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MATHEMATICS**0580/22**

Paper 2 Non-calculator (Extended)

February/March 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 **20** pages.



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 .

$$V = \frac{1}{3}\pi r^2 h$$

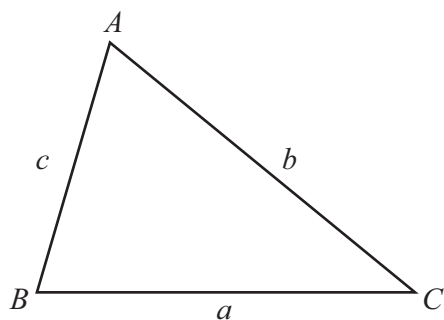
Volume, V , of sphere of radius r .

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

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,



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

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

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





Calculators must **not** be used in this paper.

- 1 Oranges cost 220 rupees per kilogram.

Work out the cost of 9 kg of these oranges.

..... rupees [1]

- 2 Aryan goes on a journey.
He leaves home at 11 40 and arrives at 14 18.

Find how many hours and minutes the journey took.

..... h min [1]

- 3 A quadrilateral has one line of symmetry.
The diagonals of the quadrilateral cross at right angles.

Write down the mathematical name of the quadrilateral.

..... [1]





4

$$V = 4mp^2$$

(a) Find V when $m = 10$ and $p = -3$.

$$V = \dots\dots\dots [2]$$

(b) Find the positive value of p when $V = 3200$ and $m = 2$.

$$p = \dots\dots\dots [2]$$

5 Write these lengths in order of size, starting with the smallest.

0.03 m 2.9 cm 32 mm 0.000 02 km

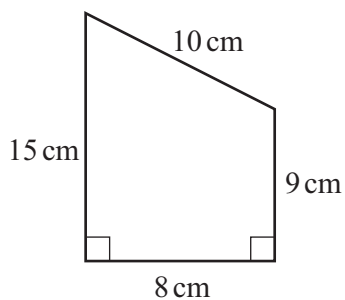
.....,,, [2]
smallest





5

6

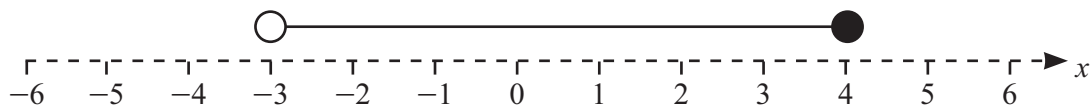


NOT TO
SCALE

Work out the area of the trapezium.

..... cm^2 [2]

7



Write down the inequality for x represented on the number line.

..... [2]





- 8 Pryanka plays a game in which she can win, lose or draw.
The table shows the probability of her winning or losing a game.

Result of game	win	lose	draw
Probability	0.3	0.25	

- (a) Complete the table.

[2]

- (b) Pryanka plays this game 120 times.

Work out the expected number of games she wins.

..... [1]

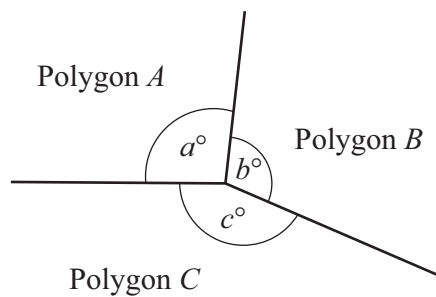
9

$$D = \sqrt{\frac{1.95 \times 9.92^2}{8.07}}$$

By writing each number correct to 1 significant figure, work out an estimate for D .

$D =$ [3]





NOT TO
SCALE

Three regular polygons A , B and C meet at a point.
The interior angles of the polygons are in the ratio $a : b : c = 3 : 4 : 5$.

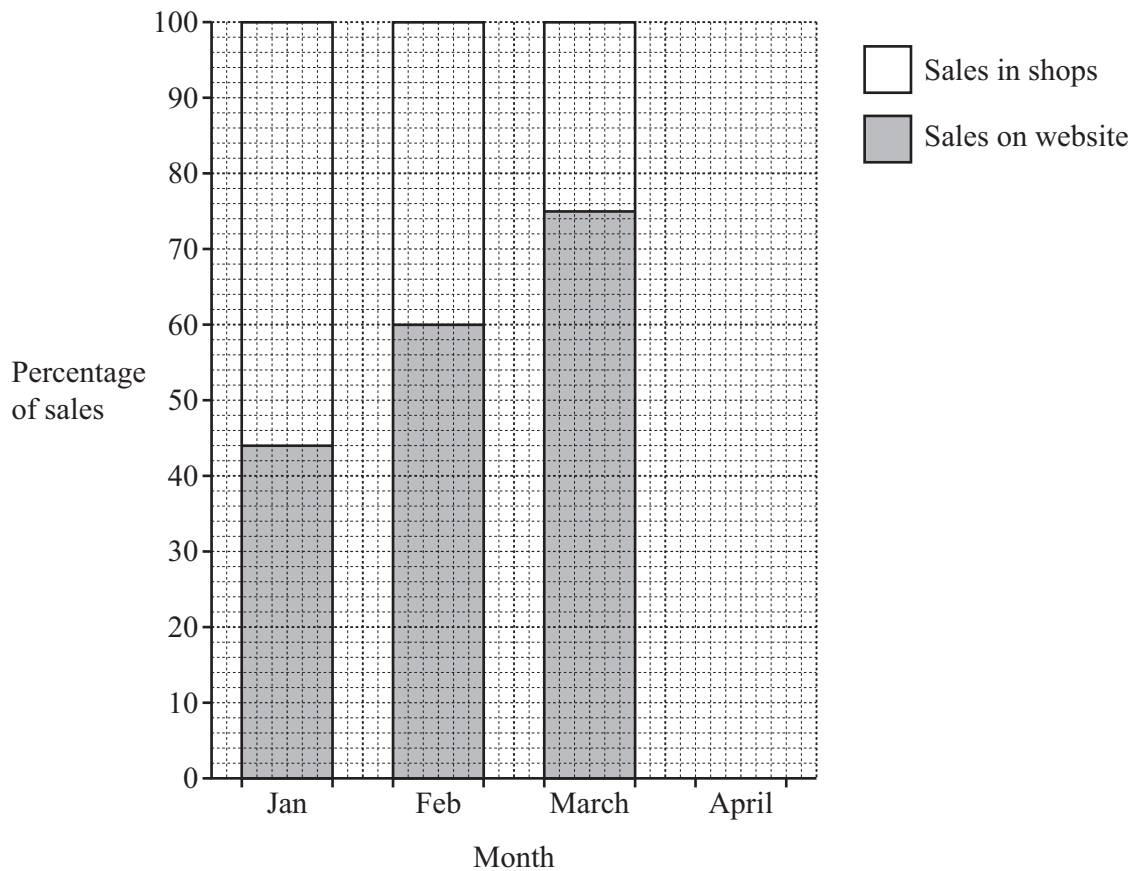
Show that polygon C has twice the number of sides as polygon B .

[5]





- 11 A company sells items either on a website or in shops.
The composite bar chart shows the percentage of sales on the website and in shops for January, February and March.



- (a) In April, $\frac{17}{20}$ of the company's sales were on the website.

On the grid, draw the bar for April.

[2]

- (b) In February, the company had sales of \$3.5 million.

Work out the value of sales **in shops** in February.

\$ million [3]





- (c) In May, the company had sales of \$6 million.
In June, the company had sales of \$7.5 million.

Find the percentage increase in sales from May to June.

..... % [3]

- (d) In 2024, the company had total sales of \$52 million.
This was an increase of 30% on the total sales for 2023.

Work out the total sales in 2023.

\$ million [2]

- 12 (a) Write as a single fraction in its simplest form.

$$\frac{x}{4} + \frac{3x}{8} - \frac{x+2}{12}$$

..... [3]

- (b) Factorise.

$$3x(a+4y) - ay - 4y^2$$

..... [1]

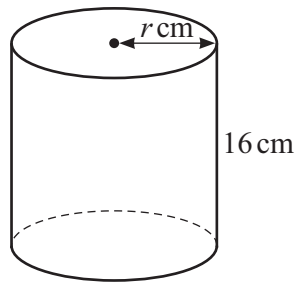




13



10



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The diagram shows a cylinder with radius r cm and height 16 cm.

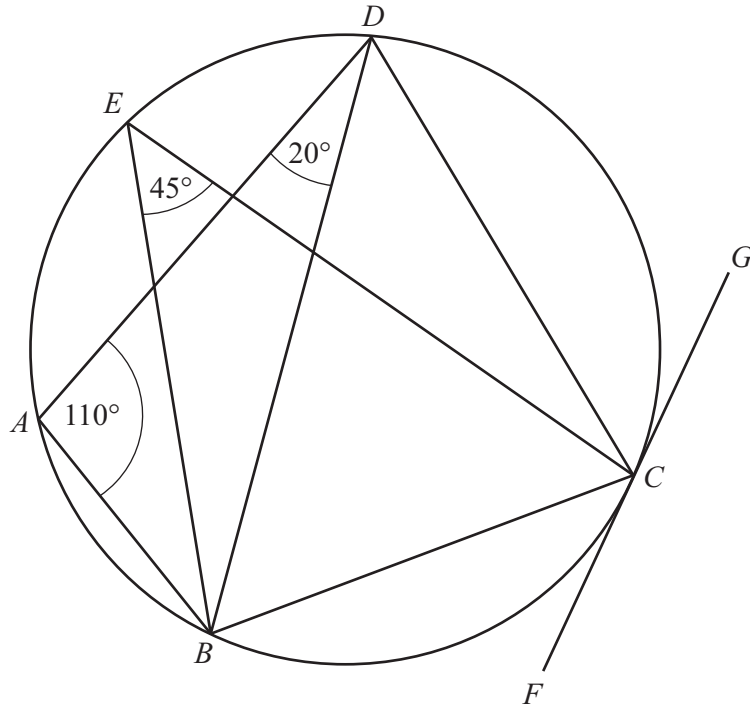
A sphere has radius 3 cm.

The volume of the cylinder is equal to the volume of the sphere.

Find the value of r .

$r = \dots\dots\dots$ [4]



NOT TO
SCALE

A, B, C, D and E lie on a circle.

FG is a tangent to the circle at C .

Angle $BAD = 110^\circ$, angle $ADB = 20^\circ$ and angle $BEC = 45^\circ$.

(a) Find angle BCD .

Give a geometrical reason for your answer.

Angle $BCD = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$ [2]

(b) (i) Find angle DBC .

Angle $DBC = \dots\dots\dots$ [2]

(ii) Find angle DCG .

Angle $DCG = \dots\dots\dots$ [1]





15 Point A has coordinates $(-4, 1)$ and $\overrightarrow{BA} = \begin{pmatrix} -5 \\ -12 \end{pmatrix}$.

(a) Find the coordinates of point B .

(..... ,) [2]

(b) Point C has coordinates $(5, -2)$.

Find the vector $\overrightarrow{CA}$.

$\overrightarrow{CA} = \begin{pmatrix} \\ \end{pmatrix}$ [2]

(c) $\overrightarrow{EF} = 3\overrightarrow{BA}$

Find $|\overrightarrow{EF}|$.

..... [3]





- 16 The stem-and-leaf diagram shows the mass of each of 13 packets.

3	1	2	8			
4	0	1	2	3	3	8
5	1	2	3	4		

Key: 3 | 1 represents 31 g

- (a) Work out the interquartile range.

..... g [3]

- (b) Two of these packets are chosen at random.

Find the probability that the one packet has a mass of more than 50 g and the other packet has a mass of less than 50 g.

..... [3]





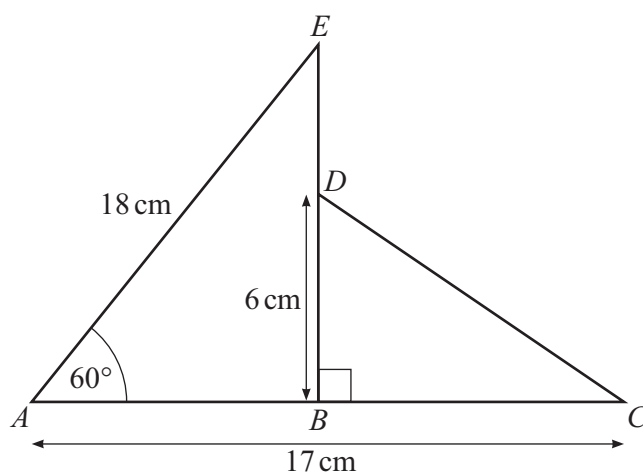
17 Work out.

$$\frac{5}{9} + 0.2\dot{8}$$

Give your answer as a fraction in its simplest form.

..... [4]



NOT TO
SCALE

The quadrilateral $ACDE$ is formed by two right-angled triangles ABE and BCD .
 $AC = 17$ cm, $AE = 18$ cm and $BD = 6$ cm.

(a) Show that $CD = 10$ cm.

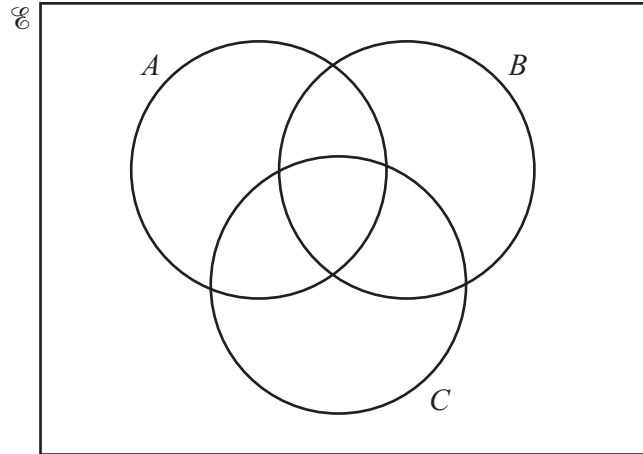
[5]

(b) Find the perimeter of the quadrilateral $ACDE$.
 Give your answer in the form $p + k\sqrt{q}$.

..... cm [4]



19



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

[1]

20 (a) Simplify.

$$\sqrt{300} + \sqrt{48}$$

..... [2]

(b) Rationalise the denominator and simplify.

$$\frac{9}{2 + \sqrt{7}}$$

..... [3]



- 21 (a) Write down the coordinates of the point where the graph of $y = 5x - 3$ crosses the y -axis.

(..... ,) [1]

- (b) A is the point $(1, 7)$ and B is the point $(5, 15)$.

Find the equation of the perpendicular bisector of the line AB .

Give your answer in the form $y = mx + c$.

$y = \dots\dots\dots$ [5]





22 A curve has equation $y = x^3 + x^2 - x$.

The curve has a stationary point at $\left(\frac{1}{3}, -\frac{5}{27}\right)$.

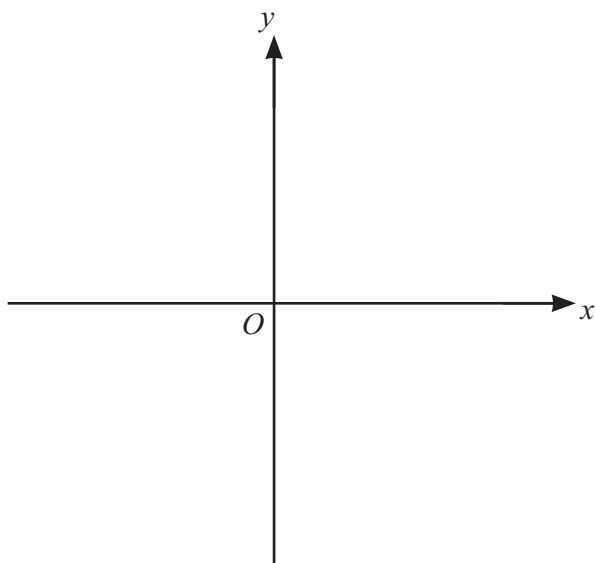
(a) Find the coordinates of the other stationary point.

(..... ,) [5]





- (b) By sketching the graph of $y = x^3 + x^2 - x$, determine whether the stationary point $\left(\frac{1}{3}, -\frac{5}{27}\right)$ is a maximum or a minimum.



$\left(\frac{1}{3}, -\frac{5}{27}\right)$ is a [2]

- (c) The equation $x^3 + x^2 - x = k$ has fewer than 3 solutions.

Find the range of possible values for k .

..... [2]

Question 23 is printed on the next page.





23 (a) Simplify $\left(\frac{x^2}{4}\right)^{\frac{3}{2}}$.

..... [2]

(b) $16^x \times \left(\frac{1}{2}\right)^x = 4^{x+3}$

Find the value of x .

$x =$ [4]

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