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MATHEMATICS**0580/22**

Paper 2 Non-calculator (Extended)

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 **16** 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 .

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

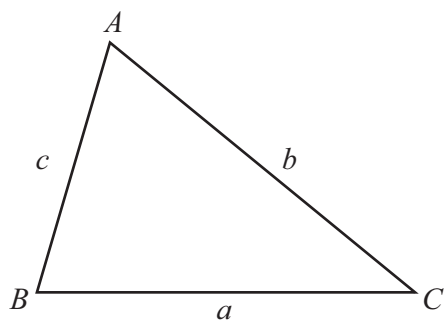
Volume, V , of sphere of radius r .

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

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 The temperature at 4 am is -12°C .
The temperature at 4 pm is 21°C .

Find the increase in temperature from 4 am to 4 pm.

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

- 2 Find **all** the common factors of 8 and 12.

..... [1]

- 3 A cuboid has length 6 cm, width 5 cm and height 2.5 cm.

Work out the volume of the cuboid.

..... cm^3 [2]

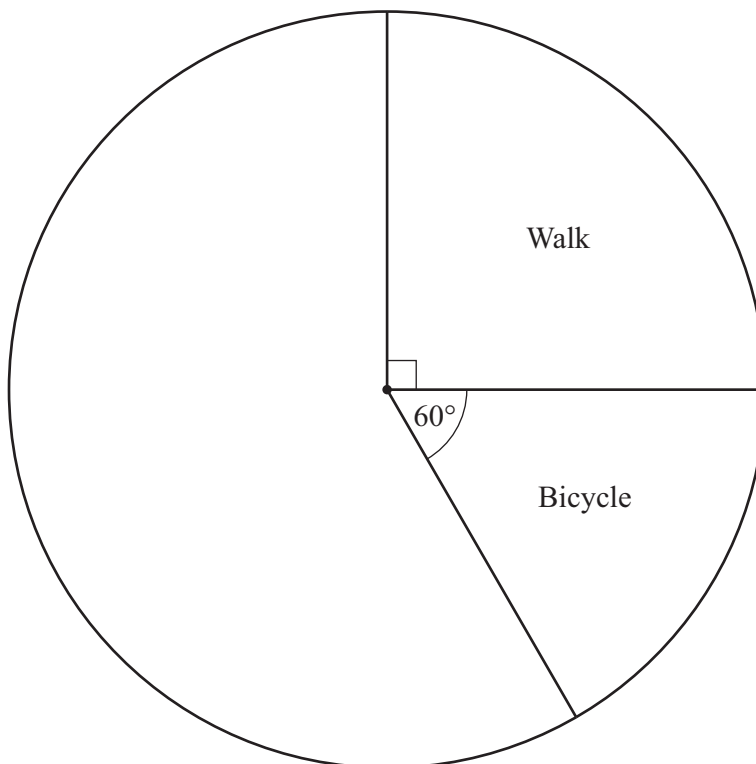
- 4 A computer costs \$560.
In a sale, this cost is reduced by 20%.

Find the cost of the computer in the sale.

\$ [2]



- 5 The pie chart shows some information about the way 600 students travel to school.



- (a) Work out the number of students that walk to school.

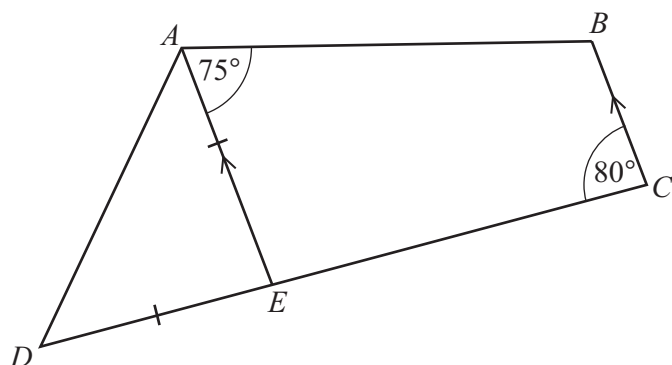
..... [2]

- (b) 120 of the students travel to school by car.
The remaining students travel by bus.

Complete the pie chart.

[3]





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$ABCD$ is a quadrilateral.

E lies on CD and AE is parallel to BC .

$EA = ED$.

Find

(a) angle ABC

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

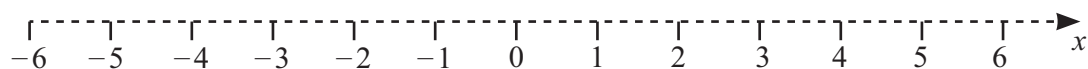
(b) angle AED

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

(c) angle DAB .

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

7 Represent the inequality $-4 < x \leq 3$ on the number line.



[2]



- 8 Kemi buys p pens that each cost 40 cents.
She pays with \$20.

Write an expression, in terms of p , for the change, in **cents**, Kemi receives from the \$20.

..... cents [2]

- 9 Rajid has a full bottle of juice.
He drinks $\frac{1}{3}$ of the full bottle on Monday.
He drinks $\frac{3}{7}$ of the full bottle on Tuesday.

Find the fraction of the bottle of juice remaining.

..... [3]

10 $b = dm + 2mk$

- (a) $d = 3.14$, $m = 7.92$ and $k = 10.16$.

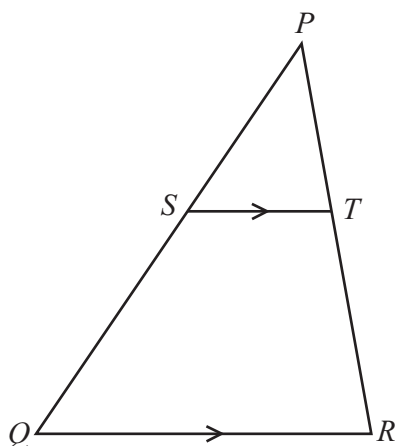
By rounding each value correct to 1 significant figure, work out an estimate for b .

..... [3]

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

$m =$ [2]





NOT TO
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In the diagram, S lies on PQ and T lies on PR .
 ST is parallel to QR .

- (a) Explain why triangle PQR is mathematically similar to triangle PST .
Give a geometrical reason for each statement you make.

.....

.....

.....

..... [3]

- (b) $ST = 3$ cm, $QR = 9$ cm and $PS = 5$ cm.

Work out PQ .

$PQ =$ cm [2]

- (c) The area of triangle PST is $2k$ cm².

Find, in terms of k , the area of quadrilateral $QRTS$.

..... cm² [2]

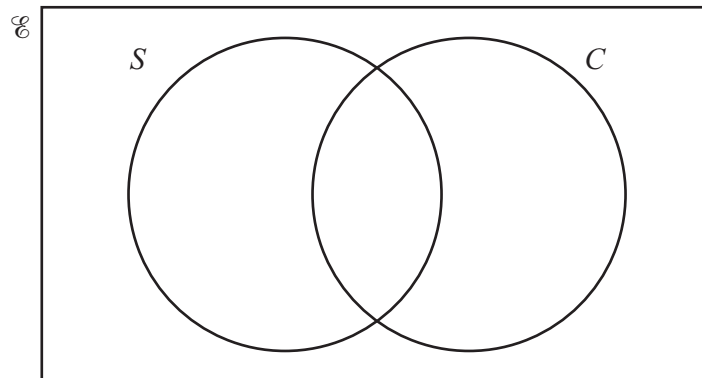


12 A fitness club has 100 members.

60 swim (S).

70 cycle (C).

25 do not swim or cycle.



(a) Complete the Venn diagram.

[3]

(b) One member of the fitness club is chosen at random.

For this member, find

(i) $P(C)$

..... [1]

(ii) $P(S \cap C)$

..... [1]

(iii) $P(S \cup C')$.

..... [1]



13

$$M = 2^7 \times 3^3 \times 5^2$$

- (a) Write $14M$ as a product of its prime factors.
Give your answer in index form.

..... [2]

- (b) R is an integer.

$\frac{M}{R}$ is a cube number.

Find the smallest possible value of R .

$R =$ [2]

14 Find the value of

- (a) $3^2 \div 3^{-2}$

..... [2]

- (b) $16^{-\frac{3}{2}}$.

..... [2]



15 Factorise.

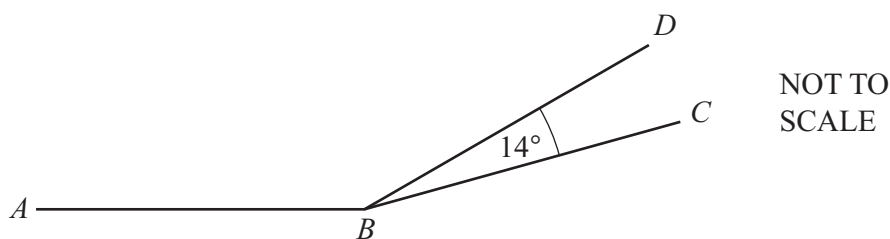
(a) $x^2 - 64$

..... [1]

(b) $5x(x-2y) + 6(x-2y)^2$

..... [2]

16



AB and BD are two sides of a regular 15-sided polygon.

AB and BC are two sides of a regular n -sided polygon.

Angle $DBC = 14^\circ$.

Work out the value of n .

$n =$ [4]



- 17 B is the point $(-3, 1)$ and D is the point $(-5, 9)$.
 BD is a diagonal of the kite $ABCD$.

- (a) The ratio of the lengths of the diagonals $BD : AC = 2 : 3$.

Work out the length of AC .

Give your answer as a surd in its simplest form.

..... [5]

- (b) Find the coordinates of the midpoint of BD .

(..... ,) [2]

- (c) The diagonal AC of the kite passes through the midpoint of BD .

Find an equation of AC .

Give your answer in the form $y = mx + c$.

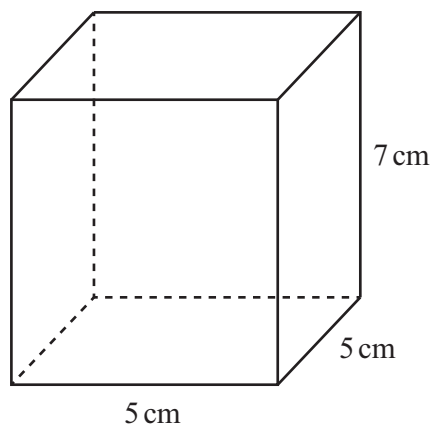
$y =$ [4]



18 Rationalise the denominator and simplify.

$$\frac{20}{4 + \sqrt{6}}$$

19



..... [3]

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The diagram shows a box in the shape of a cuboid.
Mala has a straight rod of length 10 cm.

Show that this rod does **not** fit completely inside the box.

[3]



20

$$f(x) = \frac{21}{2x-1}, \quad x \neq \frac{1}{2}$$

$$g(x) = 3x + 4$$

(a) Find

(i) $g(2)$

..... [1]

(ii) $gf(-1)$

..... [2]

(iii) $f^{-1}(x)$.

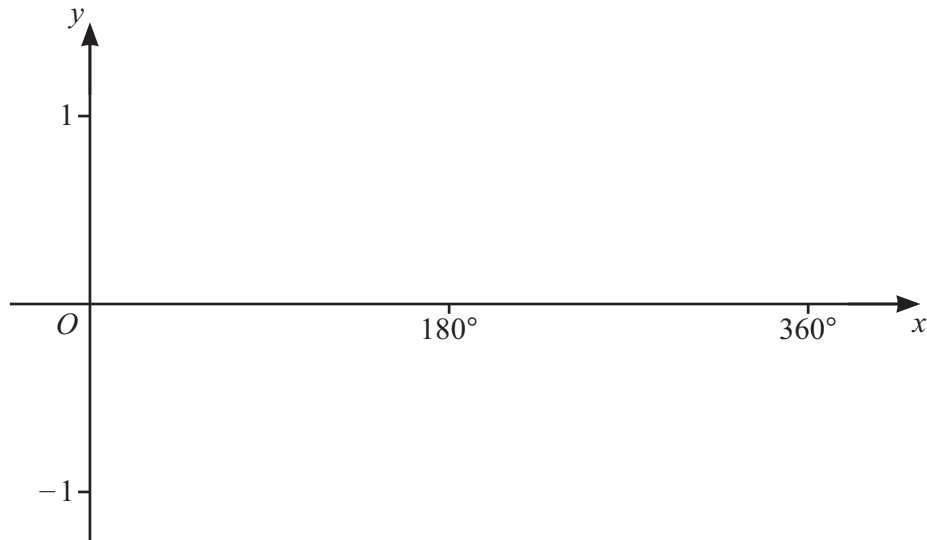
$$f^{-1}(x) = \dots\dots\dots [3]$$

(b) Solve $f(x) = g(x)$.

$$x = \dots\dots\dots \text{ or } x = \dots\dots\dots [5]$$



21 (a)



On the diagram, sketch the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$. [2]

(b) Solve the equation $2 \cos x + \sqrt{3} = 0$ for $0^\circ \leq x \leq 360^\circ$.

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

22 A graph with equation $y = x^2 + bx + c$ has a minimum point at $(-5, 12)$.

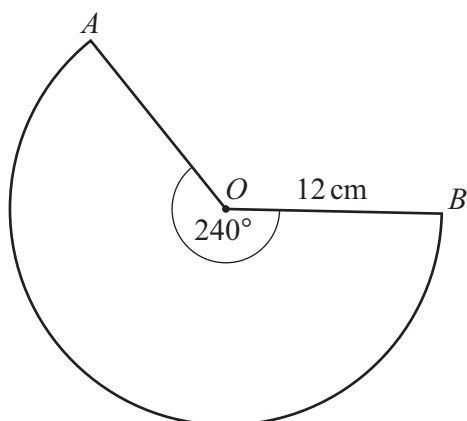
Find the value of b and the value of c .

$b = \dots\dots\dots$

$c = \dots\dots\dots$

[3]





NOT TO
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The diagram shows a major sector, AOB , of a circle.
The sector angle is 240° and the radius is 12 cm.

- (a) Show that the length of the major arc AB is 16π cm.

[1]

- (b) OA is joined to OB to form a cone.

Work out the volume of the cone.

Give your answer in the form $\frac{(a\sqrt{b})\pi}{3}$ where a is an integer and b is a prime number.

..... cm^3 [6]

Question 24 is printed on the next page.



24

$$27^{nx} = (9^x)^2$$

Find the value of n .

$$n = \dots\dots\dots [2]$$

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