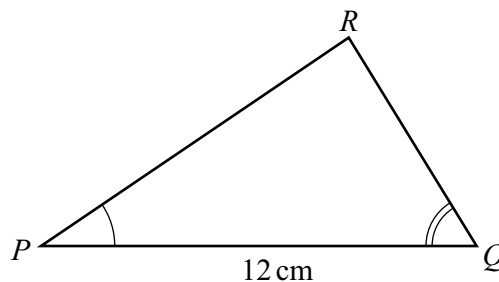
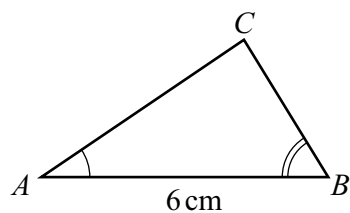
$\begin{pmatrix} \\ \end{pmatrix}$ [2]

- (b)** Find the exact value of $|\mathbf{p}|$.

Give your answer in its simplest form.

..... [3]

15

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Triangle ABC is mathematically similar to triangle PQR .
The area of triangle ABC is 15 cm^2 .

(a) Calculate the area of triangle PQR .

..... cm^2 [2]

(b) The triangles are the cross-sections of prisms which are also mathematically similar.
The volume of the smaller prism is 300 cm^3 .

Calculate the length of the larger prism.

..... cm [3]

16 $f(x) = 3x + 2$ $g(x) = x^2 + 1$ $h(x) = 4^x$

(a) Find $h(3)$.

..... [1]

(b) The domain of $f(x)$ is $-4 \leq x \leq 4$.

Find the range of $f(x)$.

..... [2]

(c) Find $fg(1)$.

..... [2]

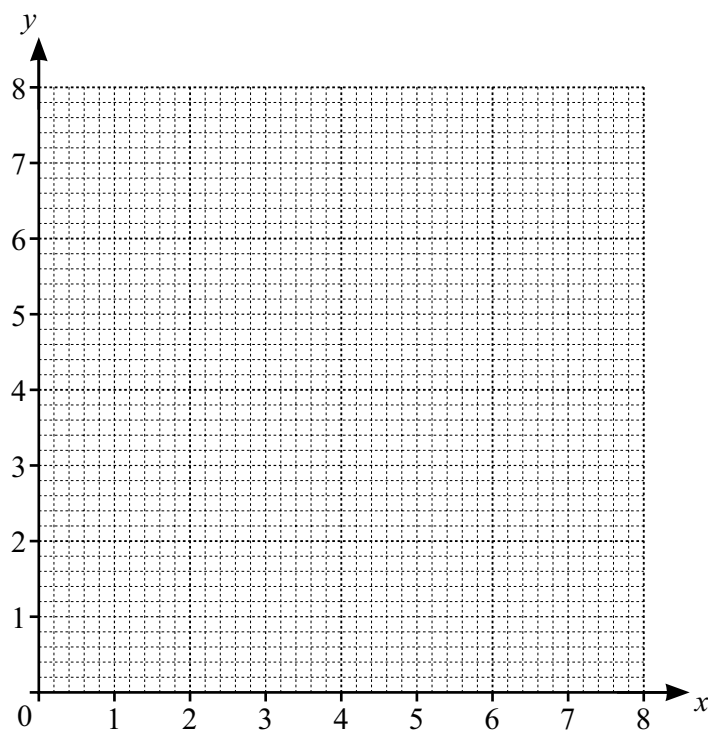
(d) Find $gf(x)$ in the form $ax^2 + bx + c$.

..... [3]

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

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

17



The region R is defined by these three inequalities.

$$\begin{aligned}x &\geq 2 \\ y &\geq x \\ 2x + y &\leq 8\end{aligned}$$

By drawing suitable lines and shading unwanted regions, find the region R .

[5]

18 Tanya plants some seeds.

The probability that a seed will produce flowers is 0.8 .

When a seed produces flowers, the probability that the flowers are red is 0.6 .

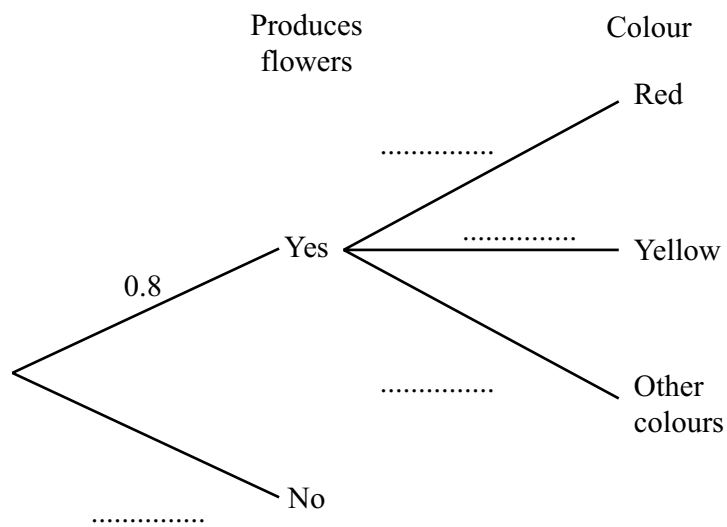
When a seed produces flowers, the probability that the flowers are yellow is 0.3 .

(a) Tanya has a seed that produces flowers.

Find the probability that the flowers are not red and are not yellow.

..... [1]

(b) (i) Complete the tree diagram.



[2]

(ii) Tanya chooses a seed at random.

Find the probability that this seed produces red flowers.

..... [2]

- (iii) Tanya chooses a seed at random.

Find the probability that this seed does not produce red flowers and does not produce yellow flowers.

..... [3]

- 19 Ella's height is 175 cm, correct to the nearest 5 cm.

- (a) Write down the upper bound of Ella's height.

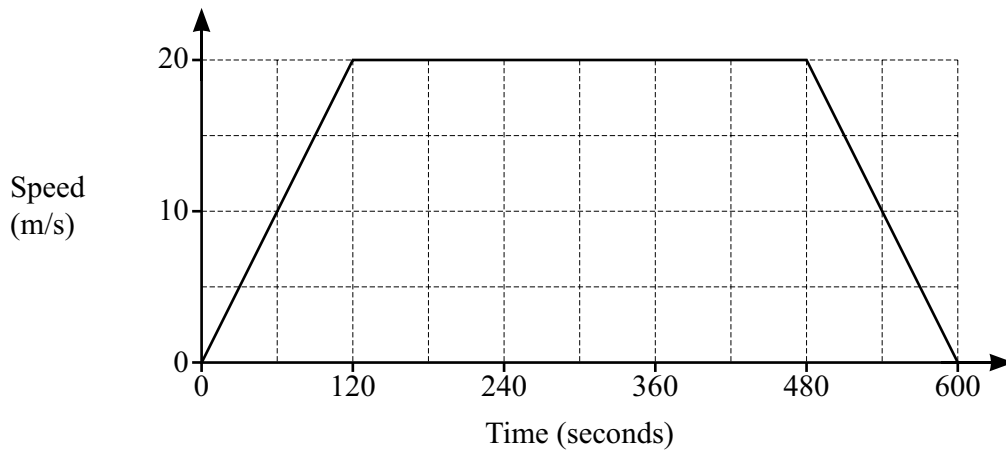
..... cm [1]

- (b) Rafael's height is 161 cm, correct to the nearest cm.

Work out the upper bound of the difference between Ella's height and Rafael's height.

..... cm [2]

20 The diagram shows the speed–time graph of Sam’s journey from home to work.



- (a) Calculate the acceleration for the first 2 minutes of Sam’s journey.
Give your answer in m/s^2 .

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

- (b) Calculate Sam’s average speed for the whole journey.
Give your answer in m/s .

..... m/s [3]

- 21** A solid cylinder has radius x cm and height $\frac{7x}{2}$ cm.

A solid sphere has radius R cm.

The surface area of the sphere is equal to the total surface area of the cylinder.

Find an expression for R in terms of x .

$$R = \dots\dots\dots [3]$$

- 22** y is inversely proportional to $(x + 1)^2$.
When $x = 1$, $y = 5$.

Find y when $x = 9$.

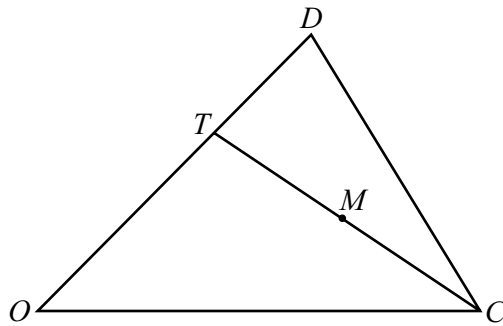
$$y = \dots\dots\dots [3]$$

23 Simplify fully by rationalising the denominator.

$$\frac{45}{\sqrt{6} + 1}$$

..... [3]

24



NOT TO
SCALE

In the diagram, O is the origin, $OT = 2TD$ and M is the midpoint of TC .
 $\overrightarrow{OC} = \mathbf{c}$ and $\overrightarrow{OD} = \mathbf{d}$.

Find the position vector of M .
 Give your answer in terms of \mathbf{c} and \mathbf{d} in its simplest form.

..... [3]

25 Solve.

$$\frac{x}{x-4} + \frac{9}{x+1} = 2$$

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [7]

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