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Cambridge Assessment International Education

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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.

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

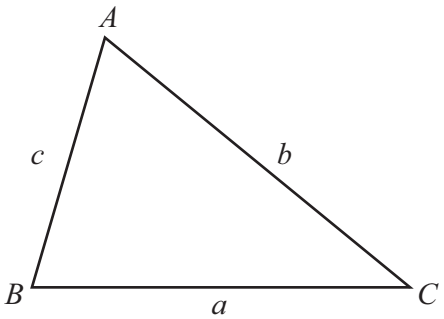
Volume, V, of cylinder of radius r, height h. $V = \pi r^2 h$

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,



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

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

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

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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.

..... °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%.

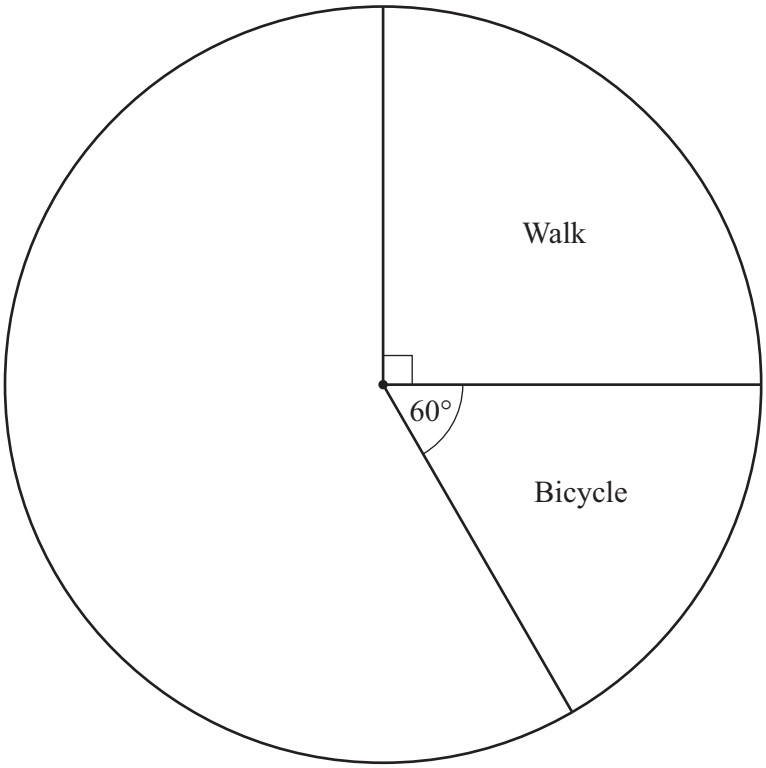
Find the cost of the computer in the sale.

$ ..... [2]

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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.

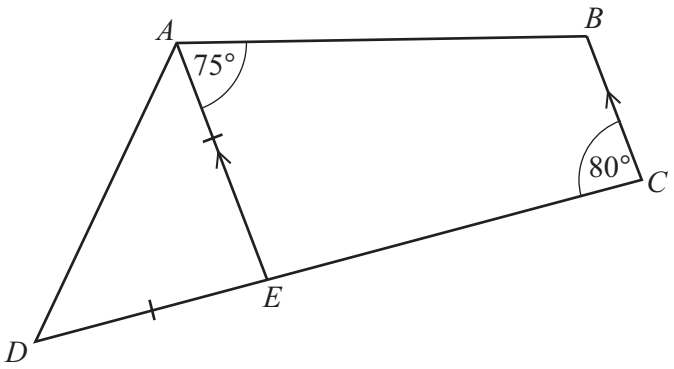
Complete the pie chart.

[3]

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6



NOT TO SCALE

ABCD is a quadrilateral.
E lies on *CD* and *AE* is parallel to *BC*.
EA = *ED*.

Find

(a) angle *ABC*

Angle *ABC* = ... [1]

(b) angle *AED*

Angle *AED* = ... [1]

(c) angle *DAB*.

Angle *DAB* = ... [2]

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



[2]

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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.

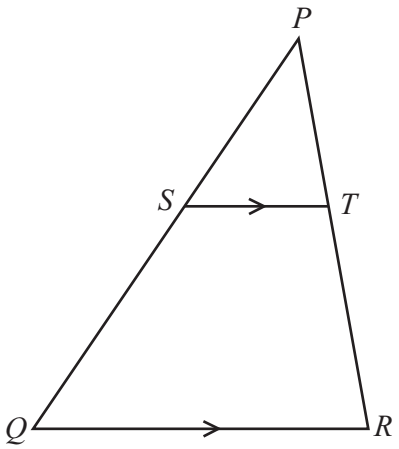
..... [3]

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

$m =$ ..... [2]

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NOT TO SCALE

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) $ST = 3\,\text{cm}$, $QR = 9\,\text{cm}$ and $PS = 5\,\text{cm}$.

Work out PQ.

$PQ =$ .....cm [2]

(c) The area of triangle PST is $2k\,\text{cm}^2$.

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

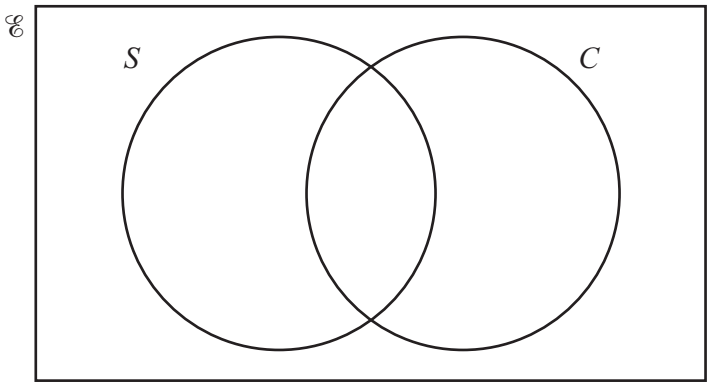
..... cm^2 [2]

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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]

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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]

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15 Factorise.

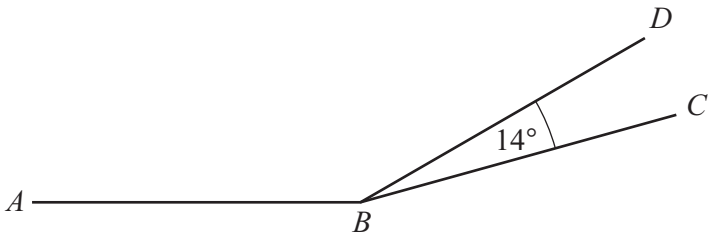
(a) $x^2 - 64$

..... [1]

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

..... [2]

16



NOT TO SCALE

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°.

Work out the value of *n*.

n = ... [4]

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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]

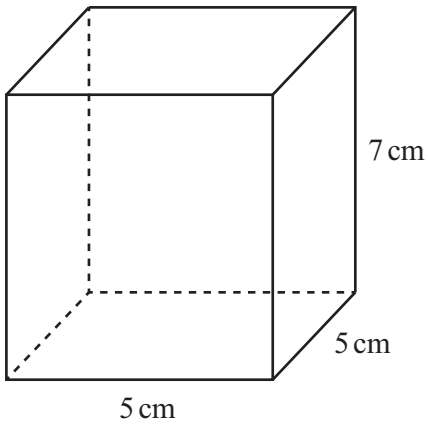
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18 Rationalise the denominator and simplify.

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

..... [3]

19



NOT TO SCALE

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]

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20 $f(x) = \frac{21}{2x-1}$, $x \neq \frac{1}{2}$ $g(x) = 3x+4$

(a) Find

(i) $g(2)$

..... [1]

(ii) $gf(-1)$

..... [2]

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

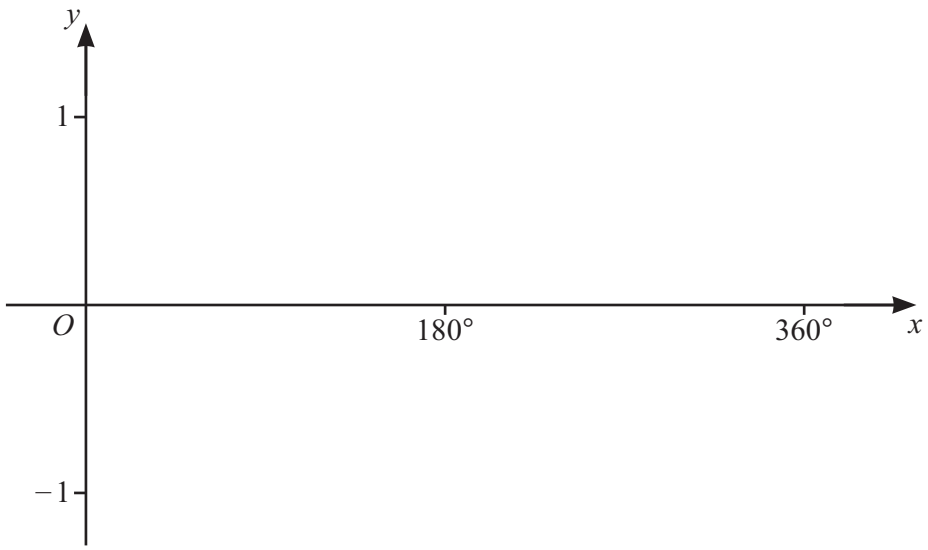
$f^{-1}(x) =$ ..... [3]

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

$x =$ ..... or $x =$ ..... [5]

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21 (a)



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

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

$x =$ ..... or $x =$ ..... [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.

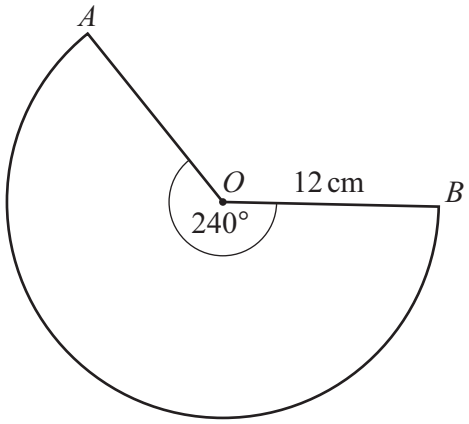
$b =$ .....

$c =$ .....

[3]

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23



NOT TO SCALE

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.

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24 $27^{nx} = (9^x)^2$

Find the value of n.

$n =$ ..... [2]

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