



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

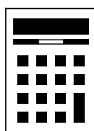
Paper 2 Calculator

Wednesday 18 June 2025 Afternoon Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:

- a calculator
- mathematical instruments
- the Formulae Sheet (enclosed).



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.
- The use of a calculator is expected but calculators with a facility for symbolic algebra must **not** be used.

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	
22–23	
TOTAL	



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

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1

Sequence	n th term
A	$\frac{6n}{7n+25}$
B	$\frac{20}{n+4}$

The 5th term in sequence A is also a term in sequence B.

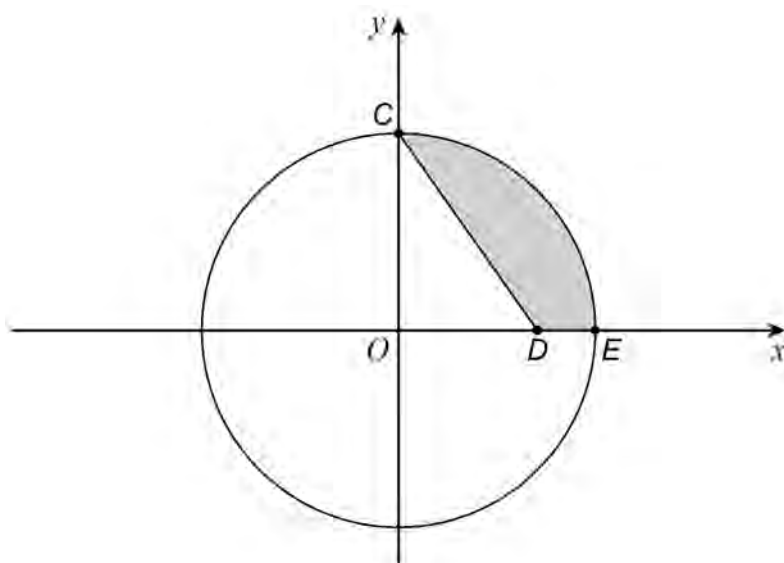
Work out the **position** of the term in sequence B.

[3 marks]

Answer _____



- 2 C and E are points on the circle with equation $x^2 + y^2 = 144$
 CD is a straight line.
 $OD : DE = 5 : 1$



Work out the shaded area.
 Give your answer as a decimal.

[4 marks]

Answer _____ units²

3 The equation of a straight line is $2ax + y = 25$ where a is a constant.

The line passes through the point (3, 1)

Work out the value of the gradient of the line.

[3 marks]

Answer _____

4 $-5 \leq n \leq 5$

Work out the range of possible values of n^2

[2 marks]

Answer _____



5 The equation of a curve is $y = x^5 + px^4$ where p is a constant.

When $x = -1$ the gradient of the curve is -3

Work out the value of p .

[3 marks]

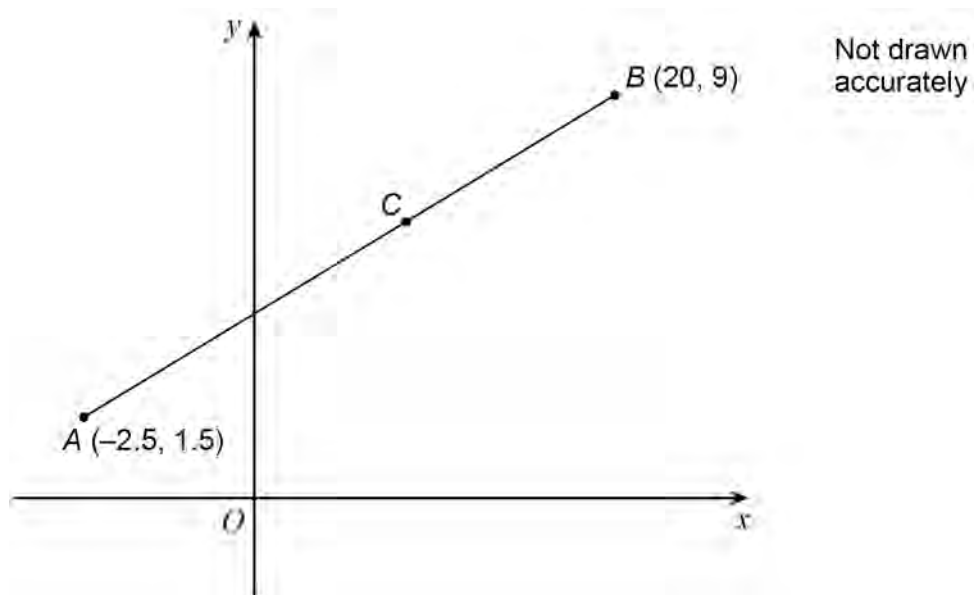
$p =$ _____

Turn over for the next question



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6 C is a point on the straight line AB .



$$AC : CB = 3 : 2$$

Work out the equation of the straight line passing through O and C .

[3 marks]

Answer _____



7 (a) $2^{5a+1} = 2^a$

Work out the value of a .

[2 marks]

$a =$ _____

7 (b) $3^{-7} \div 3^c = (3^{-3})^{2c}$

Work out the value of c .

[3 marks]

$c =$ _____



8 k is a positive integer.

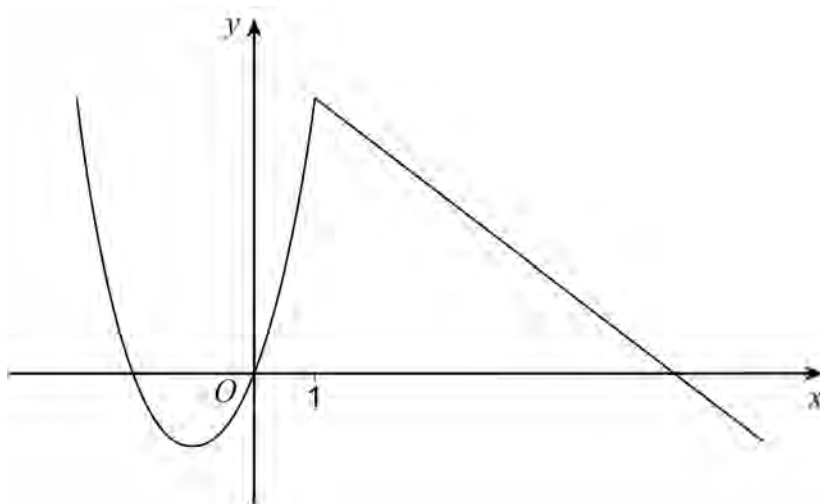
Prove that $4k(k + 8) - (4k + 9)(k - 1)$ is a multiple of 9

[3 marks]



9 $f(x) = x^2 + px \quad x \leq 1$
 $= 2p - \frac{1}{2}x \quad x > 1$

A sketch of $y = f(x)$ is shown.



Work out the value of p .

[2 marks]

$p =$ _____

Turn over for the next question



10 The first four terms of a quadratic sequence are

−1 11 31 59

Work out an expression for the n th term.

Give your answer in the form $an^2 + b$ where a and b are constants.

[2 marks]

Answer _____



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11 (a) Simplify fully $\frac{3}{4w} + \frac{1}{6w}$

[2 marks]

Answer _____

11 (b) Factorise fully $(x - 1)^9 + (x - 1)^8(x + 4)$

[2 marks]

Answer _____

11 (c) Factorise fully $8y^2 - 50$

[2 marks]

Answer _____

8

Turn over ►



- 12 (a)** Circle the matrix that represents an enlargement, scale factor 3, centre O .

[1 mark]

$$\begin{pmatrix} 3 & 0 \\ 0 & 3 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 3 \\ 0 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 & 3 \\ 3 & 0 \end{pmatrix}$$

$$\begin{pmatrix} 3 & 0 \\ 3 & 0 \end{pmatrix}$$

- 12 (b)** $OABC$ is the unit square.

$$O(0, 0) \quad A(1, 0) \quad B(1, 1) \quad C(0, 1)$$

K is the transformation represented by $\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$

L is the transformation represented by $\begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix}$

$OABC$ is mapped to $OA'B'C'$ under a **combined** transformation of **K** followed by **L**.

Work out the coordinates of A' , B' and C' .

[3 marks]

$A'(\quad, \quad)$ $B'(\quad, \quad)$ $C'(\quad, \quad)$



13

Rearrange $x = \frac{3k^2}{5k^2 - 2}$ to make k the subject.

[4 marks]

Answer _____

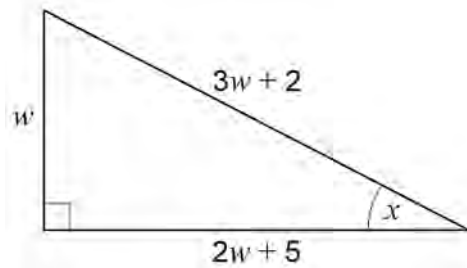
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Turn over ►



- 14** All lengths shown are in centimetres.



Not drawn
accurately

- 14 (a)** Use Pythagoras' theorem to show that $4w^2 - 8w - 21 = 0$

[2 marks]



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14 (b) Work out the size of angle x .

[3 marks]

$x =$ _____ °

Turn over for the next question

Turn over ►



15 For a curve $y = f(x)$

$$\frac{dy}{dx} = 1 - \frac{9}{x^2}$$

15 (a) Show that the curve has a turning point where $x = 3$

[1 mark]

15 (b) Use $\frac{d^2y}{dx^2}$ to work out the nature of the turning point.

You **must** show your working.

[2 marks]

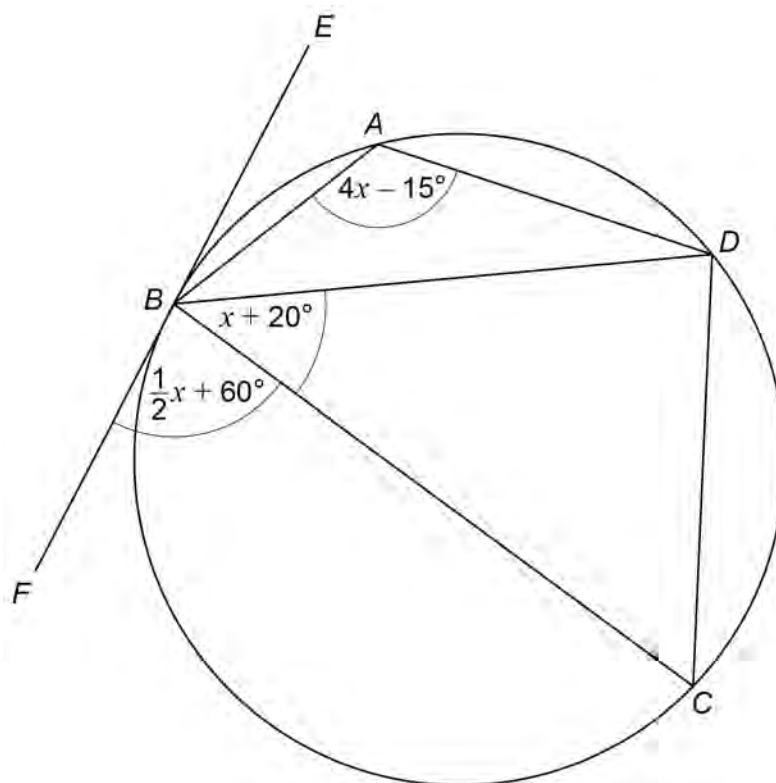
Answer _____



16

A, B, C and D are points on a circle.

EBF is a tangent.



Not drawn
accurately

Work out the value of x .

[4 marks]

$x =$ _____ $^{\circ}$

7

Turn over ►



21 (a) θ is an angle between 270° and 360°

$$\cos \theta = \frac{1}{5k} \quad \text{and} \quad \tan \theta = -3k \quad \text{where } k \text{ is a positive constant.}$$

Work out the value of θ .

[2 marks]

Answer _____^o



21 (b) Work out the values of x between 0° and 360° for which

$$8\cos^2 x - \cos x = 0$$

[3 marks]

Answer _____

END OF QUESTIONS



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2 8



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