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Cambridge Assessment International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

5491764877

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

Paper 1 Non-calculator **October/November 2025**

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

This document has **20** pages.

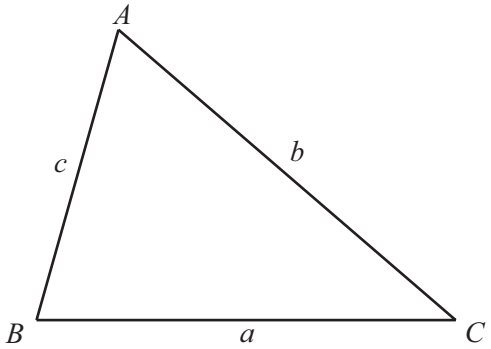
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List of formulas

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,



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

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

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

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

1 Write down the reciprocal of $\frac{7}{2}$.

..... [1]

2 Some children record the number of hours they each spend watching television one day.
These are the results.

1 2 2 2 6 7 7 8 10

(a) Write down the mode.

..... [1]

(b) One of the 9 children is chosen at random.

Find the probability that this child spends more than 6 hours watching television on this day.

..... [1]

3 A shirt costs $24.
In a sale the cost is reduced by 15%.

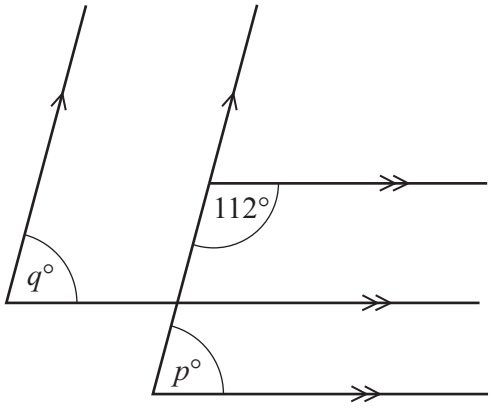
Work out the cost of the shirt in the sale.

$ ..... [2]

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4 The diagram shows five straight lines.



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The diagram shows three horizontal parallel lines and two sloping parallel lines.

(a) Find the value of p.
Give a geometrical reason to explain your answer.

p = ... because .....

..... [2]

(b) Find the value of q.
Give a geometrical reason to explain your answer.

q = ... because .....

..... [2]

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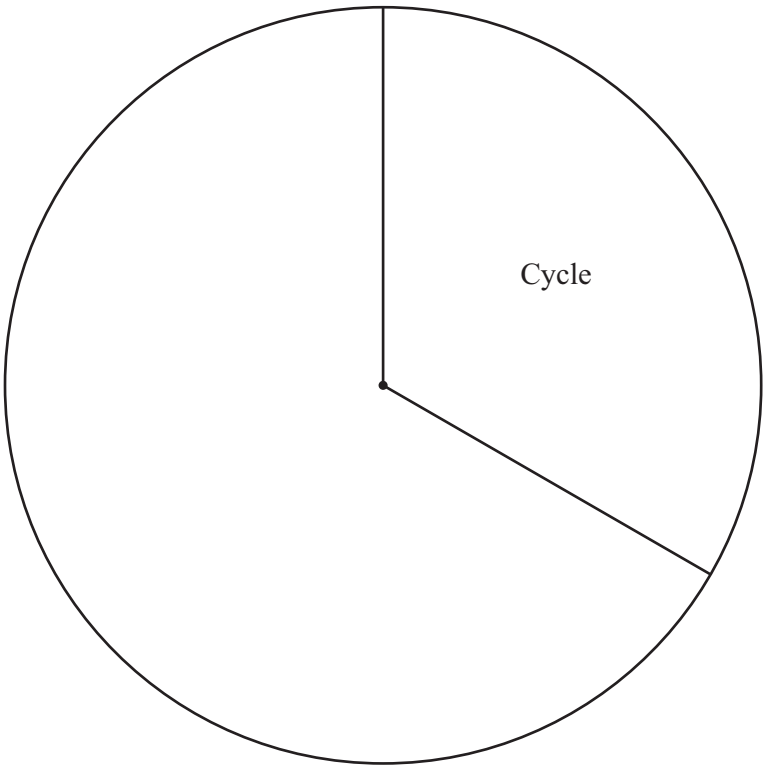
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5 The table shows how some people travel to work.

Type of travel	Number of people	Pie chart angle
Cycle	20	120°
Walk	12	72°
Car		
Bus	5	

(a) Complete the table. [2]

(b) Complete the pie chart to show the information in the table.



[2]

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6 Sam buys some chocolate.

He eats $\frac{2}{7}$ of the chocolate.

The mass of the **remaining** chocolate is 350 g.

Work out the mass of the chocolate Sam buys.

..... g [2]

7

Car hire
\$40 per day **plus** \$0.30 per kilometre

Amy hires a car for 10 days.
She pays a total of \$670.

Work out the number of kilometres Amy travels in the car.

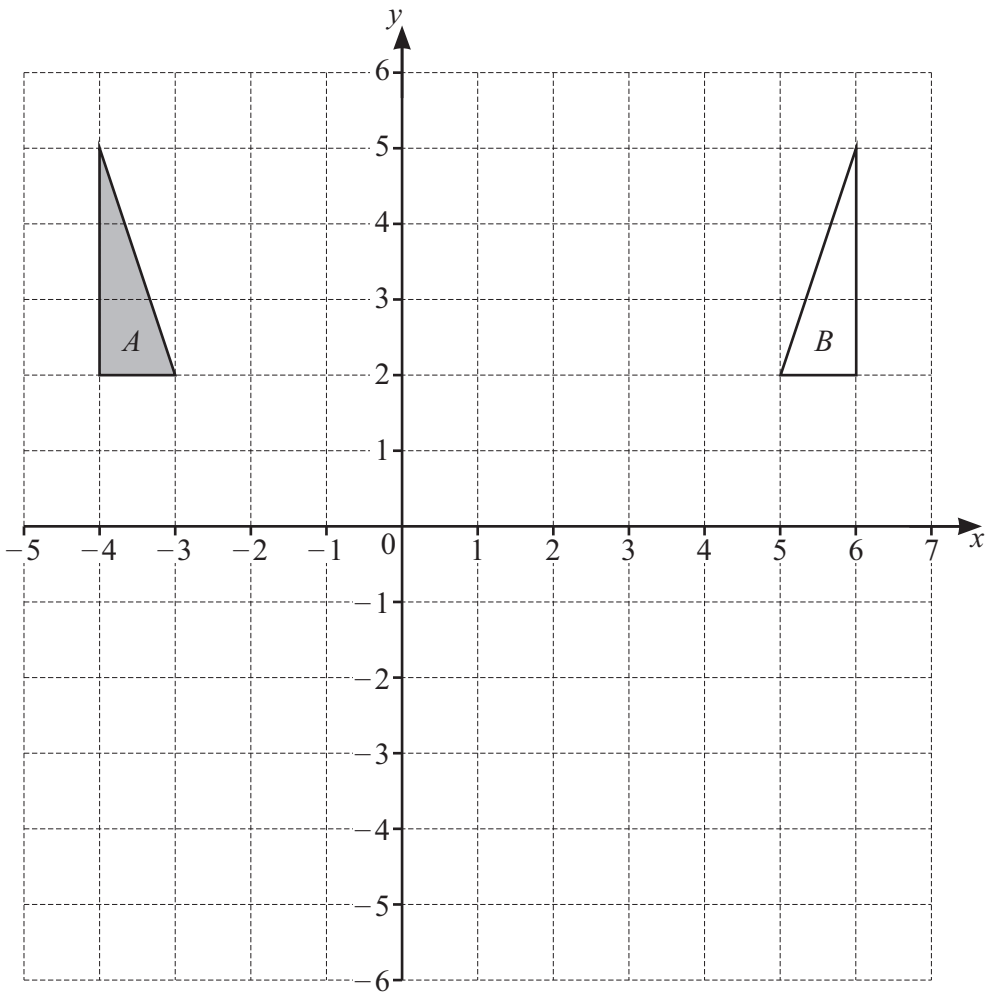
..... km [3]

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8 The diagram shows triangle A and triangle B.



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

.....

..... [2]

(b) Draw the image of triangle A after a rotation of 180° about centre (0, 0). [2]

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9 By writing each number correct to 1 significant figure, work out an estimate for the value of

$$\frac{\sqrt{102.5} \times 8.7}{27}.$$

..... [2]

10 A circle has diameter 12 cm.

Find the area of the circle.
Give your answer in terms of π.

..... cm^2 [2]

11 A bag contains 10 plums.
The mean mass of 6 of the plums is 50 g.
The mean mass of the remaining 4 plums is 40 g.

Calculate the mean mass of all 10 plums in the bag.

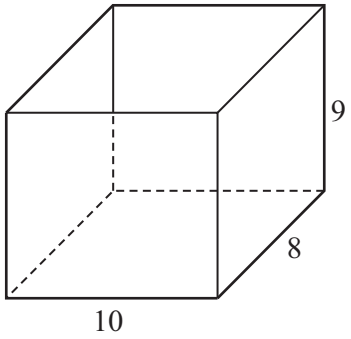
..... g [3]

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NOT TO SCALE

The diagram shows an empty container.
The container is a cuboid of width 10 cm, length 8 cm and height 9 cm.
Water drips into the container at a rate of 6 millilitres per second.

Find the time, in seconds, it takes to fill the container.

..... seconds [3]

13 Work out $2\frac{2}{3}+3\frac{3}{4}$.

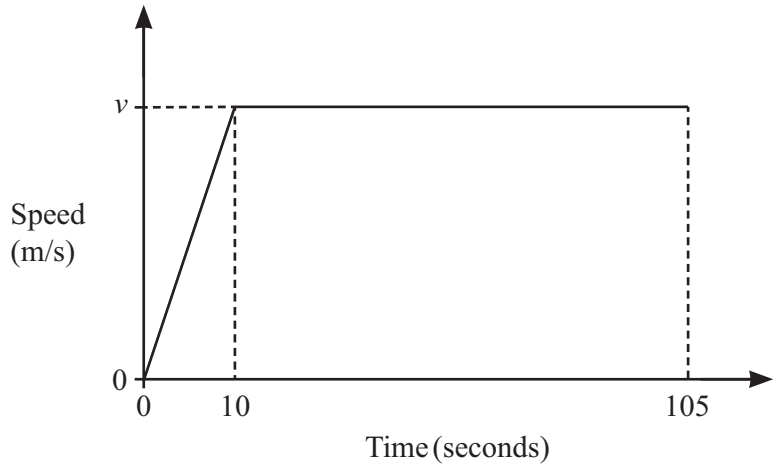
Give your answer as a mixed number in its simplest form.

..... [3]

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14



NOT TO SCALE

Lia cycles 800 m in 105 seconds.
The diagram shows the speed–time graph for this journey.

(a) Work out the value of v.

$v =$ ..... [2]

(b) Work out Lia's acceleration during the first 10 seconds.

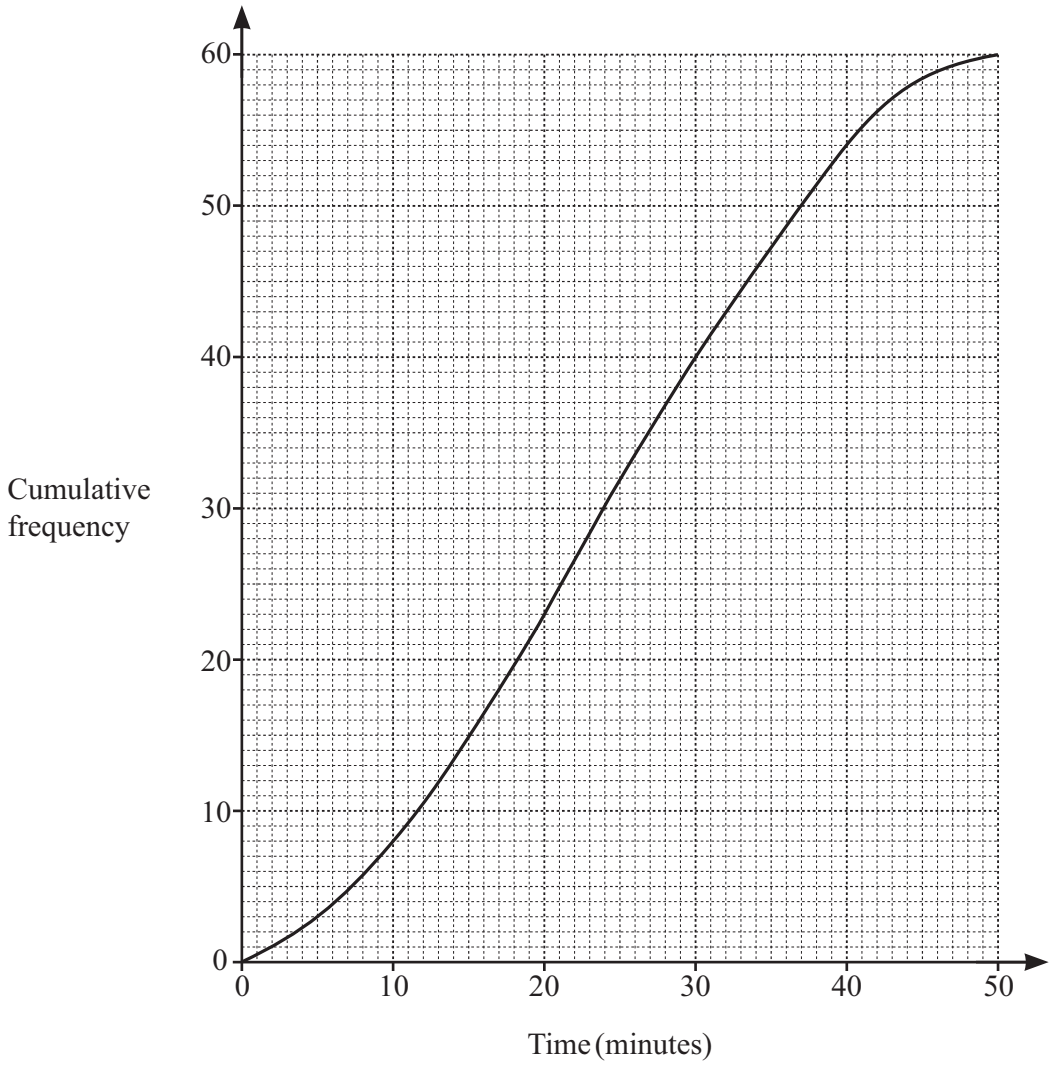
..... m/s^2 [1]

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15 The cumulative frequency diagram shows information about journey times.



Use the cumulative frequency diagram to find an estimate for

(a) the median

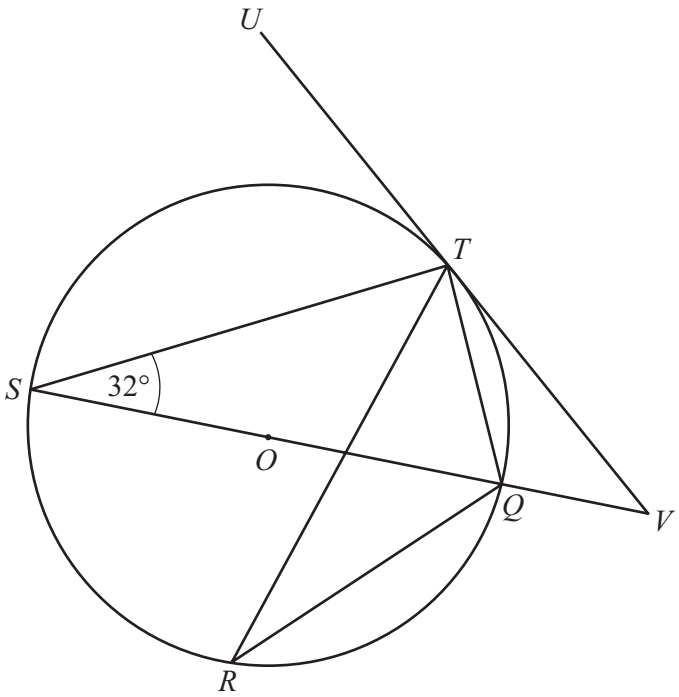
..... minutes [1]

(b) the number of journeys that took 20 minutes or more.

..... [2]

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NOT TO SCALE

Points Q, R, S and T lie on a circle, centre O.
UV is a tangent to the circle at T.
$SOQV$ is a straight line.
Angle $QST = 32°$.

(a) Find angle QRT.
Give a geometrical reason to explain your answer.

Angle QRT = ... because .....

..... [2]

(b) Find angle TQS.

Angle TQS = ... [2]

(c) Find angle TVQ.

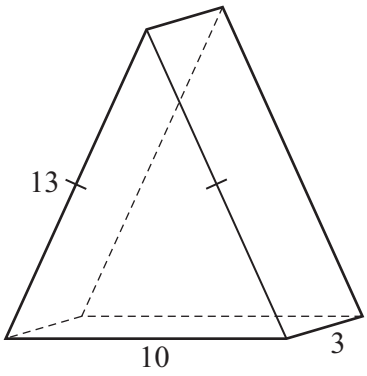
Angle TVQ = ... [2]

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NOT TO SCALE

The diagram shows a prism.
The cross-section of the prism is an isosceles triangle with sides 13 cm, 13 cm and base 10 cm.
The length of the prism is 3 cm.

(a) Show that the volume of the prism is 180 cm^3.

[4]

(b) A mathematically similar prism has a volume of 1440 cm^3.
The cross-section of this prism is an isosceles triangle with base x cm.

Calculate the value of x.

$x =$ ..... [3]

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18 Write $0.1\dot{4}$ as a fraction.

..... [2]

19 $g(x) = \frac{x}{2} + 4$ $h(x) = 3x - 1$

Solve $hg(x) = 5$.

$x =$ ..... [3]

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20 Write as a single fraction in its simplest form.

$$\frac{5}{2x} - \frac{4}{7x}$$

..... [2]

21 **(a)** Evaluate.

$$27^{-\frac{2}{3}}$$

..... [2]

(b) Simplify.

$$\left(\frac{1}{100}x^{100}\right)^{\frac{1}{2}}$$

..... [2]

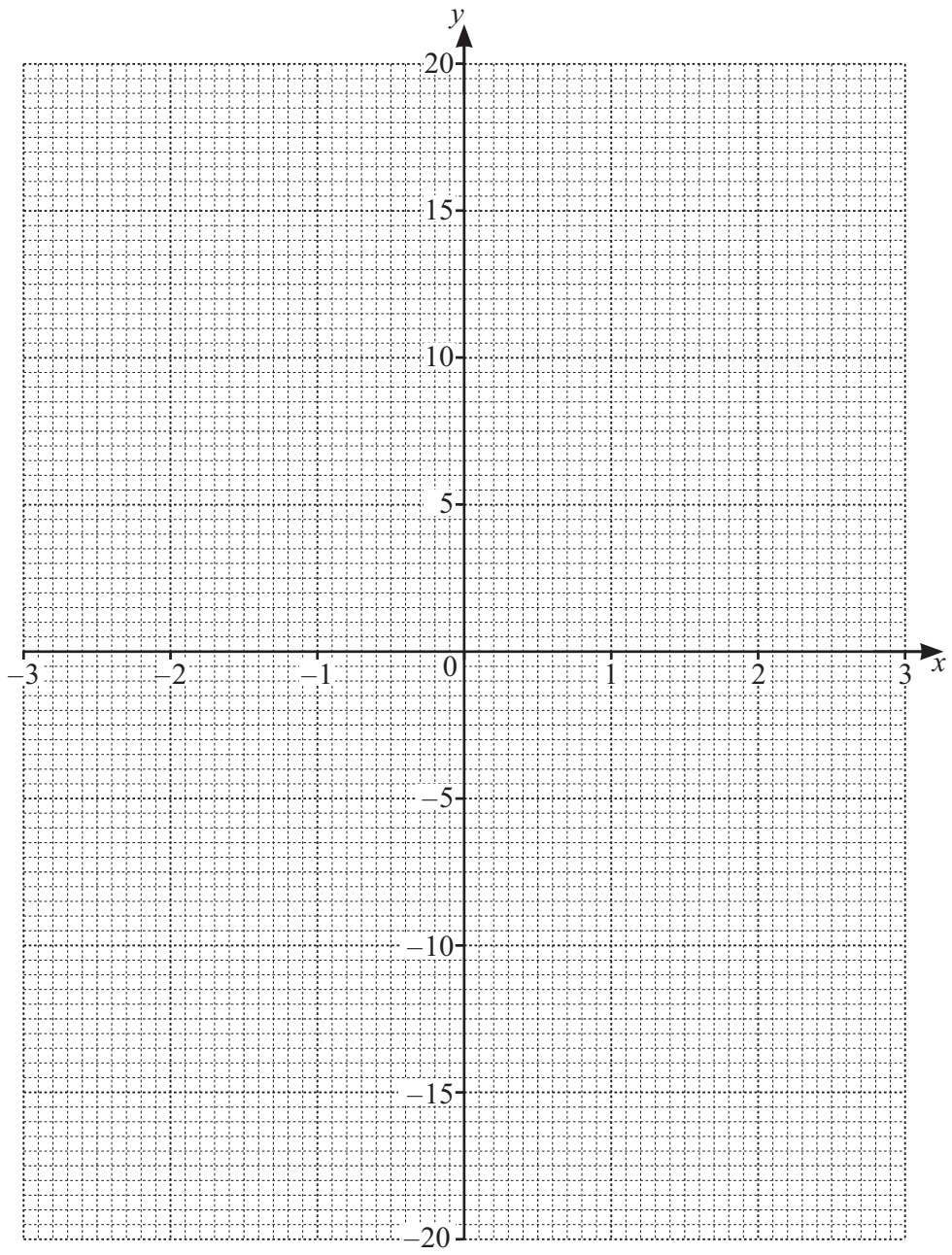
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22 The table shows some values for $y = x^3 - 3x + 2$.

x	-3	-2	-1	0	1	2	3
y	-16		4	2	0		20

(a) Complete the table. [2]

(b) Draw the graph of $y = x^3 - 3x + 2$ for $-3 \leqslant x \leqslant 3$.



[4]

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(c) By drawing a suitable line on the grid, find the solutions of the equation $x^3 - 7x + 1 = 0$.

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

23 **(a)** Simplify.

$\sqrt{8} \times \sqrt{6} + \sqrt{3}$

..... [2]

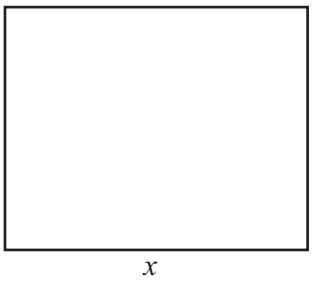
(b) Rationalise the denominator and simplify.

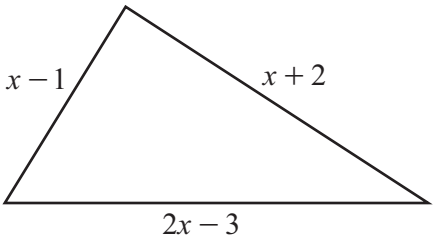
$\dfrac{3}{2 - \sqrt{5}}$

..... [3]

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24 The diagram shows a rectangle and a triangle.





NOT TO SCALE

The length of the rectangle is x cm and the area of the rectangle is $30\,\text{cm}^2$.
The triangle has sides of length $(x-1)$ cm, $(x+2)$ cm and $(2x-3)$ cm.

(a) Write down an expression, in terms of x, for the width of the rectangle.

..... cm [1]

(b) The perimeter of the rectangle is equal to the perimeter of the triangle.

Form an equation in x and show that it simplifies to $x^2 - x - 30 = 0$.

[4]

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(c) Solve the equation $x^2 - x - 30 = 0$.

$x =$ ..... or $x =$ ..... [3]

(d) Work out the perimeter of the rectangle.

..... cm [2]

25 Factorise.

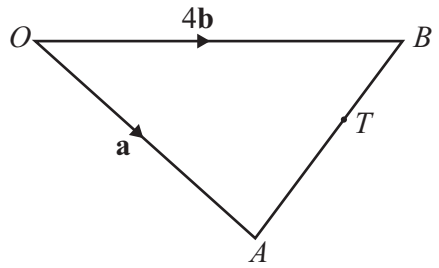
$6x^3 + 5x^2 - 4x$

..... [3]

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NOT TO SCALE

The diagram shows triangle OAB.
$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = 4\mathbf{b}$.
T is a point on AB such that $AT : TB = 3 : 2$.

(a) Find $\overrightarrow{AB}$ in terms of $\mathbf{a}$ and $\mathbf{b}$.

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

(b) Show that the position vector of T is $\frac{2}{5}(\mathbf{a}+6\mathbf{b})$.

[3]

(c) Q is a point on OB and $\overrightarrow{QT} = \frac{1}{5}(2\mathbf{a}-3\mathbf{b})$.

Find $OQ : QB$.

..... : ..... [3]

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