Simultaneous Equations (Linear and Non-Linear)

Please write clearly in block capitals

Forename:
Surname:

Materials

For this paper you must have:
- mathematical instruments

You *can* 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.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

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

Advice

- In all calculations, show clearly how you work out your answer.

1   Solve the simultaneous equations: *(Level 7)*

$$y = -x + 2$$
$$y = x^2 + 2x - 1.$$

[4 marks]

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$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____

Turn over for next question

4

Turn over ▶

2   Solve the simultaneous equations: *(Level 7)*

$$x^2 + y^2 = 9$$

$$2y = x + 1$$

[4 marks]

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$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____

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4

Turn over ►

3 Solve the simultaneous equations: *(Level 7)*

$$3x + y = -9$$

$$x^2 + 2x - 3 = y$$

[4 marks]

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$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____

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4

Turn over ▶

4   Solve the simultaneous equations: *(Level 7)*

$$y = 3x - 1$$
$$3x^2 + 2y^2 = 35$$

[6 marks]

$x = $ _____ $y = $ _____

$x = $ _____ $y = $ _____

6

Turn over ►

5(a)   By eliminating y from the following equations   *(Level 8)*

$$y = 2 - 4x$$

$$3x^2 + xy + 11 = 0$$

show that $x^2 - 2x - 11 = 0$.

[2 marks]

5(b)   Hence or otherwise, solve the simultaneous equations, giving your answers

in the form $a + b\sqrt{3}$, where a and b are integers.

[5 marks]

$x =$ _____ $y =$ _____

$x =$ _____ $y =$ _____

Turn over for next question

7

6   Given that these simultaneous equations   *(Level 9)*

$$x - y = k$$
$$x^2 + y^2 - 9 = 0$$

have exactly one pair of solutions, show that $k = \pm 3\sqrt{2}$.

[6 marks]

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Answer _____

End of questions

6

END