

IGCSE Mathematics 0580 Extended

Practice Paper A: CALCULATOR (Paper 4 style)

QUESTIONS | 100 marks | Calculator allowed | Numrahedu.com | Free, no login needed

Time allowed: 2 hours. Total marks: 100.

- Answer **all** questions in the spaces provided.
- Show **all** your working. Marks are given for correct method even when the final answer is wrong.
- Give non-exact answers correct to 3 significant figures unless the question says otherwise. Give answers in degrees correct to 1 decimal place.
- A scientific calculator is allowed. This paper follows the **Paper 4** format. To practise for **Paper 2**, attempt it without a calculator and leave surds and π in your answers.
- Use $\pi = 3.142$ or the π key on your calculator.
- Diagrams are not drawn to scale.
- Full worked solutions are in the separate Solutions PDF at <https://numrahedu.com/mathematics/>

Question	Topic	Marks
1	Number	20
2	Algebra	20
3	Geometry and mensuration	20
4	Trigonometry, vectors and probability	20
5	Statistics and graphs	20
	Total	100

Question 1

20 marks

Number

- (a) Write 0.000 34 in standard form. [1]
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- (b) Calculate $(3.6 \times 10^5) \times (2.5 \times 10^3)$. Give your answer in standard form. [2]
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- (c) Evaluate $64^{\frac{2}{3}}$. [2]
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- (d) Write 2^{-3} as a fraction. [1]
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- (e) A jacket costs \$200. The price is increased by 35 percent. Find the new price. [2]

(f) After a 20 percent decrease, the price of a book is \$96. Find the original price of the book. [2]

(g) \$1000 is invested at a compound interest rate of 5 percent per year. Calculate the total amount [3]
after 3 years. Give your answer correct to the nearest cent.

(h) Share \$450 in the ratio 2 : 3 : 5. Find each share. [3]

(i) y is directly proportional to x^2 . When $x = 3$, $y = 36$. Find y when $x = 5$. [3]

(j) Find the lowest common multiple of 12 and 18. [1]

Question 2

20 marks

Algebra

(a) Expand and simplify $(3x - 2)(2x + 5)$. [2]

(b) Factorise completely $2x^2 + 7x + 3$. [2]

(c) Solve $2x^2 - 5x - 3 = 0$. [3]

(d) The first four terms of a sequence are 5, 9, 13, 17.

(i) Find the n th term of this sequence. [2]

(ii) Find the value of the 50th term. [1]

(e) Solve the simultaneous equations $3x + 2y = 16$ and $x - y = 2$. [3]

- (f) Make r the subject of the formula $A = \pi r^2$. [2]

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- (g) Solve the inequality $3x - 7 > 2$ and show your solution on the number line below. [2]



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- (h) Simplify $\frac{x^2 - 9}{x^2 - x - 6}$. [3]

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Question 3

20 marks

Geometry and Mensuration

- (a) Find the distance between the points $A(2, 1)$ and $B(8, 9)$. [2]

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- (b) Find the equation of the line passing through $(1, 3)$ and $(5, 11)$. [3]

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- (c) A circle has radius 6 cm. Calculate its area and its circumference. Give your answers in terms of π . [2]

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- (d) The cylinder below has radius 4 cm and height 9 cm. Calculate its volume and its total surface area, correct to 3 significant figures. [4]

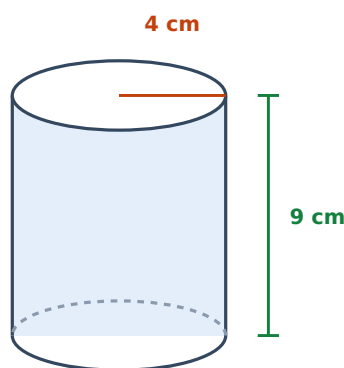


Diagram not drawn to scale

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- (e) The cone below has base radius 5 cm and vertical height 12 cm. Calculate its slant height l and [4]
its volume, correct to 3 significant figures.

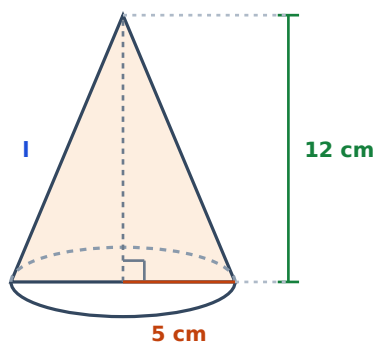


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- (f) The sector below has radius 8 cm and angle 135° . Calculate its arc length and its area, correct [3]
to 3 significant figures.

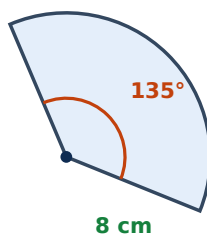


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- (g) In the diagram, O is the centre of the circle and angle $AOB = 112^\circ$. C is a point on the major arc. [2]
Find angle ACB , giving a reason for your answer.

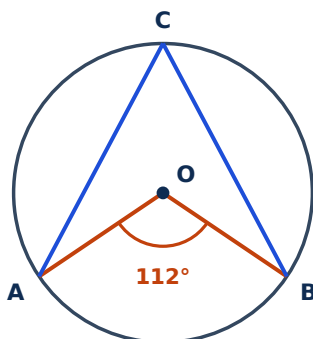


Diagram not drawn to scale

Question 4

20 marks

Trigonometry, Vectors and Probability

- (a) In the right-angled triangle below, the side opposite θ is 8 cm and the hypotenuse is 17 cm. [3]
Find the angle θ between the hypotenuse and the adjacent side.

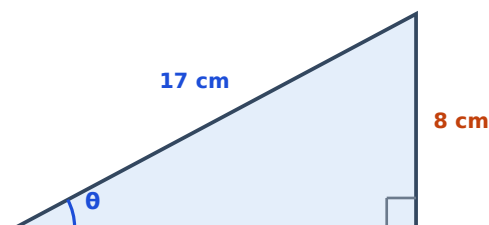


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- (b) In triangle ABC, $a = 10$ cm, angle $A = 30^\circ$ and angle $B = 45^\circ$. Use the sine rule to find the length of side b . [3]

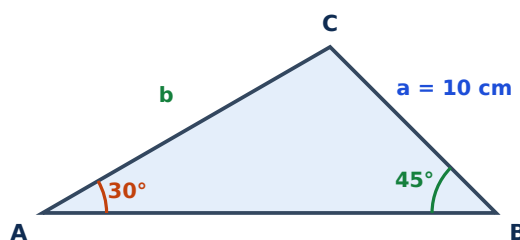


Diagram not drawn to scale

- (c) In triangle PQR, $PQ = 7$ cm, $PR = 9$ cm and angle $QPR = 60^\circ$. Use the cosine rule to find the length QR. [4]

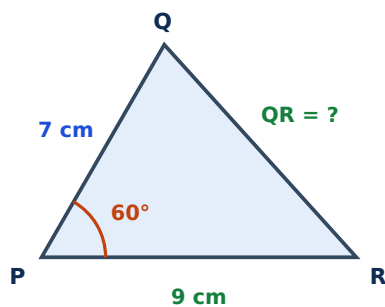


Diagram not drawn to scale

- (d) Find the area of a triangle with sides 6 cm and 8 cm and an included angle of 50° . [2]

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- (e) Vector $\mathbf{a} = (3, 2)$ and vector $\mathbf{b} = (-1, 4)$.

- (i) Find $\mathbf{a} + \mathbf{b}$. [1]

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- (ii) Find $2\mathbf{a} - \mathbf{b}$. [2]

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- (iii) Find $|\mathbf{a}|$, the magnitude of $\mathbf{a}$, correct to 3 significant figures. [2]

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- (f) The probability that it rains on any day is 0.3. Find the probability that it rains on exactly 2 of the next 3 days. [3]

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Question 5

20 marks

Statistics and Graphs

- (a) Seven students scored these marks: 7, 4, 9, 4, 12, 6, 8. Find the mean, the median, the mode and the range. [3]

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- (b) The table shows the time t minutes taken by 35 students to finish a task. Calculate an estimate of the mean time.

Time t minutes	$0 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 30$	$30 < t \leq 40$	$40 < t \leq 50$
Frequency	4	9	12	7	3

[3]

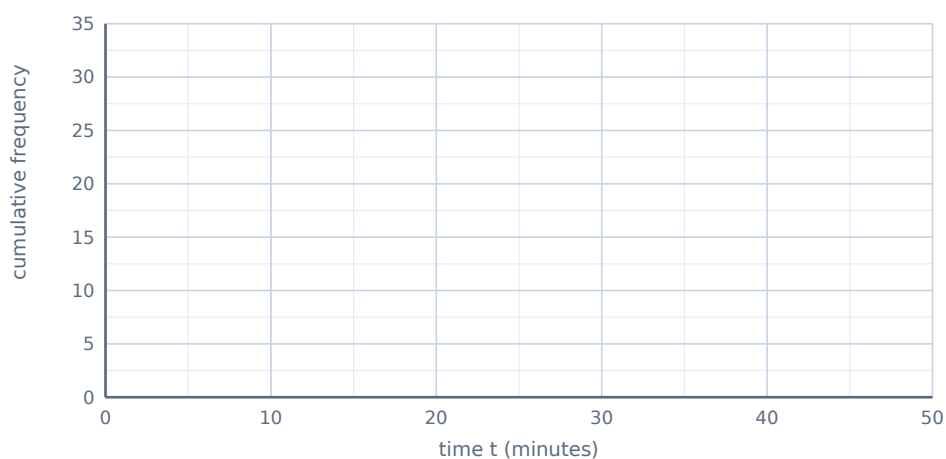
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- (c) Complete the cumulative frequency table for the same data, then draw the cumulative frequency curve on the grid and use it to estimate the median.

Time t minutes	$t \leq 10$	$t \leq 20$	$t \leq 30$	$t \leq 40$	$t \leq 50$
Cumulative frequency					



[4]

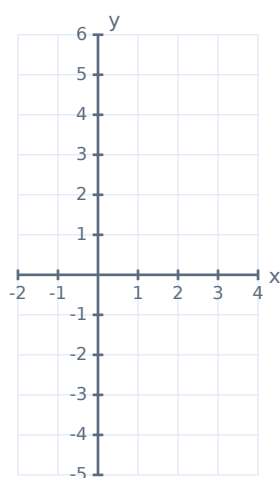
- (d) The table shows a second set of data. Calculate the frequency density for each class, ready to draw a histogram.

Class	$0 < x \leq 10$	$10 < x \leq 20$	$20 < x \leq 40$	$40 < x \leq 70$
Frequency	15	25	30	15
Frequency density				

[3]

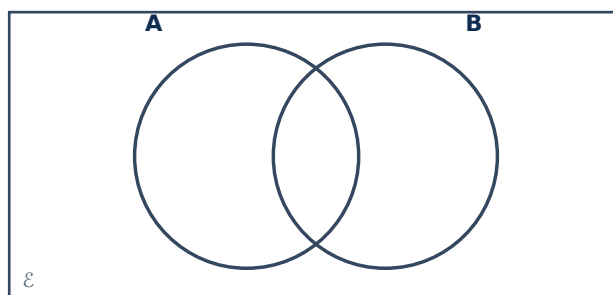
- (e) Complete the table of values for $y = x^2 - 2x - 3$, draw the graph on the grid, and use your graph to solve $x^2 - 2x - 3 = 0$.

x	-2	-1	0	1	2	3	4
y	5		-3		-3		5



[5]

- (f) In a group of 30 students, 18 study French, 15 study German and 8 study both. Complete the Venn diagram and find the number of students who study neither language. [2]



End of questions. Total 100 marks.

Full worked solutions, with the method marks shown line by line, are in the Solutions PDF. More free IGCSE and O Level resources, worksheets and past paper solutions at <https://numrahedu.com/mathematics/>

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