



Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

Level 2 Certificate

FURTHER MATHEMATICS

Paper 1 Non-Calculator

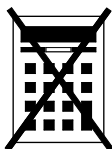
Thursday 12 June 2025 Afternoon Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:

- mathematical instruments
- the Formulae Sheet (enclosed).

You must **not** use a calculator.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more graph paper and tracing paper. These must be tagged securely to this answer book.

For Examiner's Use

Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22	
TOTAL	



J U N 2 5 8 3 6 5 1 0 1

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8365/1

Answer **all** questions in the spaces provided.

1 (a) The function f is given by $f(x) = 5x + 3$

The range is $f(x) < 23$

Work out the domain of the function, giving your answer as an inequality.

[1 mark]

Answer _____

1 (b) The function g is given by $g(x) = x^3 - 4$

The domain is $-3 < x < 2$

Work out the range of the function, giving your answer as an inequality.

[2 marks]

Answer _____



1 (c) The function h is given by $h(x) = \sqrt{2x+1}$

Work out $h^{-1}(x)$

[2 marks]

$$h^{-1}(x) = \underline{\hspace{10cm}}$$

2
$$\begin{pmatrix} 5 & 0 \\ 1 & -6 \end{pmatrix} \begin{pmatrix} 12 \\ 7 \end{pmatrix} = 15 \begin{pmatrix} a \\ b \end{pmatrix}$$

Work out the values of a and b .

[2 marks]

$$a = \underline{\hspace{2cm}} \quad b = \underline{\hspace{2cm}}$$



3 A linear sequence starts 2 5 8 11

Work out the **position** of the term that is the first to have a value greater than 500

[3 marks]

Answer _____

4 AC is a straight line.
A is the point $(-3, 2)$
B is the midpoint of the line AC.
B is the point $(12, 10)$

4 (a) Work out the coordinates of C.

[2 marks]

Answer (_____ , _____)

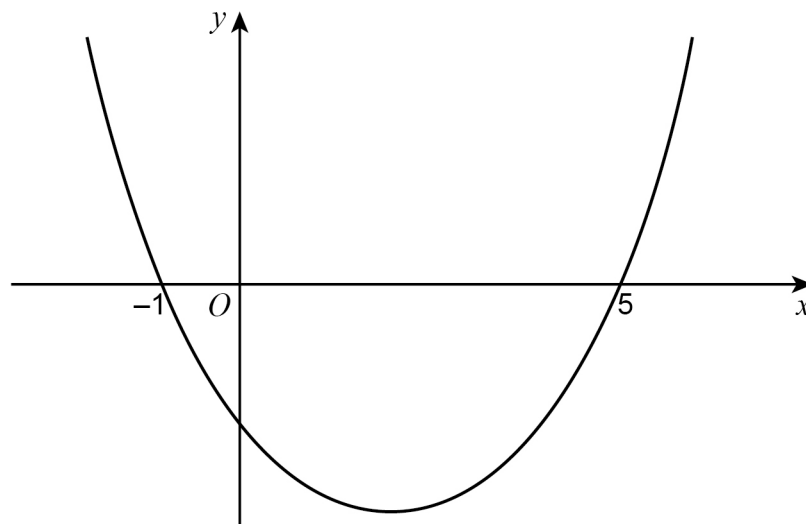


4 (b) Work out the distance AB .

[2 marks]

Answer _____ units

5 Here is a sketch of $y = x^2 + bx + c$
The graph passes through $(-1, 0)$ and $(5, 0)$



Work out the values of b and c .

[3 marks]

$b =$ _____ $c =$ _____



6

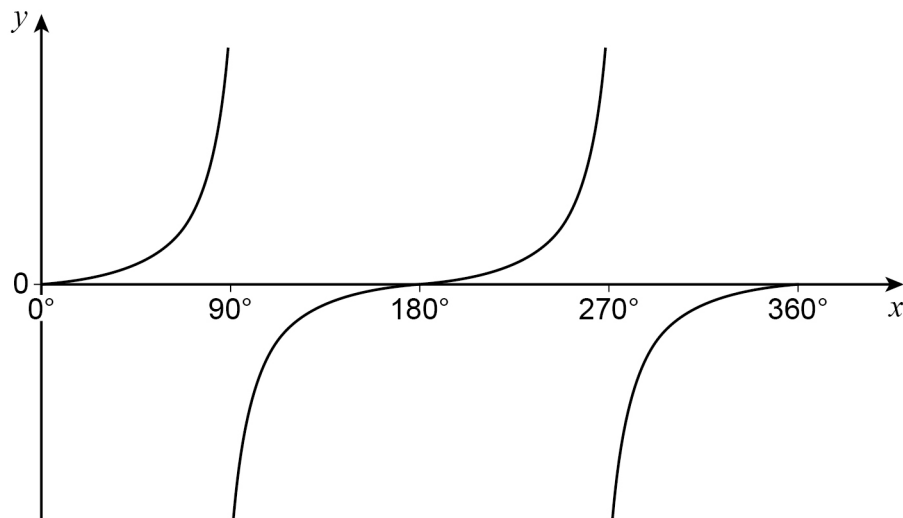
Simplify fully

$$\frac{\sqrt{75} - \sqrt{27}}{\sqrt{48}}$$

[3 marks]

Answer _____

7

Here is a sketch of $y = \tan x$ for $0^\circ \leq x \leq 360^\circ$ You are given that $\tan 72^\circ = k$ Work out the **two** values of x between 0° and 360° for which $\tan x = -k$

[2 marks]

Answer _____ and _____



8 Work out $\left(\frac{x^{\frac{9}{2}}}{x^2}\right)^3$ as a power of x .

Circle your answer.

[1 mark]

x^7

x^{12}

x^{15}

x^{27}

9 3-digit integers are made using three **different** digits.

The digits are chosen from 1, 2, 3, 4, 5, 6, 7, 8, 9

How many **more** odd integers than even integers can be made?

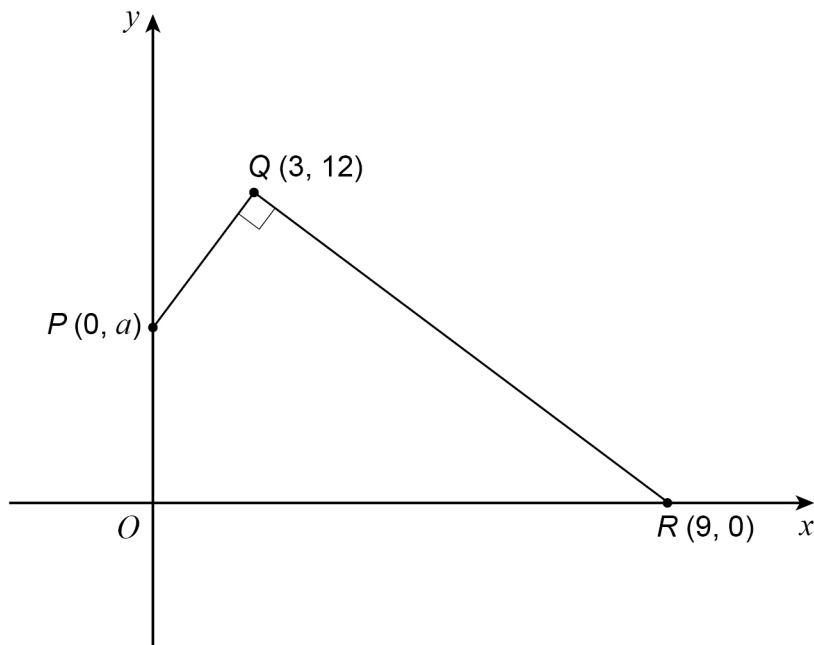
[3 marks]

Answer _____

Turn over for the next question



10

 PQ is perpendicular to QR .Not drawn
accuratelyWork out the value of a .**[4 marks]**

 $a =$ _____

11

Solve $x^3 + 10x^2 + 8x = 0$

Where appropriate give your answers in surd form.

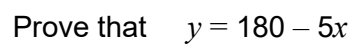
Simplify your answers where possible.

[4 marks]

Answer _____

Turn over for the next question**Turn over ►**

A , B and C are points on a circle, centre O .

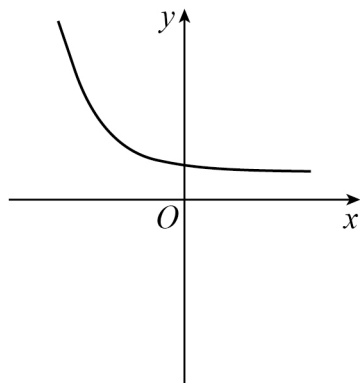
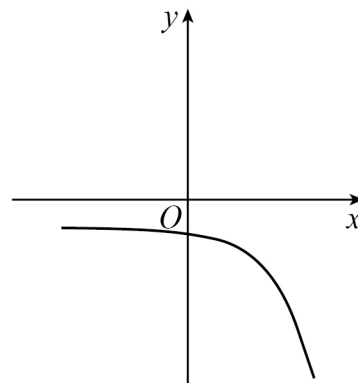
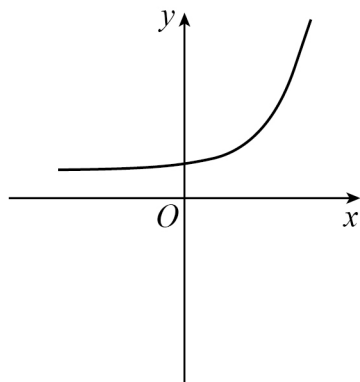
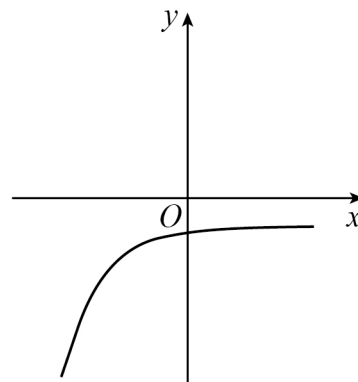


13

Here are four sketch graphs.

Circle the letter of the sketch graph that represents $y = 5^x$

[1 mark]

A**B****C****D**

Turn over for the next question

Turn over ►



$$\frac{2x^2 - 4x - 6}{x^2 - 3x} \div \frac{4x + 4}{7x^2}$$

Answer _____



15

$$(x - 3)(x + 4)(x + p) \equiv x^3 + qx^2 + rx + 24$$

Work out the values of p , q and r .

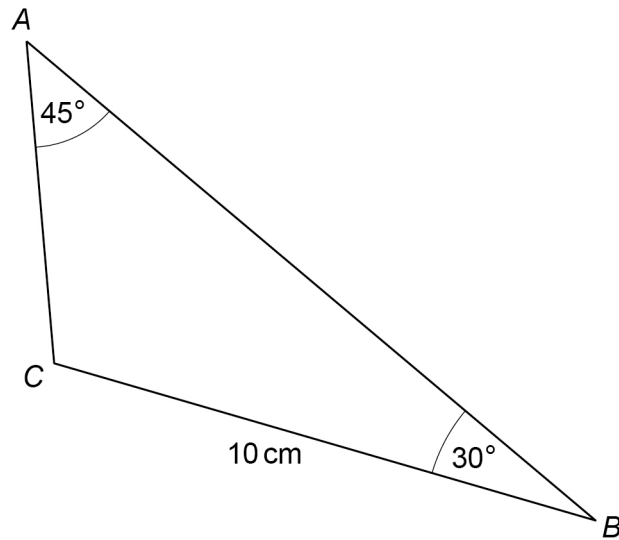
[3 marks]

$p =$ _____ $q =$ _____ $r =$ _____

Turn over for the next question



16

Not drawn
accurately

Work out the length AC.

Give your answer in the form $a\sqrt{2}$ where a is an integer.**[3 marks]**

Answer _____ cm



17

The expansions of $(4a + x)^4$ and $(5 - 2x)^3$ have the same coefficient of x^3

Work out the value of a .

[3 marks]

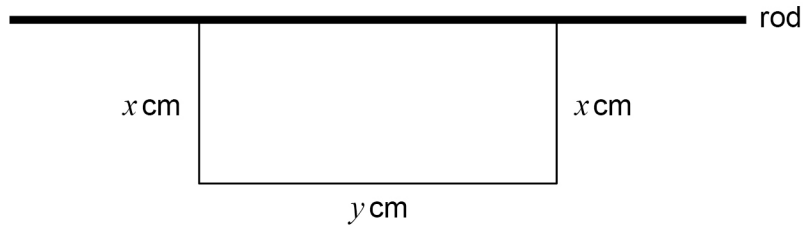
$a =$ _____

Turn over for the next question



- 18** A 60 cm piece of wire is bent to form three sides of a rectangle.
It is then attached to a fixed rod as shown in the diagram.

Not drawn
accurately



- 18 (a)** The area of the rectangle is $A \text{ cm}^2$

Show that $A = x(60 - 2x)$

[2 marks]

18 (b) Work out the maximum value of A as x varies.

[4 marks]

Answer _____ cm^2

Turn over for the next question



19 (a) $(x - 1)$ is a factor of $3x^3 + 2x^2 - 3x - 2$

Factorise fully $3x^3 + 2x^2 - 3x - 2$

[3 marks]

Answer _____

19 (b) $f(x) = (x - 2)(5x + 4)(3x + 2)$

c is a positive integer.

The value of $f(c)$ can be written as the product of **two** prime factors.

Deduce the value of $f(c)$

[2 marks]

Answer _____



20

$$y = \frac{x^3}{3} - 5x^2 + 28x + 11$$

Show that y is an increasing function for all values of x .

[4 marks]

Turn over for the next question

Turn over ►

- 21 Show that $\frac{20 \sin^2 x}{3 + \cos^2 x - 3 \sin^2 x}$ can be simplified to $k \tan^2 x$ where k is an integer. [2 marks]



[6 marks]

Answer (,) and (,)



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2 8



2 5 6 G 8 3 6 5 / 1

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