Cambridge Assessment International Education

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MATHEMATICS **0580/43**

Paper 4 Calculator (Extended) **May/June 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 π, 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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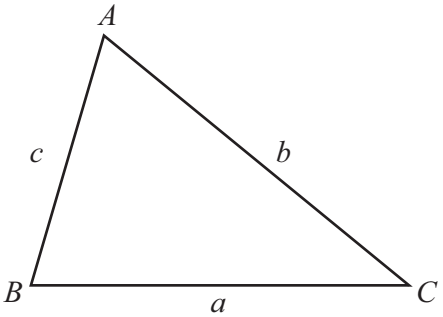
List of formulas

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 Find the median of these numbers.

View solution

5 11 11 13 17 21

..... [1]

View solution

2 In triangle ABC, $AC = 21$ m and $BC = 15.9$ m.

Using a ruler and compasses only, complete the scale drawing of the triangle.
Use a scale of 1 cm to represent 3 m.
The side AB is drawn for you.

A ——————————————— B

Scale : 1 cm to 3 m

[3]

3

$\frac{2}{5}$	$\sqrt{15}$	23	$\sqrt{144}$	-2	0.8

View solution

From this list, write down

(a) a natural number

..... [1]

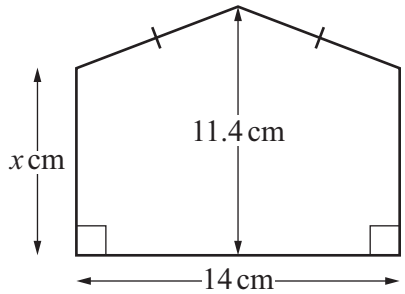
(b) an irrational number.

..... [1]

View solution

4 The diagram shows a pentagon made from two congruent trapeziums.

View solution



NOT TO SCALE

The area of the pentagon is $130.2\,\text{cm}^2$.

Calculate the value of x.

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

5 **(a)** Convert $780\,\text{cm}^2$ into m^2.

View solution

..... m^2 [1]

(b) Convert $0.037\,\text{m}^3$ into cm^3.

View solution

..... cm^3 [1]

6 One titanium atom has a mass of 7.95×10^{-23} grams.

View solution

Calculate the number of titanium atoms in 1 kg of titanium.
Give your answer in standard form.

..... [2]

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7 $\mathscr{E} = \{x: x \text{ is an integer and } 1 \leqslant x \leqslant 12\}$
$E = \{\text{even numbers}\}$
$M = \{\text{multiples of 3}\}$

(a) Find n(M).

View solution

..... [1]

(b) Write down the set $E \cap M$.

View solution

{ ..... } [1]

(c) $y \in (E \cup M)'$

View solution

Write down a possible value of y.

..... [1]

8 Factorise.

(a) $28xy - 12x$

View solution

..... [2]

(b) $y - 6x + 2xy - 3$

View solution

..... [2]

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9 **(a)** Simplify.

$$5x^5y \times 7x^3y^2$$

View solution

..... [2]

(b) $7^n = \sqrt[5]{7}$

Find the value of n.

View solution

$n =$ ..... [1]

10 Expand and simplify.

(a) $2x - x(5 - x^2)$

View solution

..... [2]

(b) $(x+4)(x-5)(x+3)$

View solution

..... [3]

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11 The table shows three sequences.

View solution

	1st term	2nd term	3rd term	4th term	5th term	6th term	nth term
Sequence A	28	22	16	10	4		
Sequence B	$\frac{1}{6}$	$\frac{2}{7}$	$\frac{3}{8}$	$\frac{4}{9}$	$\frac{1}{2}$		
Sequence C	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4		

Complete the table.

[8]

12 $\sqrt{\dfrac{10^{400}}{10^{220} \times 10^{80}}} = 10^{k}$

View solution

Find the value of k.

$k =$ ..... [3]

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13 Line L has the equation $y = 2(x-5)$.

(a) Find the coordinates of the point where line L intersects the y-axis.

View solution

(..... , ...) [1]

(b) Find the x-coordinate of the point where line L intersects the line $y = 19$.

View solution

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

(c) Line P is perpendicular to line L.
Line P passes through the point $(2, 3)$.

View solution

Find the equation of line P.
Give your answer in the form $y = mx + c$.

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

14 Jess invests \$1400 in an account.
The account pays compound interest at a rate of r% per year.
At the end of 4 years the value of her investment is \$1523.15 .

View solution

Find the value of r.

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

15 m is inversely proportional to the square root of $(t+2)$.
$m = 0.5$ when $t = 23$.

View solution

Find m when $t = 98$.

$m =$ ..... [3]

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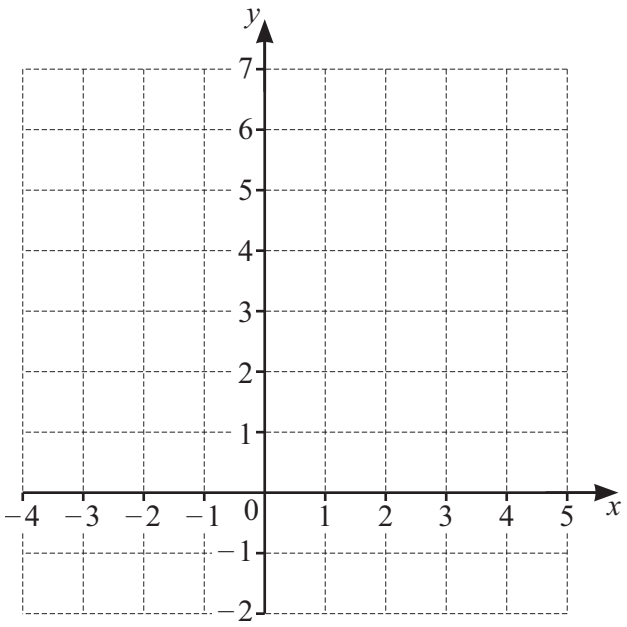
16

View solution



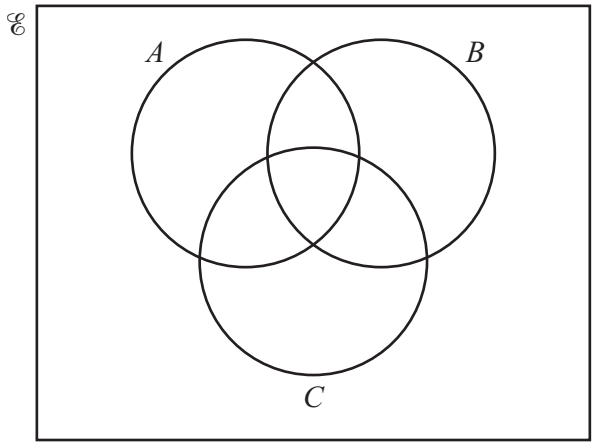
By shading the **unwanted** regions of the grid, draw and label the region R which satisfies these three inequalities.

$$y < 3 \qquad x \leqslant 2 \qquad y < x + 3$$

[5]

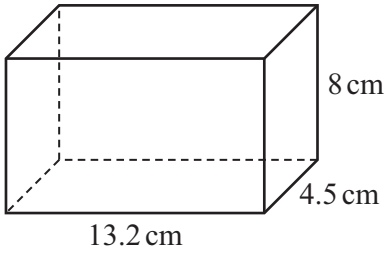
17 In the Venn diagram, shade the region $(A \cup B) \cap C'$.

View solution



[1]

18



NOT TO SCALE

The diagram shows a solid cuboid with sides of length 4.5 cm, 8 cm and 13.2 cm.

(a) Calculate the volume of the cuboid.

View solution

..... cm^3 [1]

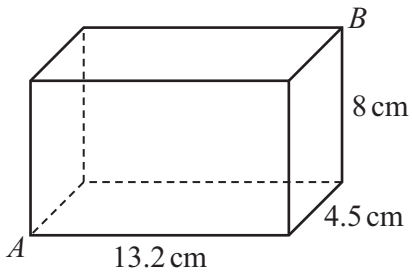
(b) Calculate the total surface area of the cuboid.

View solution

..... cm^2 [3]

(c)

View solution



NOT TO SCALE

Calculate the angle between AB and the horizontal base of the cuboid.

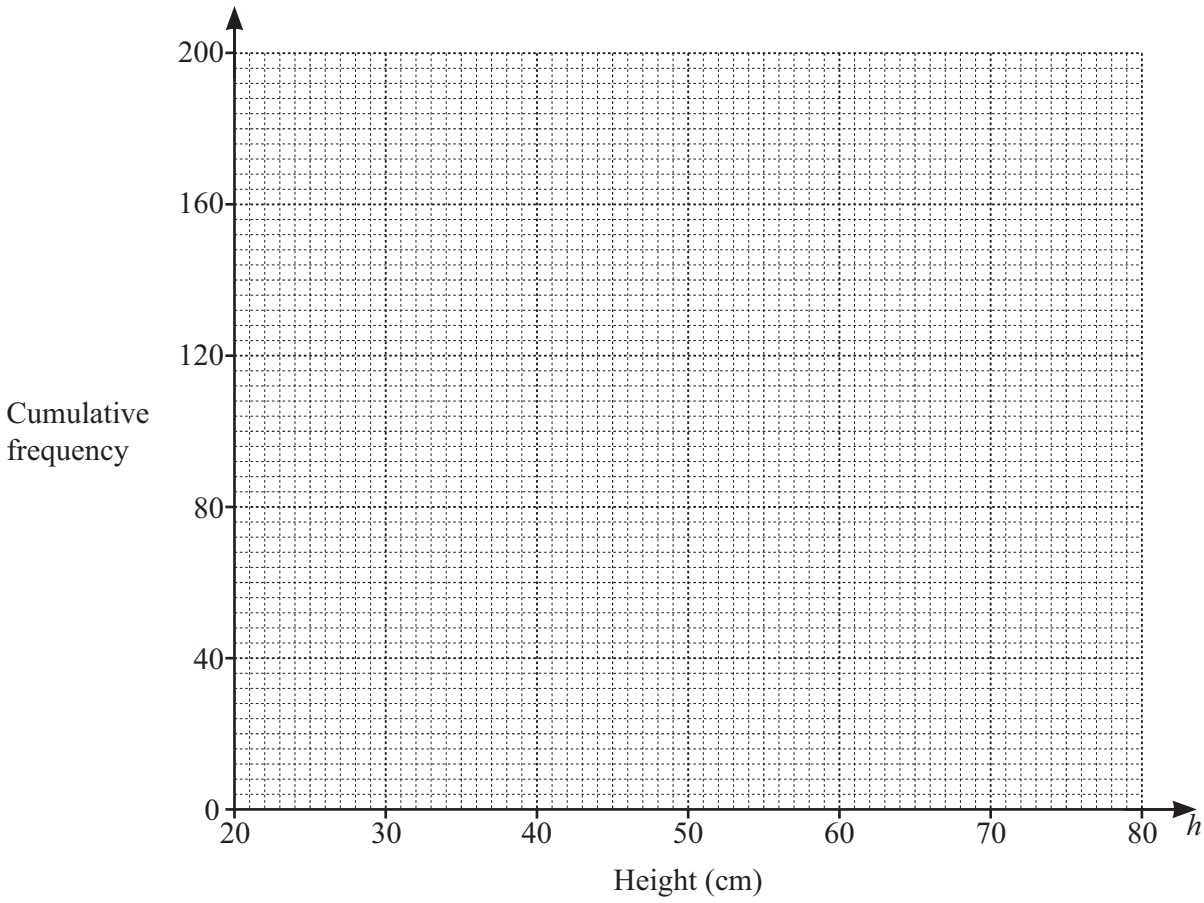
..... [4]

19 The table shows some information about the heights of 200 plants.

Height (h cm)	Cumulative frequency
$h \leqslant 30$	6
$h \leqslant 40$	42
$h \leqslant 50$	76
$h \leqslant 60$	170
$h \leqslant 70$	190
$h \leqslant 80$	200

View solution

(a) Draw a cumulative frequency diagram to show this information.



[3]

(b) Find an estimate of the 75th percentile.

.....cm [1]

View solution

20 Stephan has two bags, A and B, each containing red sweets and yellow sweets only.
He picks two sweets at random, one from bag A and the other from bag B.

The probability that Stephan picks a red sweet from bag A is $\frac{3}{5}$.

The probability that Stephan picks a red sweet from bag A and a red sweet from bag B is $\frac{2}{15}$.

(a) Find the probability that Stephan picks a red sweet from bag B.

View solution

..... [2]

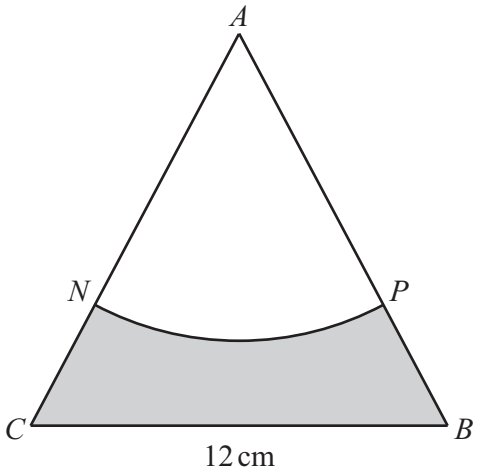
(b) Find the probability that Stephan picks a yellow sweet from bag A and a yellow sweet from bag B.

View solution

..... [3]

21

View solution



NOT TO SCALE

The diagram shows an equilateral triangle ABC with all sides of length 12 cm.
ANP is a sector of a circle, centre A.
N lies on AC such that $AN : NC = 2 : 1$.
P lies on AB such that $AP : PB = 2 : 1$.

Calculate the area of the shaded region.

..... cm^2 [4]

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22 A metal cube has mass 14.2 g, correct to 1 decimal place.

(a) Find the lower bound of the mass of the cube.

View solution

..... g [1]

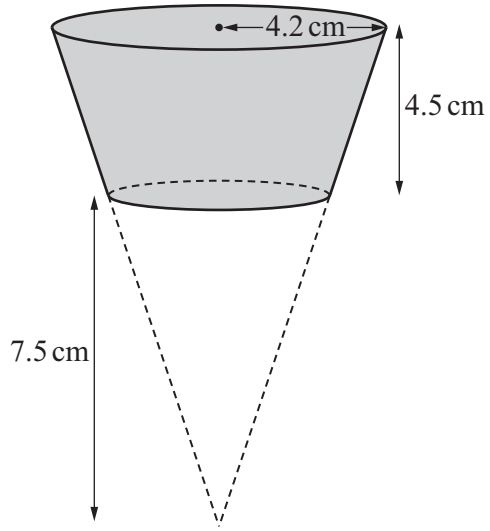
(b) The side length of the cube is 1.3 cm, correct to 1 decimal place.

View solution

Calculate the upper bound of the density of the metal.
[Density = mass ÷ volume]

..... g/cm^3 [3]

23



NOT TO SCALE

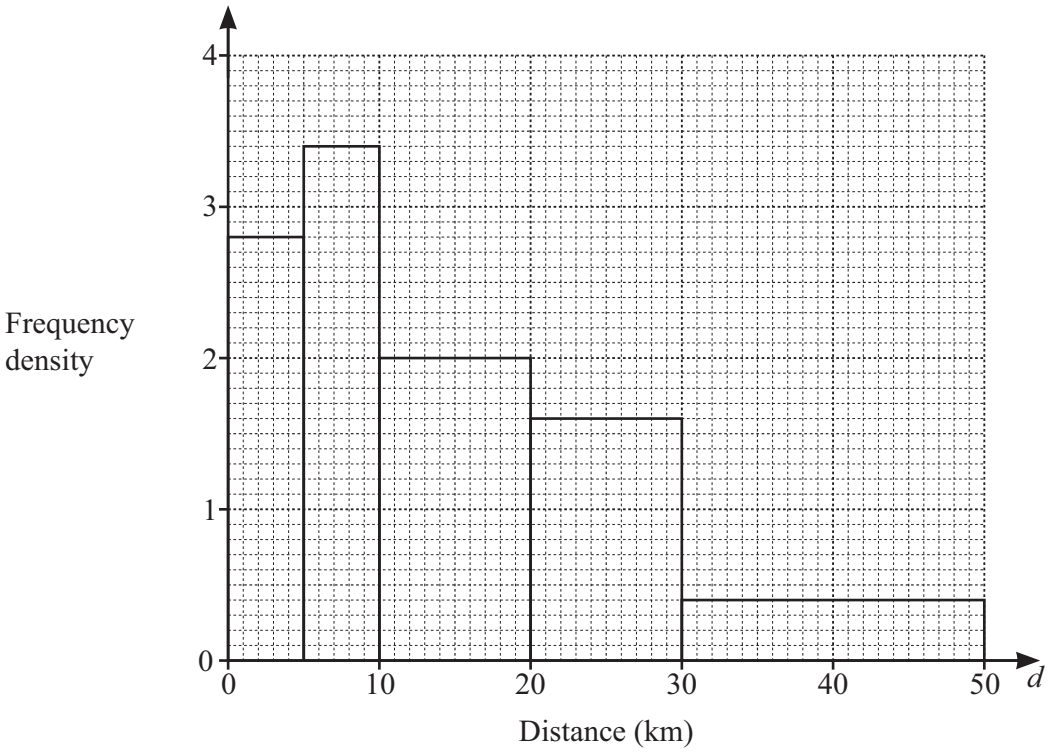
View solution

The diagram shows a frustum made by removing a small cone from a large cone.
The height of the small cone is 7.5 cm.
The height of the frustum is 4.5 cm.
The radius of the large cone is 4.2 cm.

Work out the volume of the frustum.

..... cm^3 [4]

24 The histogram shows information about the distance some people travel to work.



(a) Use the histogram to complete the table.

View solution

Distance ($d$km)	Number of people
$0 < d \leqslant 5$	
$5 < d \leqslant 20$	
$20 < d \leqslant 50$	

[3]

(b) The people who travel a distance greater than 35 km to work have a car allowance.

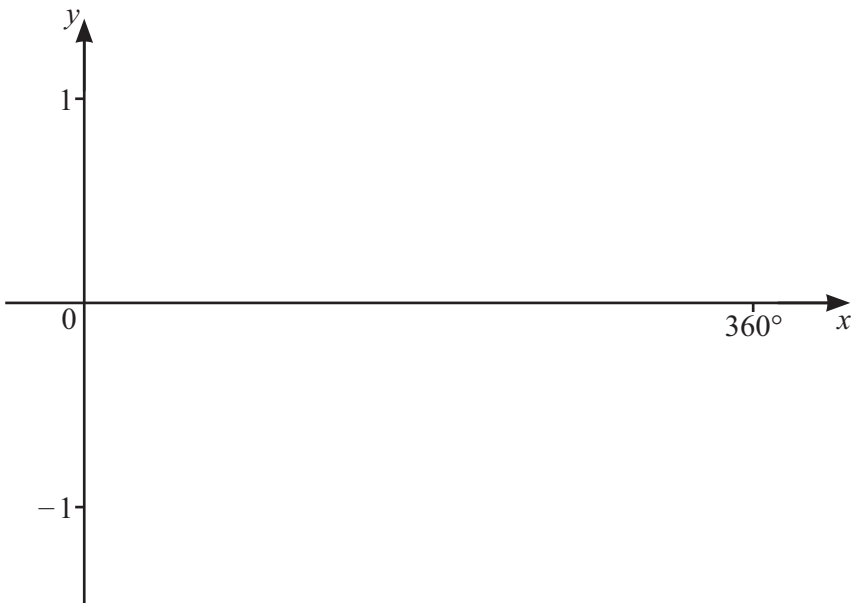
View solution

Calculate an estimate of the number of these people who have a car allowance.

..... [1]

25 **(a)** Sketch the graph of $y = \sin x$ for $0° \leqslant x \leqslant 360°$.

View solution



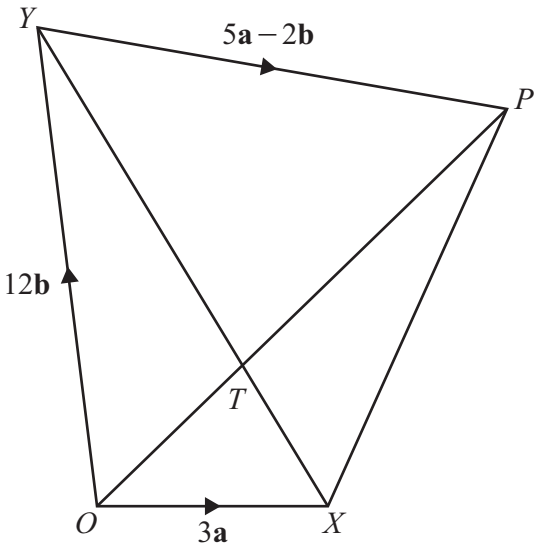
[2]

(b) Solve the equation $2 + 5\sin x = 1$ for $0° \leqslant x \leqslant 360°$.

View solution

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

26



NOT TO SCALE

The diagram shows a quadrilateral $OXPY$ with diagonals meeting at T.
$\overrightarrow{OX} = 3\mathbf{a}$ and $\overrightarrow{OY} = 12\mathbf{b}$.

(a) Find $\overrightarrow{XY}$ in terms of **a** and **b**.

View solution

..... [1]

(b) $XT : TY = 1 : 2$ and $\overrightarrow{YP} = 5\mathbf{a} - 2\mathbf{b}$.

Find the ratio $OT : TP$.

View solution

..... : ..... [4]

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