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MATHEMATICS **0580/33**

Paper 3 Calculator (Core) **May/June 2025**

1 hour 30 minutes

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 80.
- 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.	$V = \frac{4}{3}\pi r^3$

1

2	6	16	18	24	26	27	33

From this list, write down the number that is

(a) a multiple of 12

..... [1]

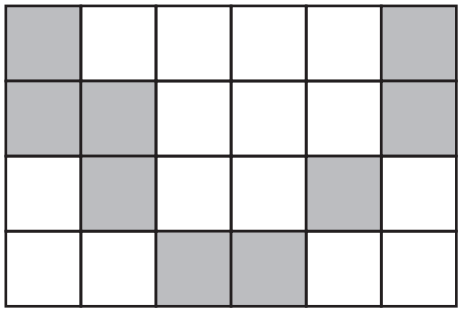
(b) a square number

..... [1]

(c) a cube number.

..... [1]

2



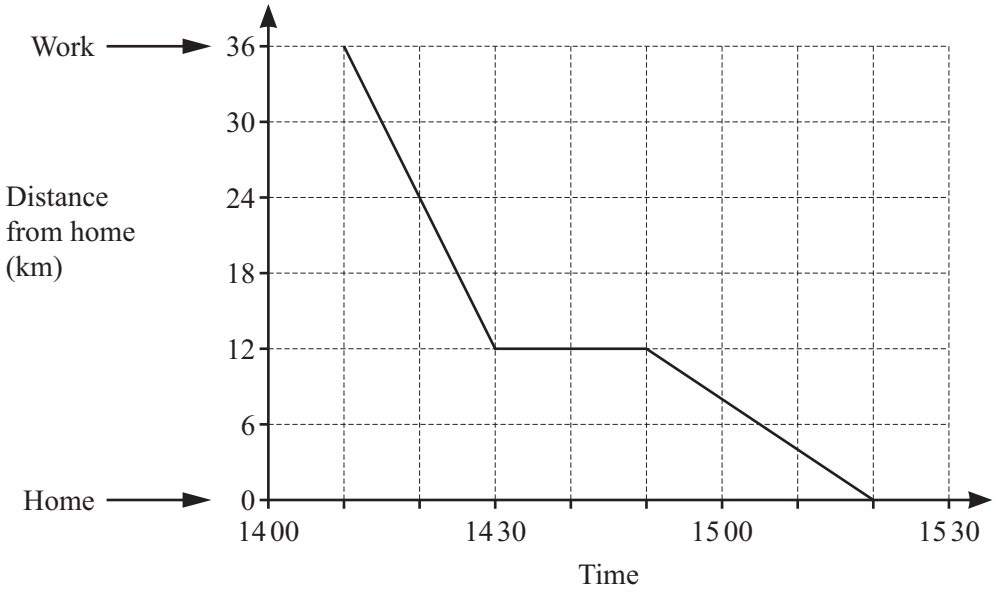
Shade one square so that the diagram has 1 line of symmetry. [1]

3 Put **one** pair of brackets into this calculation to make it correct.

$$80 \div 8 + 2 \times 3 = 24$$

[1]

4 Tim drives home from work.
The travel graph shows his journey.



(a) Write down the time Tim leaves work.

..... [1]

(b) Tim stops on the way home.

(i) Find how far Tim travels before he stops.

..... km [1]

(ii) Find how long Tim stops for.

..... min [1]

5 Calculate.

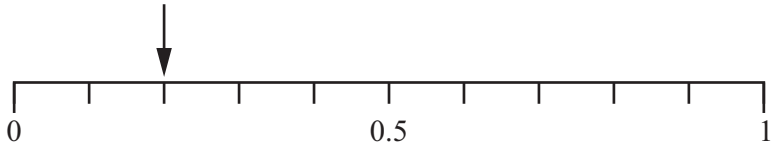
$$\frac{2.8^5 - 0.3^2}{\sqrt{5}}$$

Give your answer correct to 2 decimal places.

..... [2]

6 In a bag of counters, 6 of the counters are blue.

The arrow (↓) on the probability scale shows the probability of picking a blue counter at random.



Work out the total number of counters in the bag.

..... [1]

7 The local time in Japan is $3\frac{1}{2}$ hours ahead of the local time in India.

Find the time in Japan when it is 21 45 in India.

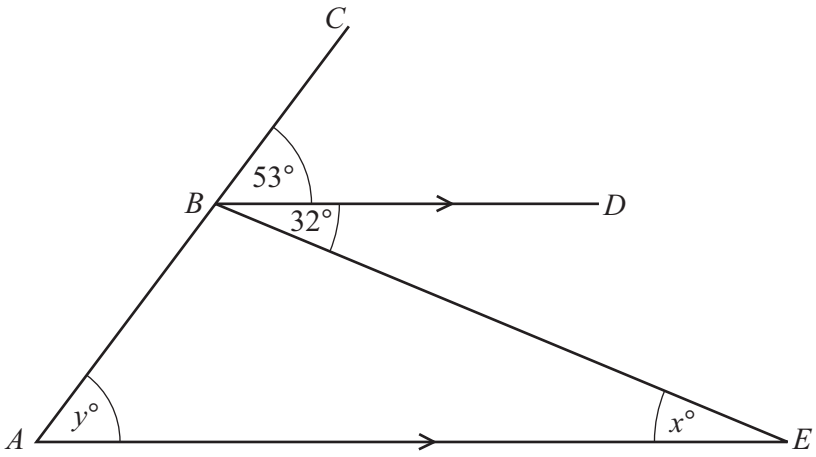
..... [1]

8 Mia changes \$350 into euros.
The exchange rate is \$1 = 0.92 euros.

Calculate the amount Mia receives.

..... euros [1]

9



NOT TO SCALE

ABC is a straight line.
BD is parallel to *AE*.

(a) Find the value of x.
Give a geometrical reason for your answer.

x = ... because..... [2]

(b) Find the value of y.
Give a geometrical reason for your answer.

y = ... because..... [2]

10 Solve.

$4p + 11 = 25$

$p =$ ..... [2]

11 **(a)** Expand and simplify.

$5(x-2)+3(x-7)$

..... [2]

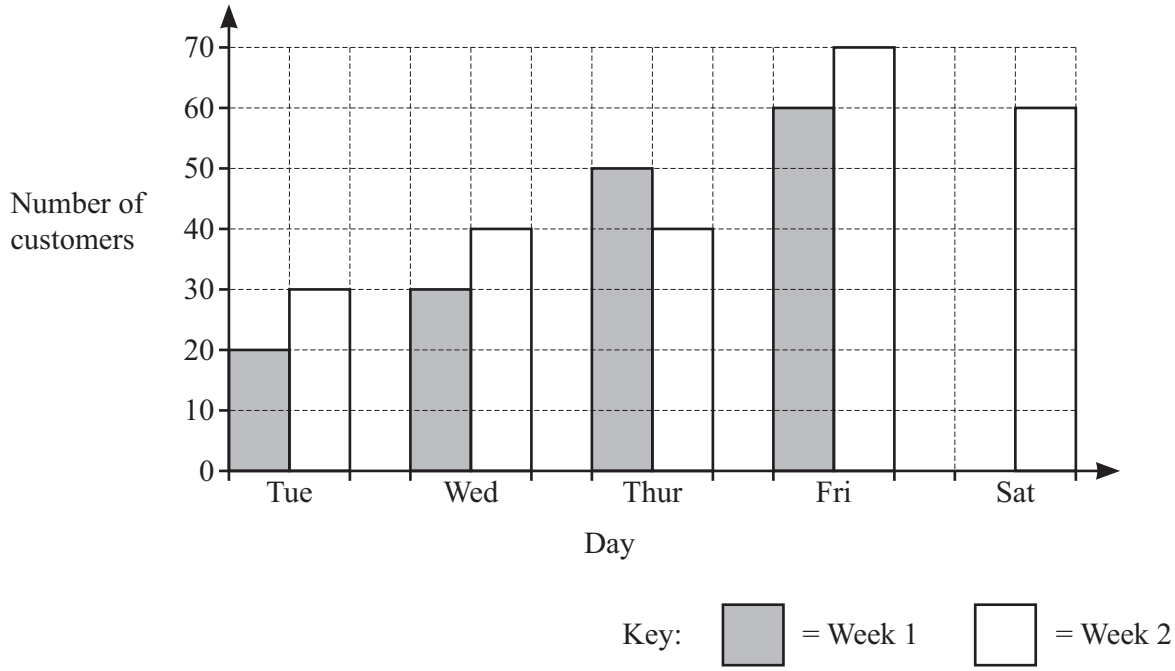
(b) Factorise.

$4a^2 + 16a$

..... [2]

12 Kai opens his restaurant from Tuesday to Saturday each week.
He counts the number of customers each day for two weeks.

The bar chart shows some of the results.



(a) In week 1 there were 200 customers in total.

Complete the bar chart.

[2]

(b) Write down the mode for week 2.

..... [1]

(c) Find the mean number of customers for the 5 days in week 2.

..... [2]

13 In May a shop makes a profit of $542.
In June the shop makes a profit of $600.

(a) Calculate the percentage increase in the profit from May to June.

..... % [2]

(b) The shop gives $\frac{2}{5}$ of the profit from May to a charity.

Find the amount the shop gives to the charity.

$ ..... [1]

(c) The shop spends 38% of the profit from June on a fridge.

Find the amount the shop spends on the fridge.

$ ..... [1]

14 Meg invests $2500 at a rate of 4.6% per year simple interest.

Calculate the total amount of her investment at the end of 3 years.

$ ..... [3]

15 The table gives information about the costs of hiring bikes.

Type of bike	Cost for first day	Cost for each extra day
Road	\$25	\$20
Mountain	\$40	\$35
Electric	\$70	\$50

(a) Work out the cost of hiring 2 road bikes for 3 days.

\$ ..... [2]

(b) The cost, M, of hiring a mountain bike for d days can be written as $M = 35d + 5$.

(i) Write a formula for the cost, E, of hiring an electric bike for d days.

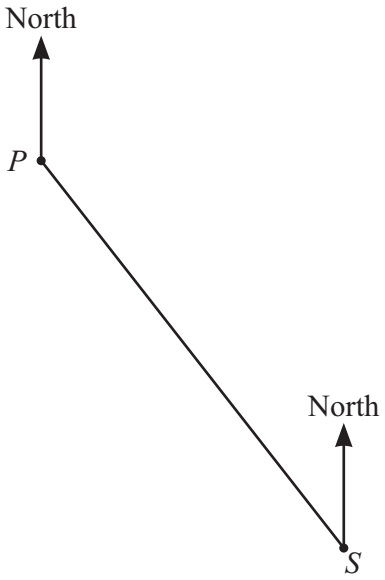
$E =$ ..... [2]

(ii) The cost of hiring an electric bike for 6 days is the same as the cost of hiring a mountain bike for d days.

Find the value of d.

$d =$ ..... [3]

16 The scale drawing shows a path from S to P.
The scale is 1 cm represents 2.5 km.



Scale: 1 cm to 2.5 km

(a) Work out the actual distance between S and P.

..... km [2]

(b) Measure the bearing of S from P.

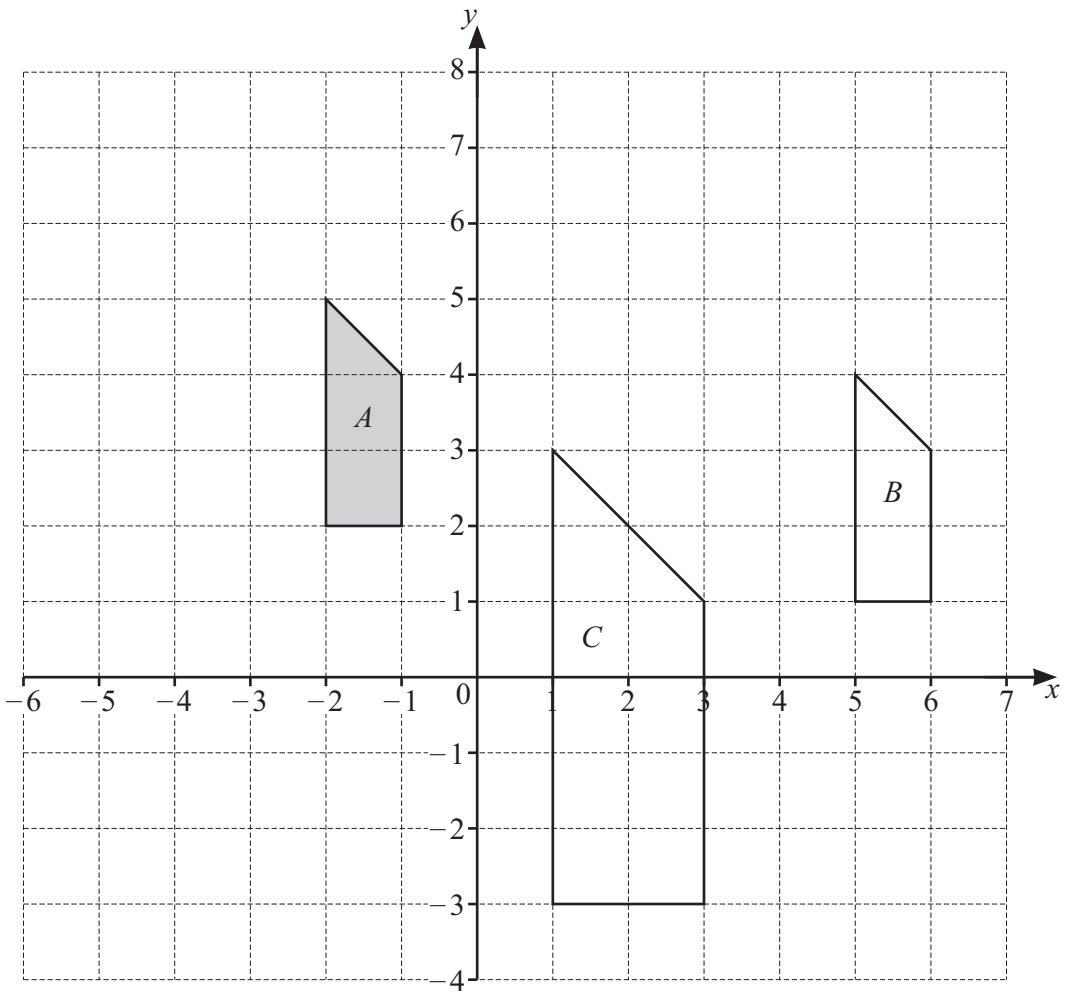
..... [1]

(c) E is 20 km from P on a bearing of 070°.

On the scale drawing, mark the position of E.

[2]

17



(a) Sue describes the **single** transformation that maps shape *A* onto shape *B* as a translation by the vector $\begin{pmatrix} 7 \\ 1 \end{pmatrix}$.

Explain why Sue is incorrect.

.....

..... [1]

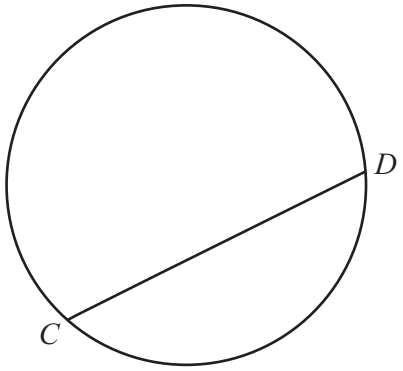
(b) On the grid, draw the image of shape *A* after a rotation of 90° anticlockwise about (0, 0). [2]

(c) Describe fully the **single** transformation that maps shape *A* onto shape *C*.

.....

..... [3]

18 (a)

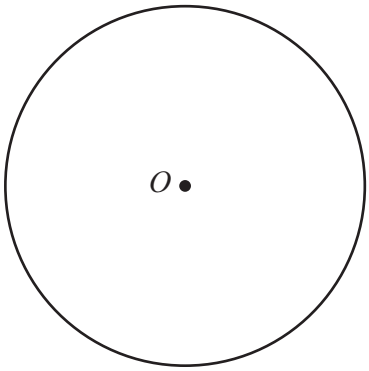


Points C and D lie on the circle.

Write down the mathematical name for the line CD.

..... [1]

(b) The diagram shows a circle with centre O.



Points K, L and M lie on the circumference of the circle.

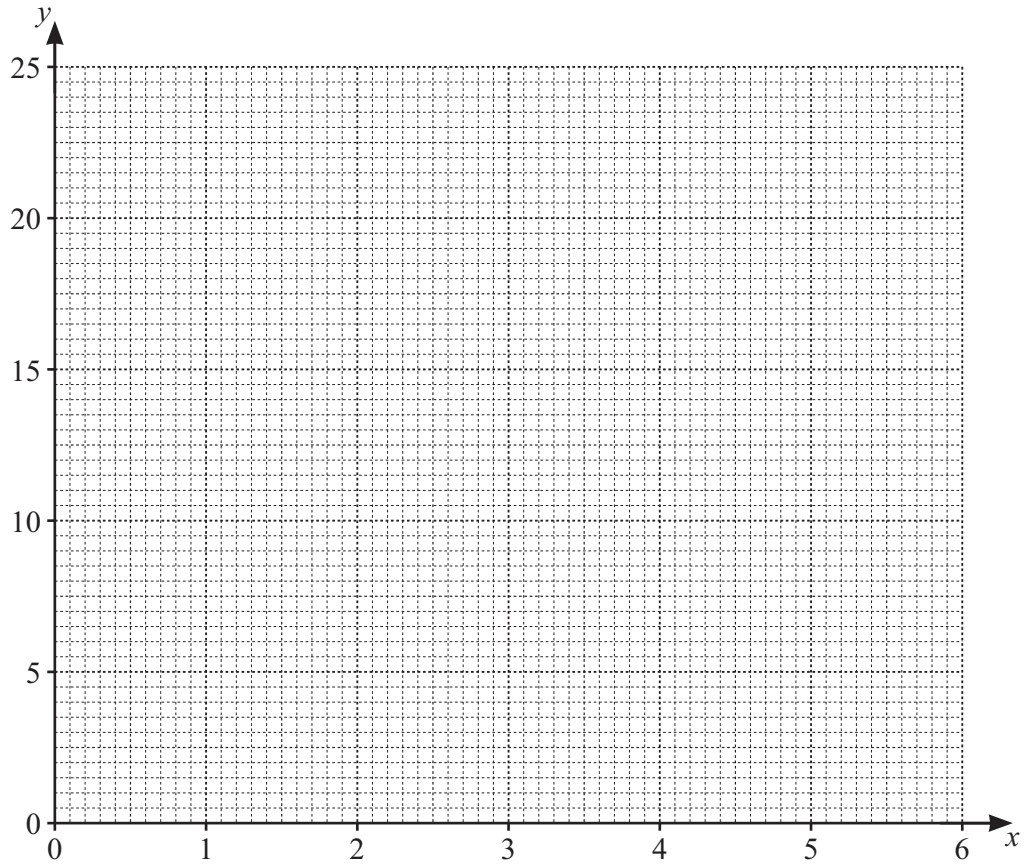
Draw triangle KLM so that angle $KLM = 90°$. [1]

19 **(a)** Complete the table of values for $y = \frac{20}{x}$.

x	1	2	3	4	5
y	20	10			4

[2]

(b) On the grid, draw the graph of $y = \frac{20}{x}$ for $1 \leqslant x \leqslant 5$.



[3]

(c) Use your graph to solve the equation $\frac{20}{x} = 8$.

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

20 A spinner is numbered 1, 2, 3, 4 and 5.

Rinesh spins the spinner many times.
He works out the relative frequency that the spinner lands on each number.

Number	1	2	3	4	5
Relative frequency	0.15	0.22		0.26	0.25

(a) Complete the table.

[2]

(b) Rinesh spins the spinner another 1500 times.

Calculate the expected number of times the spinner lands on 2.

..... [1]

21 **(a)** These are the distances above the surface of the Earth of five satellites, A, B, C, D and E. Each distance is in kilometres.

A	B	C	D	E
35 800	7.8×10^2	1.5×10^6	535	2×10^4

(i) Write these distances in order, starting with the shortest.

....., ..., ..., ..., ... [2]
shortest

(ii) The radius of Earth is 6370 km.
Satellite A is k times further from the **centre** of Earth than satellite D.

Show that $k = 6.11$ correct to 2 decimal places.

[2]

(b) A satellite travels at a speed of 27 000 km/h.

Find the distance the satellite travels in 95 minutes.

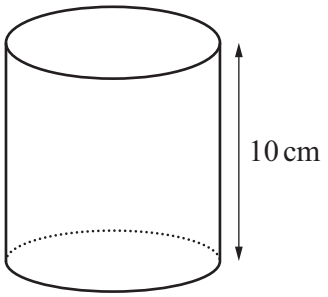
..... km [2]

(c) A different satellite travels at a speed of 25 200 km/h.

Convert this speed into m/s.

..... m/s [2]

22 The diagram shows a solid cylinder with height 10 cm.



NOT TO SCALE

The volume of the cylinder is 478 cm^3.

(a) Find the radius of the cylinder.

..... cm [3]

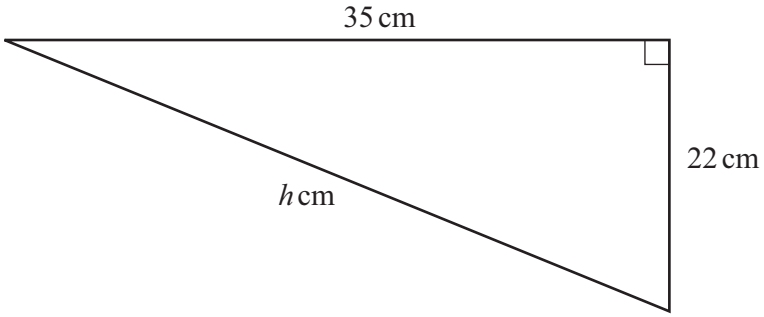
(b) The cylinder is made from gold.
The density of the gold is 19.3 g/cm^3.

Calculate the mass of the cylinder.

$\left[\text{Density} = \frac{\text{mass}}{\text{volume}}\right]$

..... g [1]

23 The diagram shows a right-angled triangle.

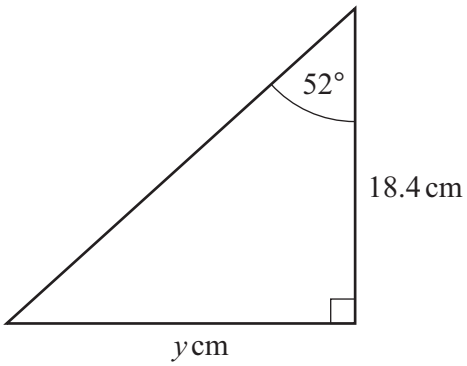


NOT TO SCALE

Calculate the value of h.

$h =$ ..... [2]

24 The diagram shows a right-angled triangle.



NOT TO SCALE

Calculate the value of y.

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

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