Cambridge Assessment International Education

# Cambridge IGCSE™

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**MATHEMATICS** **0580/41**

Paper 4 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.
- You should use a scientific calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For $\pi$, use either your calculator value or 3.142.

**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. Any blank pages are indicated.

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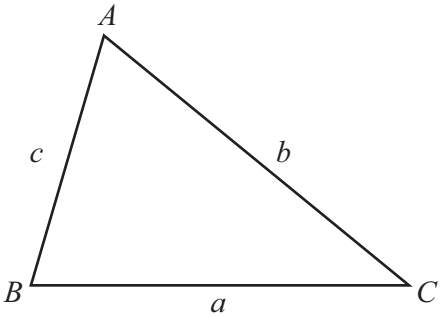
## List of formulas

| | |
|---|---|
| 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,




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

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

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

**1** A quadrilateral has

- rotational symmetry of order 2
- two diagonals that are the only lines of symmetry.

Write down the geometrical name of this quadrilateral.

View solution

..... [1]

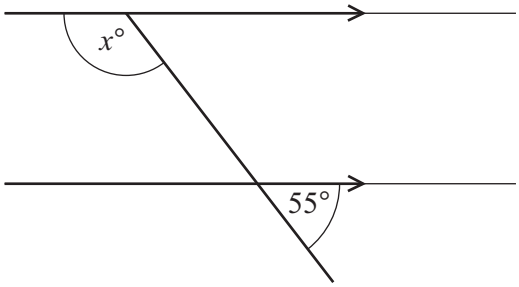
**2** Solve.

$11 - 2x = 4$

View solution

$x =$ ..... [2]

**3**




NOT TO SCALE

View solution

The diagram shows two parallel lines and a straight line.

Find the value of $x$.

$x =$ ..... [2]

**4** A train journey starts at 22 16.
The journey takes 5 hours 52 minutes.

View solution

Find the time the train journey finishes.

..... [1]

**5**

$A$ ——————————————————— $B$

**(a)** In triangle $ABC$, $AB = 8$ cm, $AC = 7$ cm and $BC = 5$ cm.

View solution

**Using a ruler and compasses only**, construct triangle $ABC$.
The side $AB$ has been drawn for you. [2]

**(b)** Measure angle $ACB$.

View solution

..... [1]

**(c)** Triangle $ABC$ is a scale drawing of a field.

View solution

**(i)** The scale is 1 : 10 000.

Find the actual distance from $A$ to $B$.
Give your answer in kilometres.

..... km [1]

**(ii)** $B$ is due east of $A$.
Find the bearing of $A$ from $B$.

View solution

..... [1]

**6** Expand.

View solution

$g(3-2g)$

..... [1]

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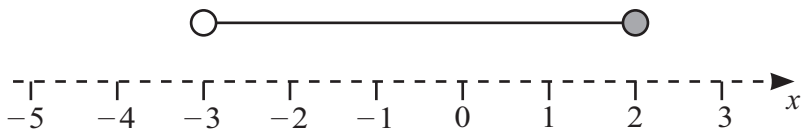
**7** **(a)**




View solution

Write down the inequality represented in the diagram.

..... [2]

**(b)** Write down the integer values of $x$ that satisfy the inequality $-4 < 2x \leqslant 8$.

View solution

..... [2]

**8** Calculate.

View solution

$$(3.5^2 - 2.2^3)^{\frac{1}{4}}$$

..... [1]

**9** An athlete runs at a speed of 9.5 m/s.

View solution

Convert this speed into km/h.

..... km/h [2]

**10** $A$ is the point (2, 1).

$\overrightarrow{AB} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$

View solution

Find the coordinates of $B$.

( ..... , ..... ) [2]

**11** In a sale, the prices of coats are reduced by 15%.

**(a)** The original price of a coat is \$60.

View solution

Calculate the sale price of the coat.

\$ ..... [2]

**(b)** The sale price of a different coat is \$58.14 .

View solution

Calculate the original price of this coat .

\$ ..... [2]

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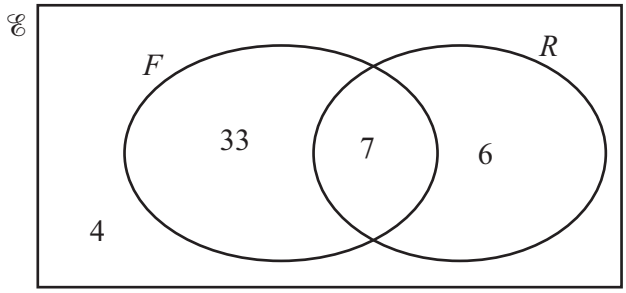
**12** Some students are asked if they like football ($F$) or rugby ($R$).
The Venn diagram shows the results.




**(a)** Find the number of students who do not like rugby.

View solution

..... [1]

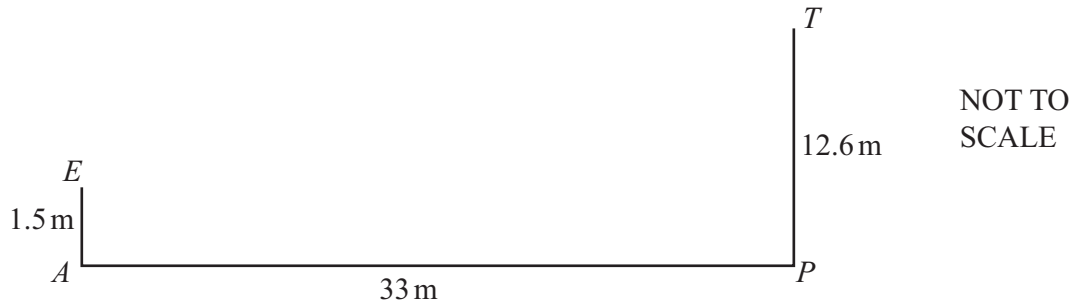
**(b)** Use set notation to describe the region containing students who like rugby but not football.

View solution

..... [1]

View solution

**13**




The diagram shows two vertical poles, $AE$ and $PT$, standing on horizontal ground, $AP$.

Calculate the angle of elevation of the point $T$ from the point $E$.

..... [3]

**14** A cube contains a solid metal sphere.
The sphere touches all the faces of the cube.
The side length of the cube is 8 cm.

**(a)** Show that the volume of the sphere is $\frac{256}{3}\pi\,\text{cm}^3$.

View solution

[1]

**(b)** Calculate the percentage of the cube that is **not** occupied by the sphere.

View solution

..... % [3]

**(c)** The density of the metal of the sphere is $7.86\,\text{g/cm}^3$.

View solution

Calculate the mass of the sphere.
Give your answer in kilograms.
[Density = mass ÷ volume]

..... kg [2]

**(d)** The sphere is melted down and made into a solid cylinder with radius 3.1 cm.

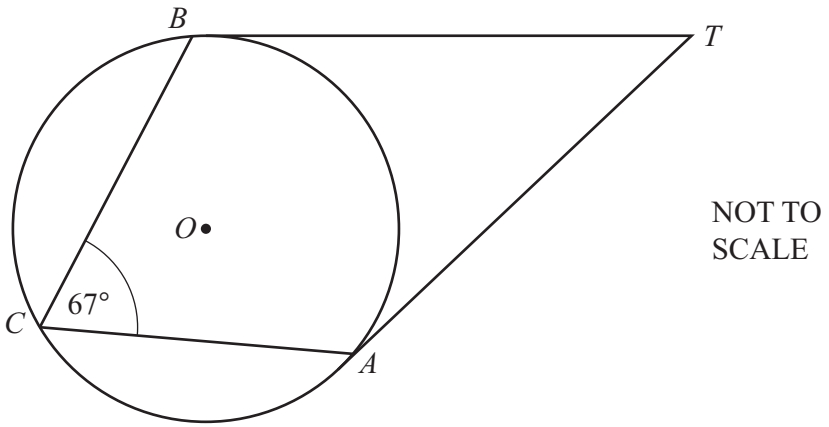
Calculate the **total** surface area of the cylinder.

View solution

..... $cm^2$ [4]

**15**

View solution




NOT TO SCALE

*A*, *B* and *C* lie on a circle, centre *O*.
*TA* and *TB* are tangents to the circle at *A* and *B*.

Calculate angle *ATB*.

Angle *ATB* = ..... [3]

**16** The table shows some information about the heights of 50 plants.

View solution

| Height ($h$ cm) | $5 < h \leqslant 10$ | $10 < h \leqslant 12$ | $12 < h \leqslant 20$ |
|---|---|---|---|
| Frequency | 3 | 24 | 23 |

Calculate an estimate of the mean height.

..... cm [4]

**17** Find the equation of the straight line that passes through the points (2, 0) and (0, 4).
Give your answer in the form $y = mx + c$.

View solution

$y =$ ..... [3]

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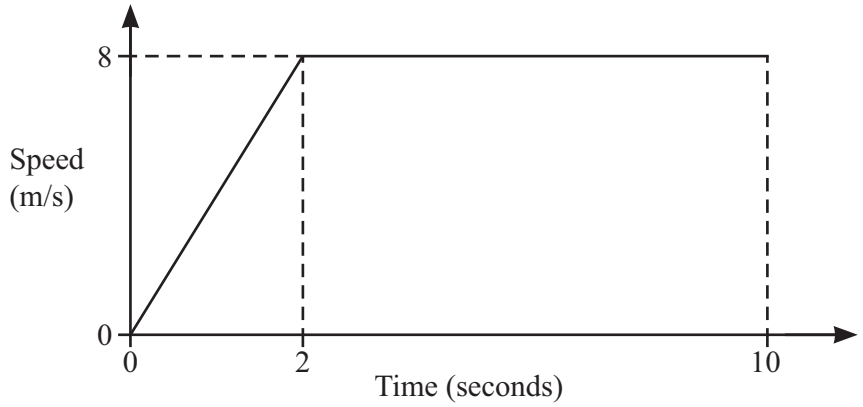
**18**




NOT TO SCALE

The diagram shows part of the speed–time graph for an athlete in a race.

**(a)** Calculate the distance the athlete runs in the first 10 seconds.

View solution

..... m [2]

**(b)** The length of the race is 100 m.
After 10 seconds, the athlete continues to run at a speed of 8 m/s until the end of the race.

View solution

Calculate the **total** time the athlete takes to complete the 100 m race.

..... s [2]

**19** The mass of a radioactive substance decays exponentially at a rate of 10% per day.
The initial mass of the substance is 20 g.

View solution

Find the number of whole days it takes for the mass of the substance to first be less than 1 g.

..... days [3]

**20** These are the first five terms of a sequence.

48 24 12 6 3

**(a)** Find the next term.

View solution

..... [1]

**(b)** Find the $n$th term.

View solution

..... [2]

**21** In triangle $STU$, $ST = 8$ cm, $SU = 9$ cm and angle $TSU = 50°$.

View solution

Calculate the area of triangle $STU$.

..... $cm^2$ [2]

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**22** Alex invests \$200 at a rate of $r$% per year compound interest.
At the end of 25 years the value of this investment is \$301.10 .

View solution

Find the value of $r$.

$r =$ ..... [3]

**23** $y \propto \dfrac{1}{\sqrt{x+1}}$

View solution

When $x = 8$, $y = 3$.

Find $y$ in terms of $x$.

$y =$ ..... [2]

**24** Martha walks a distance of 10 km at a speed of $x$ km/h.
She then runs a distance of 5 km at a speed of $(x+4)$ km/h.
The total time taken for the whole journey is 3.5 hours.

**(a)** Write down an expression in terms of $x$ for the time Martha is walking.

View solution

..... h [1]

**(b)** Show that $7x^2 - 2x - 80 = 0$.

View solution

[4]

**(c)** Solve $7x^2 - 2x - 80 = 0$, giving your answers correct to 2 decimal places.
You must show all your working.

View solution

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

**(d)** Calculate the difference between the time Martha is walking and the time she is running.
Give your answer in hours and minutes correct to the nearest minute.

View solution

..... h ..... min [3]

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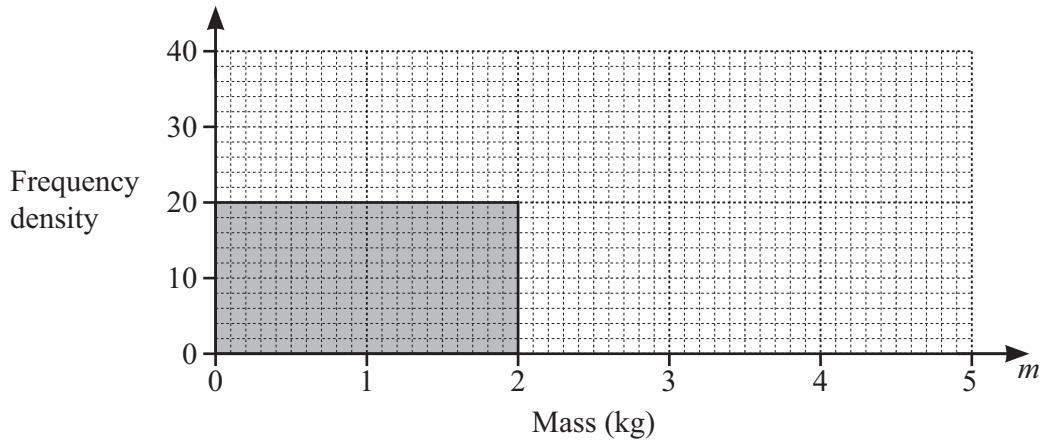
**25** Kai sorts parcels into two types, light and heavy.

| Type of parcel | Mass ($m$ kg) |
|---|---|
| Light | $0 < m \leqslant 2$ |
| Heavy | $2 < m \leqslant 5$ |

The histogram shows some information about the number of parcels Kai sorts in one day.




**(a)** Find the number of light parcels.

View solution

..... [1]

**(b)** There are 102 heavy parcels.

Complete the histogram. [2]

View solution

**26** Solve the simultaneous equations.
You must show all your working.

View solution

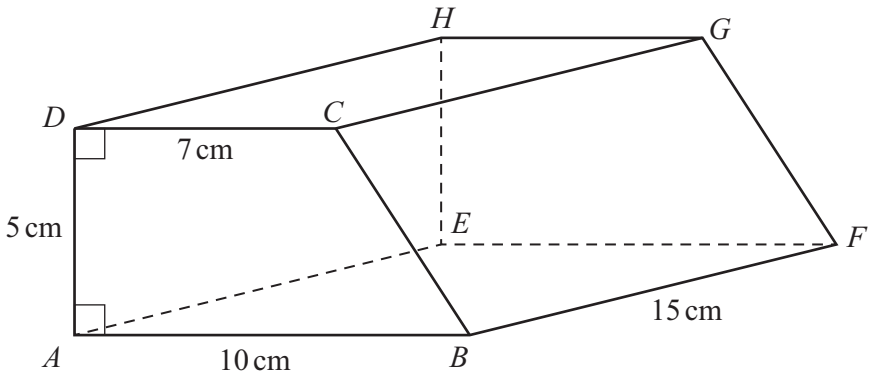
$y = 2x^2 - 3x - 7$
$y = 2x - 7$

$x =$ ..... , $y =$ .....

$x =$ ..... , $y =$ .....

[4]

**27**




NOT TO SCALE

View solution

The diagram shows a prism of length 15 cm.
The cross-section of the prism is a trapezium.

Angle $DAB = 90°$ and angle $ADC = 90°$.
$AB = 10$ cm, $AD = 5$ cm and $DC = 7$ cm.

Calculate the angle the diagonal $AG$ makes with the base $ABFE$.

..... [4]

**28** $f(x) = 7^{x-4}$

Find the value of $x$ when

**(a)** $f(x) = 1$

View solution

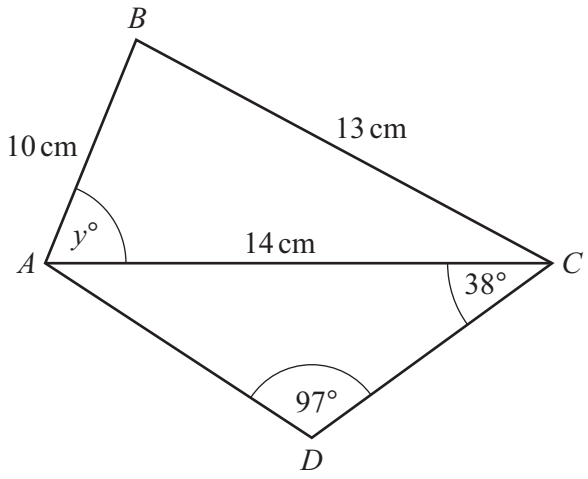
$x =$ ..... [1]

**(b)** $f^{-1}(x) = 1$.

View solution

$x =$ ..... [2]

**29**




NOT TO SCALE

**(a)** Calculate the value of $y$.

View solution

$y =$ ..... [3]

**(b)** Calculate $BD$.

View solution

$BD =$ ..... cm [5]

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