



Cambridge O Level

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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.

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 .

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

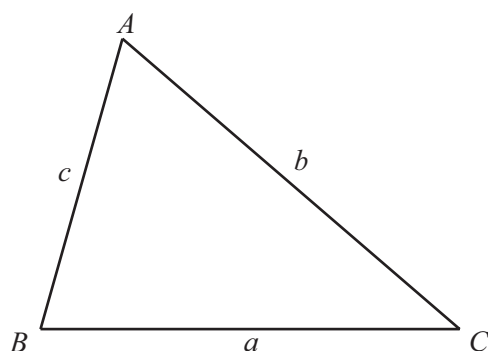
Volume, V , of sphere of radius r .

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

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 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]

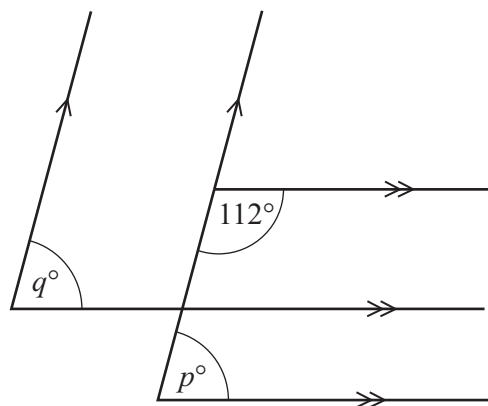
- 3 A shirt costs \$24.
In a sale the cost is reduced by 15%.

Work out the cost of the shirt in the sale.

\$ [2]



4 The diagram shows five straight lines.



NOT TO
SCALE

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.

$p = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

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

$q = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]





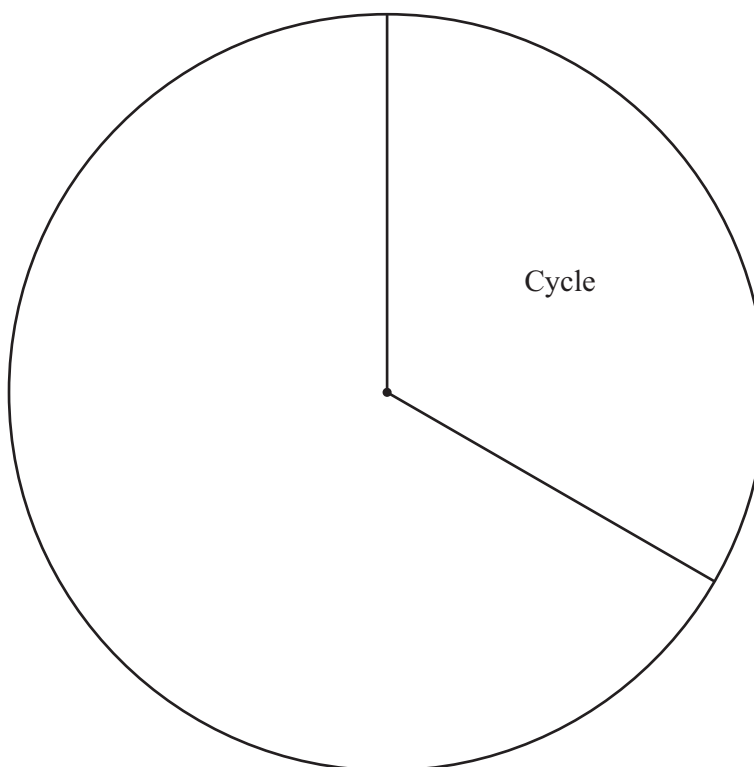
5 The table shows how some people travel to work.

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]





6

- 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

<u>Car hire</u> \$40 per day plus \$0.30 per kilometre

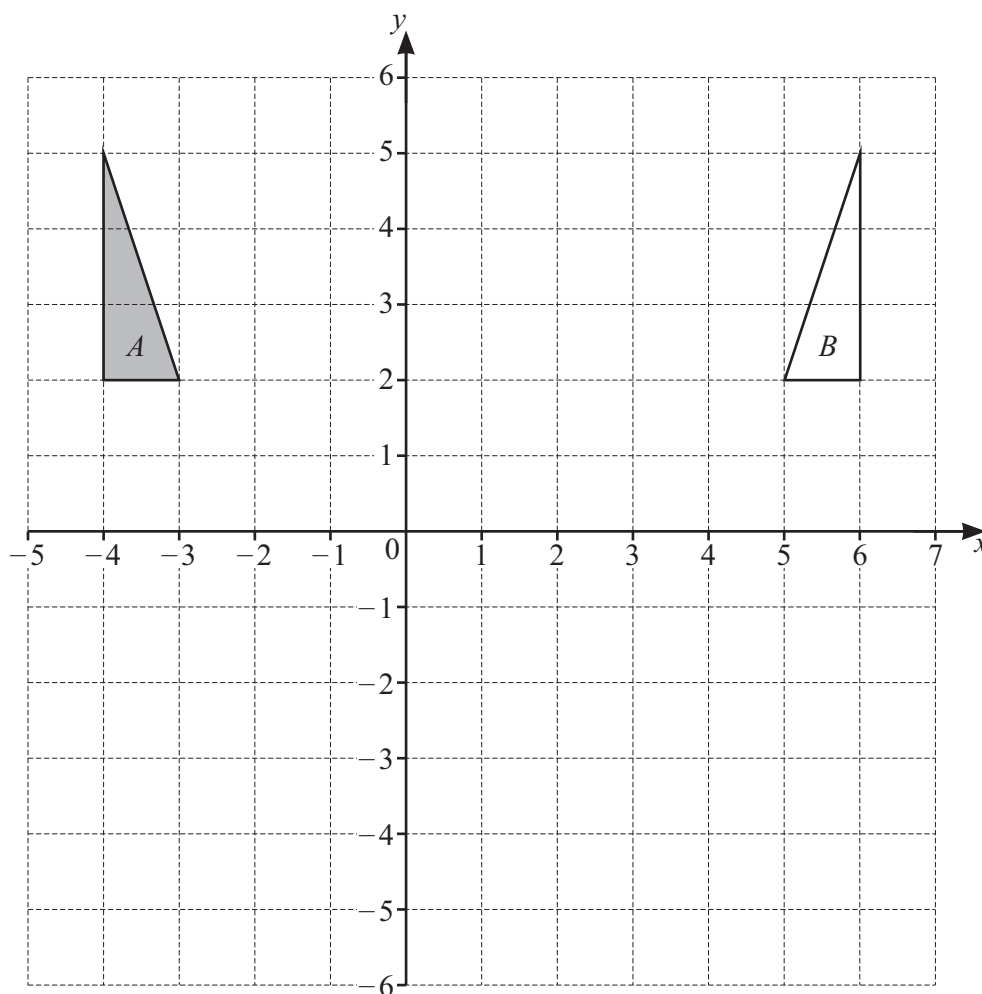
Amy hires a car for 10 days.
 She pays a total of \$670.

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

..... km [3]



- 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]



- 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 .

..... cm² [2]

- 11 A bag contains 10 plums.

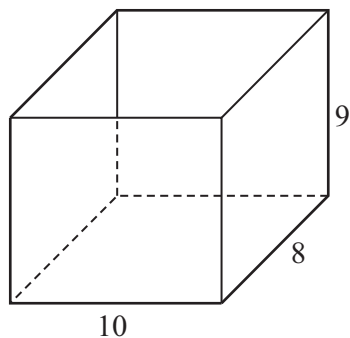
The mean mass of 6 of the plums is 50 g.

The mean mass of the remaining 4 plums is 40 g.

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

..... g [3]





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.

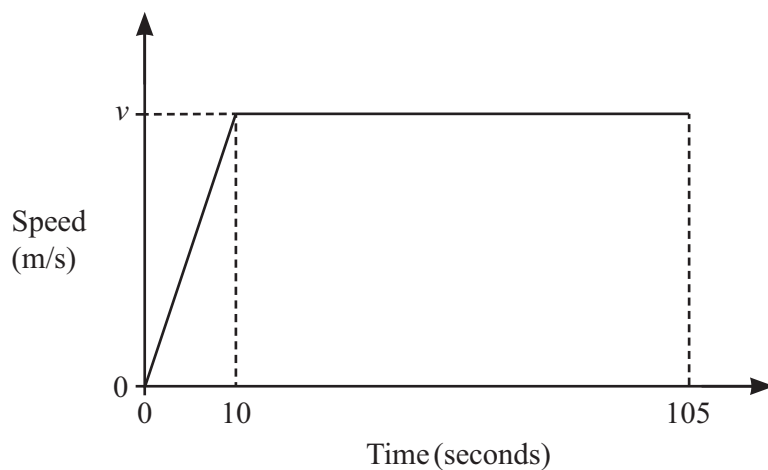
..... seconds [3]

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

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

..... [3]





NOT TO
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Lia cycles 800 m in 105 seconds.
The diagram shows the speed–time graph for this journey.

(a) Work out the value of v .

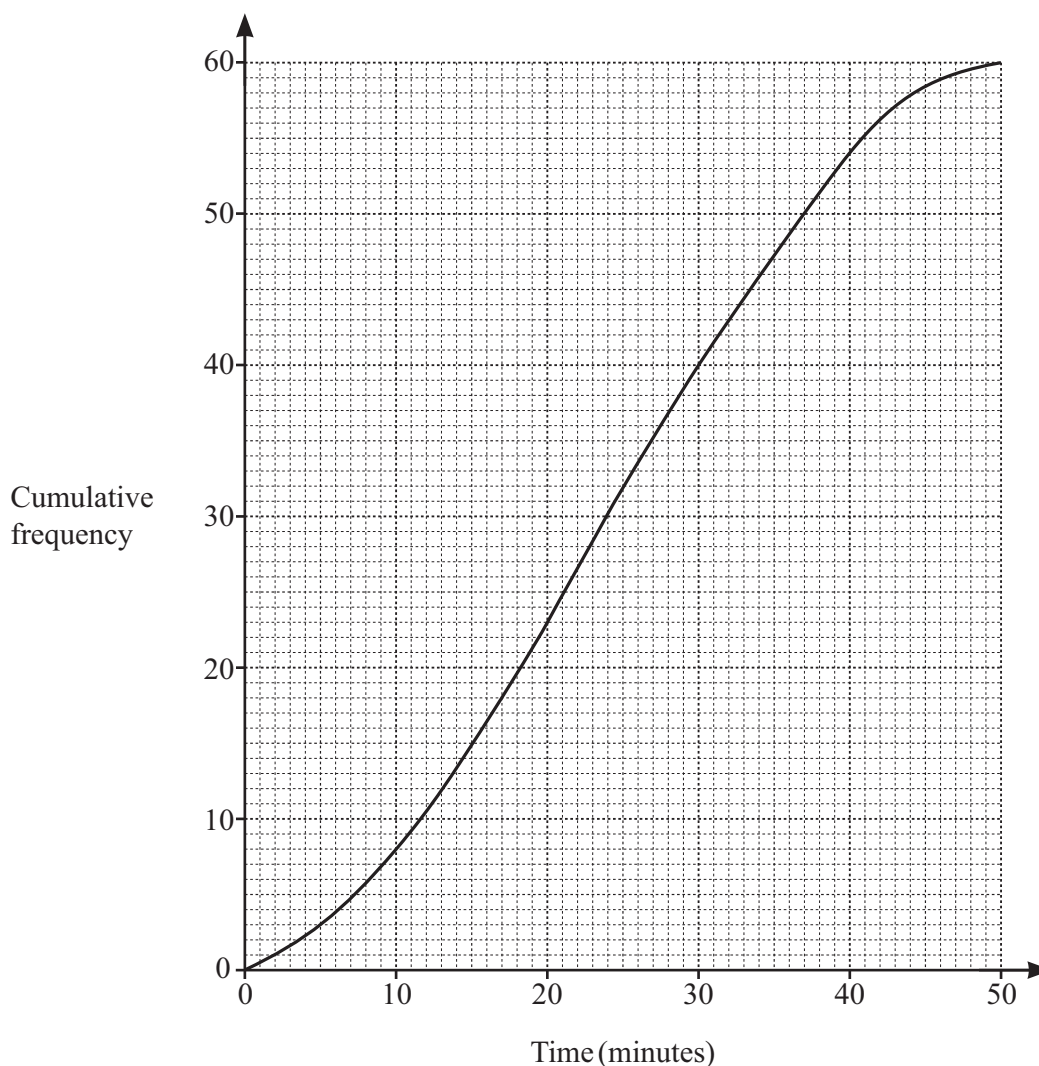
$$v = \dots\dots\dots [2]$$

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

$$\dots\dots\dots \text{ m/s}^2 [1]$$



15 The cumulative frequency diagram shows information about journey times.



Use the cumulative frequency diagram to find an estimate for

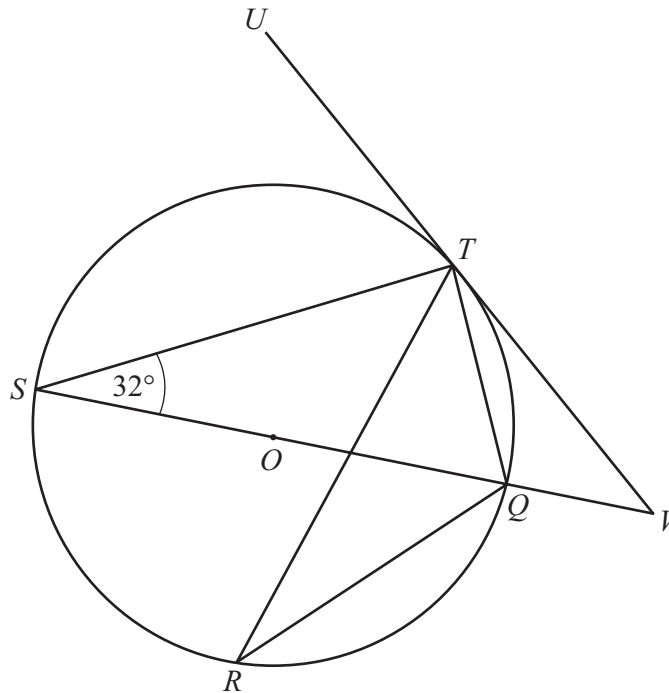
(a) the median

..... minutes [1]

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

..... [2]





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 $QST = 32^\circ$.

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

Angle $QRT = \dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [2]

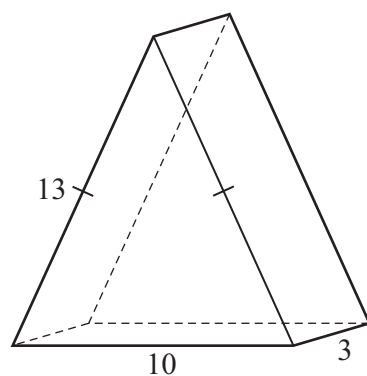
- (b) Find angle TQS .

Angle $TQS = \dots\dots\dots$ [2]

- (c) Find angle TVQ .

Angle $TVQ = \dots\dots\dots$ [2]





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 .

$x = \dots\dots\dots$ [3]





18 Write $0.\dot{1}4$ as a fraction.

..... [2]

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

Solve $hg(x) = 5$.

$x =$ [3]



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]



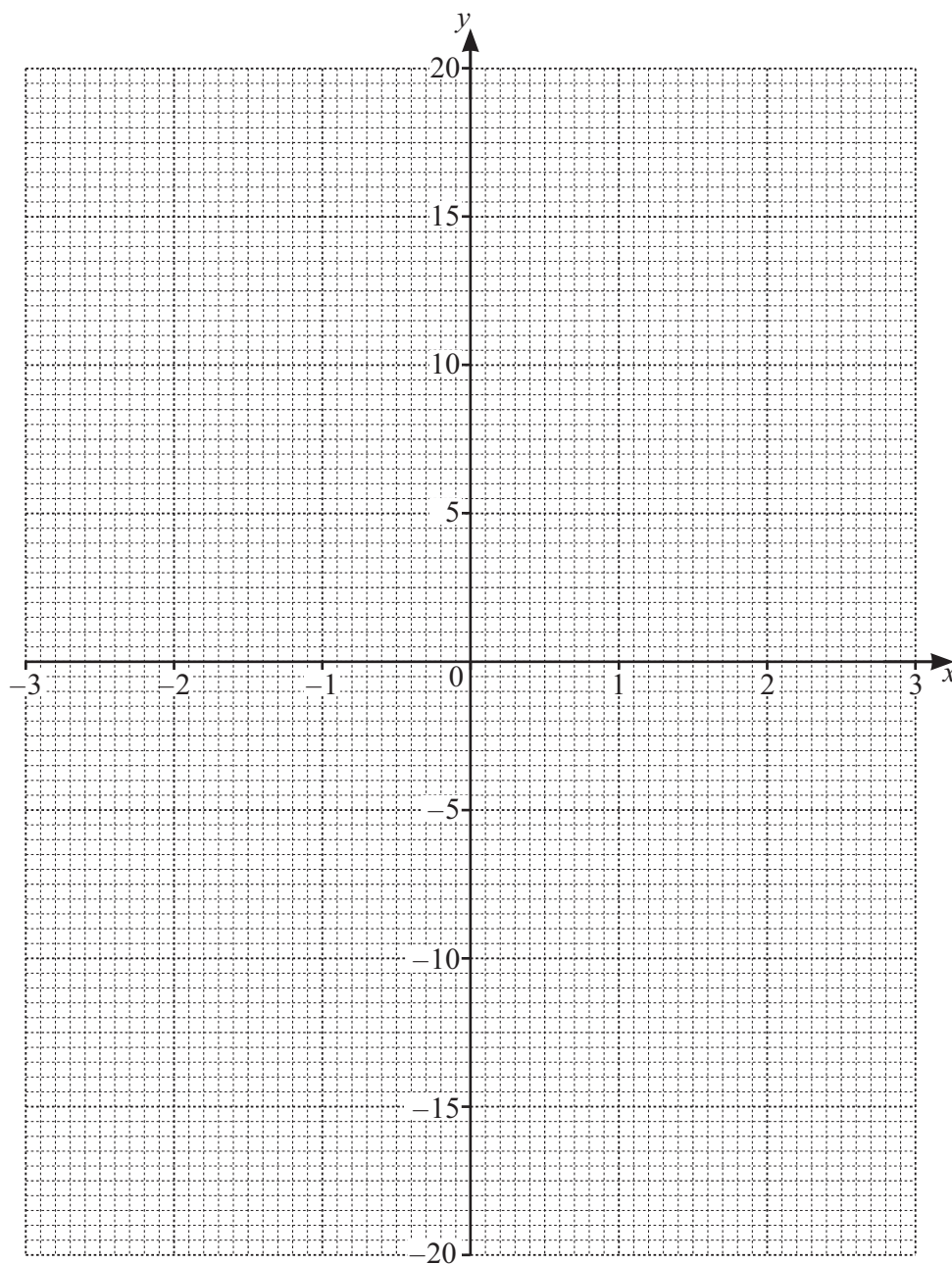
22 The table shows some values for $y = x^3 - 3x + 2$.

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 $-3 \leq x \leq 3$.



[4]

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

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

23 (a) Simplify.

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

$\dots\dots\dots$ [2]

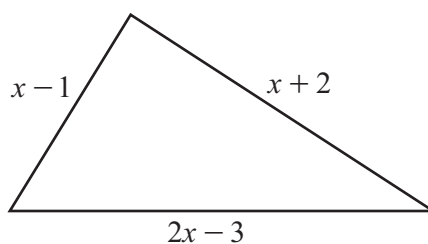
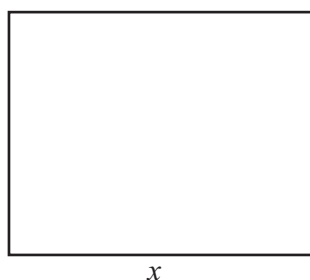
(b) Rationalise the denominator and simplify.

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

$\dots\dots\dots$ [3]



- 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 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]





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

$x = \dots\dots\dots$ or $x = \dots\dots\dots$ [3]

(d) Work out the perimeter of the rectangle.

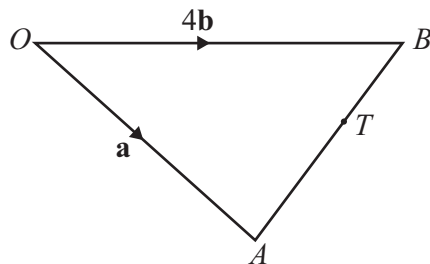
$\dots\dots\dots$ cm [2]

25 Factorise.

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

$\dots\dots\dots$ [3]





NOT TO
SCALE

The diagram shows triangle OAB .

$\vec{OA} = \mathbf{a}$ and $\vec{OB} = 4\mathbf{b}$.

T is a point on AB such that $AT : TB = 3 : 2$.

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

$$\vec{AB} = \dots\dots\dots [1]$$

(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 $\vec{QT} = \frac{1}{5}(2\mathbf{a} - 3\mathbf{b})$.

Find $OQ : QB$.

$$\dots\dots\dots : \dots\dots\dots [3]$$

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