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MATHEMATICS **0580/42**

Paper 4 Calculator (Extended) **February/March 2026**

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. Do **not** use correction fluid or tape.
- 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 **16** pages.

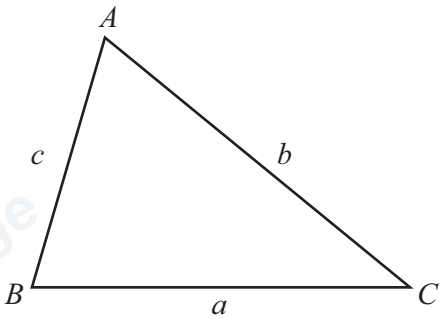
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[Turn over

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,



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

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

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

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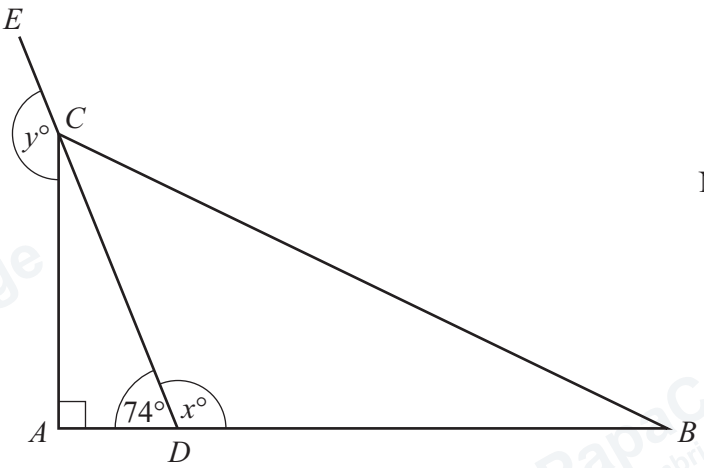
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1 Write the number seven point two five million in figures.

..... [1]

2



NOT TO SCALE

ABC is a right-angled triangle.
ADB and *DCE* are straight lines and angle $ADC = 74°$.

Find the value of x and the value of y.

$x =$ .....

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

3 Calculate $10 - \left(\frac{7}{8}\right)^3 \times 2$.

Give your answer correct to 1 decimal place.

..... [2]

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4 The exchange rate between pounds (£) and dollars ($) is £1 = $1.28 .
The exchange rate between pounds and rupees is £1 = 115 rupees.
A computer costs $576.

Calculate the cost of the computer in rupees.

..... rupees [2]

5 Nisha flies from Mumbai to New York.
The journey takes 16 hours 18 minutes.

(a) The flight departs from Mumbai at 11 50.
The local time in Mumbai is 10.5 hours ahead of the local time in New York.

Find the local time in New York when Nisha's flight arrives.

..... [2]

(b) The plane flies a distance of 12 800 km.

Calculate the average speed of the plane on this flight in km/h.

..... km/h [2]

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6 A bag contains yellow counters, blue counters and red counters.
Asif takes a counter at random from the bag.
The probability that he takes a yellow counter is 27%.
The probability that he takes a blue counter is $\frac{3}{5}$.

Find the probability that he takes a red counter.

..... [2]

7 $p^2 = r^2 - 8t$

(a) Find p when $r = -15$ and $t = 7$.

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

(b) Rearrange $p^2 = r^2 - 8t$ to make t the subject.

$t =$ ..... [2]

8 A prism has 6 planes of symmetry.
The cross-section of the prism is a regular polygon.

Write down the name of the regular polygon.

..... [1]

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9 A tank in the shape of a sphere has radius 40 cm.

(a) Show that the capacity of the tank is 268 litres, correct to the nearest litre.

[3]

(b) The tank contains 268 litres of water.

The water from the tank is emptied into a cylindrical container at a rate of 300 ml per second.

(i) Calculate the time taken for the tank to be completely emptied.
Give your answer in minutes and seconds, correct to the nearest second.

..... min ..... s [3]

(ii) The cylindrical container has radius 50 cm and height 40 cm.

Calculate the percentage of the container that is filled with water.

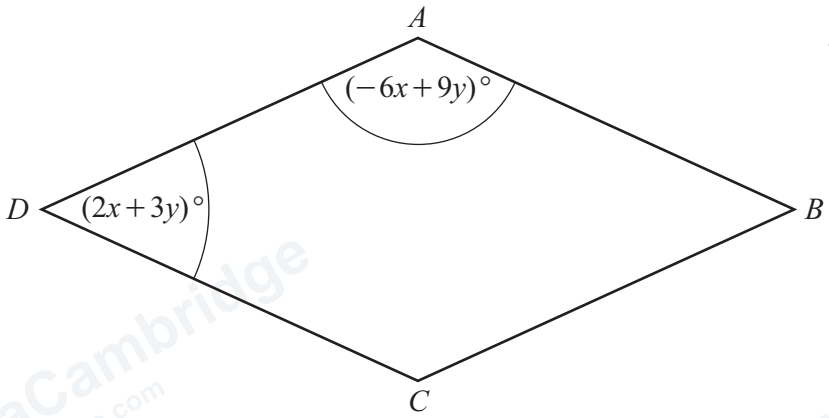
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10 The diagram shows a rhombus.



NOT TO SCALE

Angle BCD is 117°.

Write two simultaneous equations and solve them to find the value of x and the value of y.
You must show all your working.

$x =$ .....

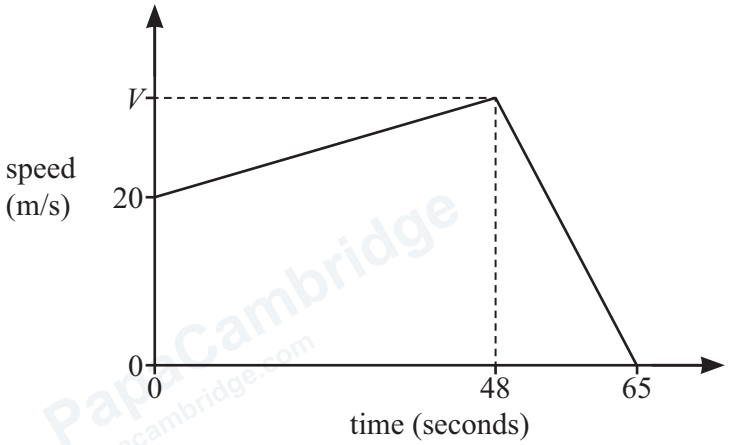
$y =$ .....

[5]

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11



NOT TO SCALE

The diagram shows the speed–time graph for 65 seconds of a journey.

(a) The acceleration during the first 48 seconds of this part of the journey is $0.25\,m/s^2$.

Show that $V = 32$ m/s.

[2]

(b) Work out the total distance travelled during the 65 seconds.
Give your answer in kilometres.

..... km [3]

12 Solve.

$$\frac{4x-3}{5} = \frac{7-2x}{3}$$

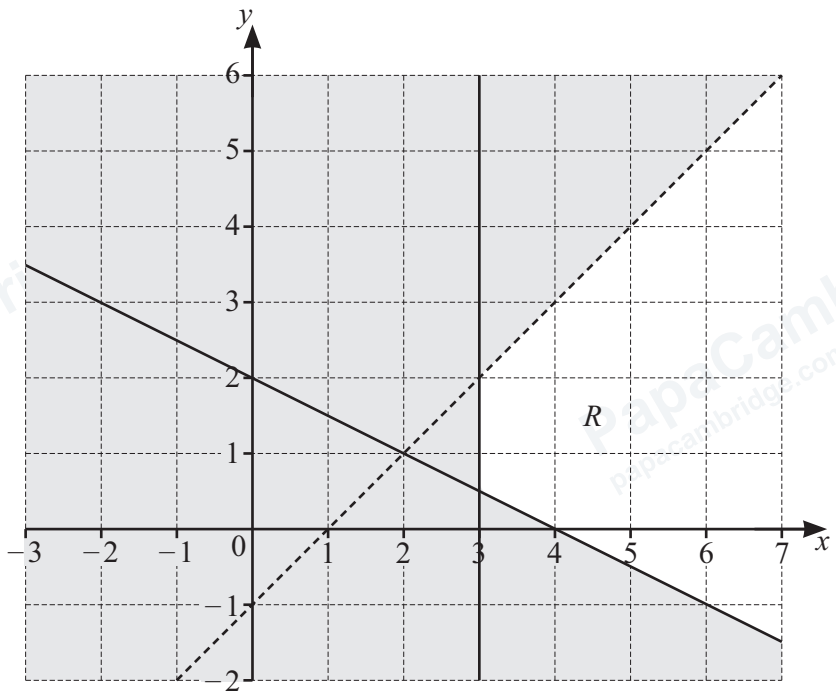
$x =$ ..... [3]

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13



The region marked R is defined by three inequalities.

Find the three inequalities.

.....

.....

.....

[5]

14 Two bottles are mathematically similar.
The larger bottle has a capacity of 1.35 litres and a height of 24 cm.
The smaller bottle has a capacity of 0.4 litres.

Calculate the height of the smaller bottle.

..... cm [3]

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15 **(a)** $f(x) = 10 - 2x$ $g(x) = 2x^2 + 3$

(i) The domain of $f(x)$ is $\{-2, 0, 3\}$.

Find the range of $f(x)$.

{ ..... } [2]

(ii) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

(iii) Find $gf(x)$ in the form $ax^2 + bx + c$.

..... [3]

(b) $h(x) = 10^{\frac{2}{x}}$, $x \neq 0$

Find $h^{-1}(10\,000)$.

..... [1]

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16 The temperature, T °C, of a liquid is given by the formula

$$T = ab^x$$

where x is the number of minutes after 2 pm.

$T = 80$ at 2 pm.
$T = 20$ at 2.30 pm.

Find the value of a and the value of b.

$a =$ .....

$b =$ .....
[3]

17 A curve has equation $y = x^3 - \frac{5}{2}x^2 + 3$.

Find the gradient of the curve at $x = 1.5$.

..... [3]

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18 The table shows information about the time that each of 90 trains is delayed.

time (m minutes)	$0 < m \leqslant 10$	$10 < m \leqslant 30$	$30 < m \leqslant 45$	$45 < m \leqslant 75$
frequency	13	35	36	6

(a) Calculate an estimate of the mean.

..... min [4]

(b) A histogram is drawn to show the information in the table.
The height of the bar for the interval $10 < m \leqslant 30$ is 14 cm.

Calculate the height of the bar for each of the other intervals.

$0 < m \leqslant 10$ ..... cm

$30 < m \leqslant 45$ ..... cm

$45 < m \leqslant 75$ ..... cm
[3]

(c) Two of the trains with delays of more than 30 minutes are chosen at random.

Find the probability that just one of these trains is delayed for 45 minutes or less.

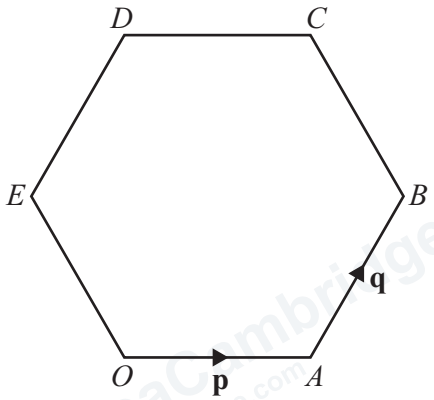
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NOT TO SCALE

$OABCDE$ is a regular hexagon.
$\overrightarrow{OA} = \mathbf{p}$ and $\overrightarrow{AB} = \mathbf{q}$.

(a) Find, in terms of **p** and/or **q**, in its simplest form

(i) $\overrightarrow{DE}$

$\overrightarrow{DE} =$ ..... [1]

(ii) $\overrightarrow{BE}$

$\overrightarrow{BE} =$ ..... [1]

(iii) $\overrightarrow{OE}$.

$\overrightarrow{OE} =$ ..... [2]

(b) OB and DC are extended to meet at G.

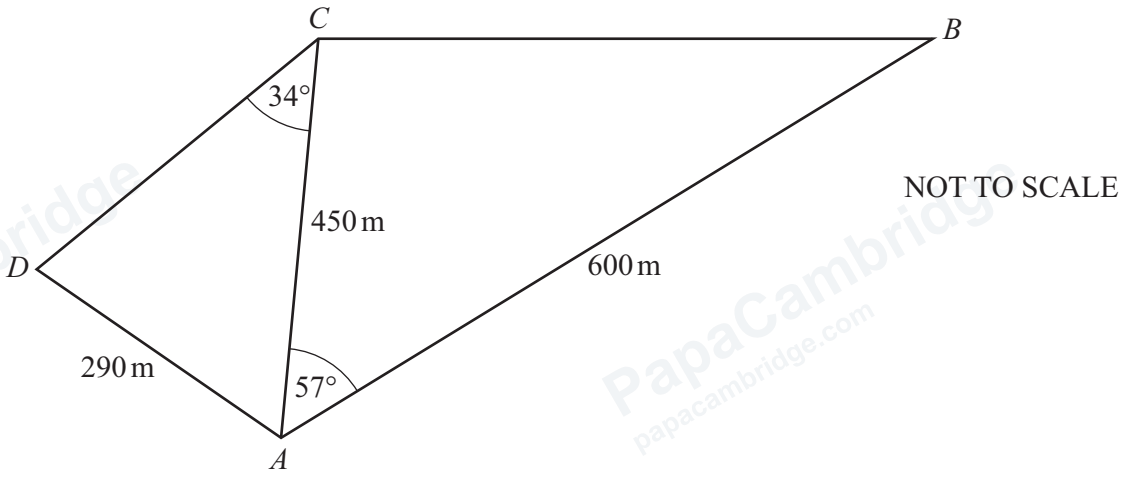
Find the position vector of G in terms of **p** and **q**.
Give your answer in its simplest form.

..... [2]

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20



The diagram shows points A, B, C and D on horizontal ground.

(a) Calculate the area of triangle ABC.

..... m^2 [2]

(b) Show that angle $CAD = 85.8°$, correct to 1 decimal place.

[4]

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(c) There is a vertical mast at point B and a vertical mast at point D.
The height of the mast at point $B = 250\,\text{m}$.
The height of the mast at point $D = 45\,\text{m}$.

Calculate the angle of depression of the top of the mast at point D from the top of the mast at point B.

..... [6]

21 The length of a cuboid is 2 cm, correct to the nearest integer.
The width of the cuboid is 4 cm, correct to the nearest integer.
The volume of the cuboid is $123.8\,\text{cm}^3$, correct to 1 decimal place.

Find the lower bound of the height of the cuboid.

..... cm [3]

Questions 22 and 23 are on the back page.

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22 These are the first five terms of a sequence.

$$\frac{1}{6} \qquad 1 \qquad 6 \qquad 36 \qquad 216$$

Find an expression for the nth term of this sequence.

..... [2]

23 Two angles, A and B, are formed when two lines meet at a point.
Angle A is given by the equation $2+3\tan A = -0.5$.

Find the **two** possible values of angle B.

angle B = ... or ..... [4]

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