Name: _____

GCSE (1 – 9)

Quadratic Inequalities

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
 – *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **show all your working out.**

Information

- The marks for each question are shown in brackets
 – *use this as a guide as to how much time to spend on each question.*
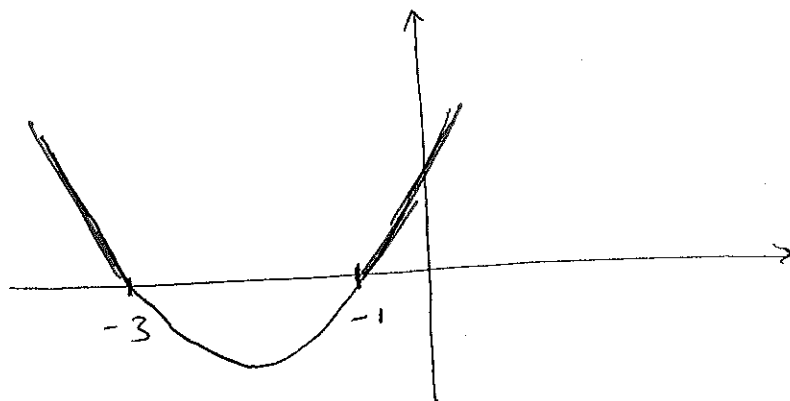
Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1. Solve $x^2 + 4x + 3 > 0$
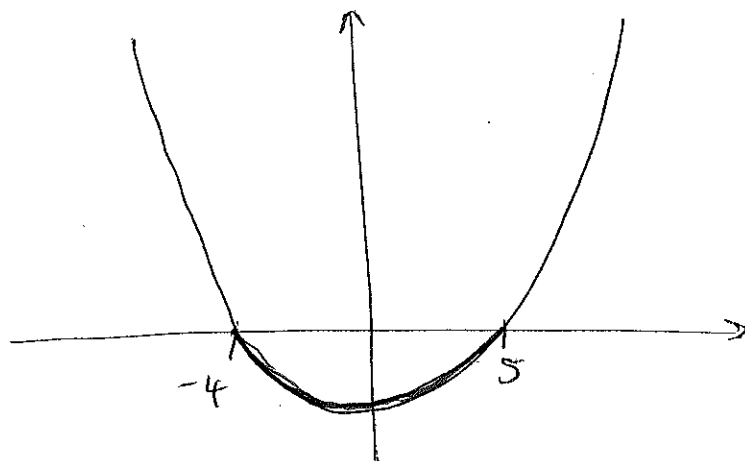
$$(x+3)(x+1) > 0$$

Crosses y axis at: $x = -3$ $x = -1$

Bigger than zero
Above Ground

$x < -3$ or $x > -1$ (3)

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2. Solve $x^2 - x - 20 < 0$

$$(x+4)(x-5) < 0$$

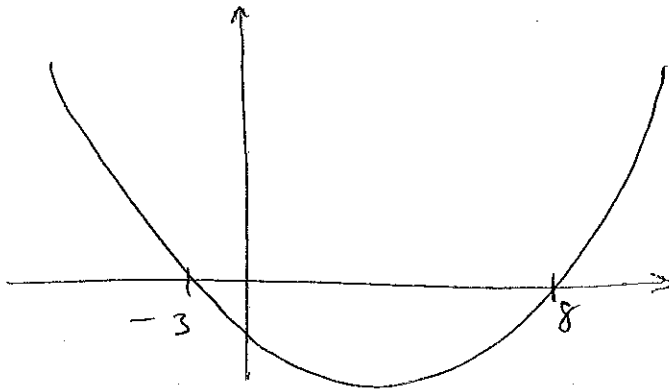Crosses y at: $x = -4$ $x = 5$

Less than zero
below ground

$-4 < x < 5$ (3)

3. Solve $x^2 - 5x - 24 > 0$

$(x - 8)(x + 3) > 0$

$x = 8 \qquad x = -3$

$\underline{x < -3 \text{ or } x > 8}$ (3)

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4. Solve $x^2 - 12x + 35 < 0$

$(x - 7)(x - 5) < 0$

$x = 7 \qquad x = 5$

$\underline{5 < x < 7}$ (3)

5. Solve $x^2 - 7x + 12 \leqslant 0$

$(x - 3)(x - 4) \leqslant 0$

$x = 3 \qquad x = 4$

$\underline{3 \leqslant x \leqslant 4}$ (3)

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6. Solve $x^2 + 2x - 35 \geqslant 0$

$(x + 7)(x - 5) \geqslant 0$

$x = -7 \qquad x = 5$

$\underline{x \leqslant -7 \text{ or } x \geqslant 5}$ (3)

7. Solve $x^2 \leqslant 100$

$x^2 - 100 \leqslant 0$

$(x+10)(x-10) \leqslant 0$

$x = -10 \qquad x = 10$

$-10 \leqslant x \leqslant 10$ (4)

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8. Solve $x^2 - 49 > 0$

$(x+7)(x-7) > 0$

$x = -7 \qquad x = 7$

$x < -7$ or $x > 7$ (4)

9. Solve $x^2 > 8x + 9$

$x^2 - 8x - 9 > 0$

$(x - 9)(x + 1) > 0$

$x = 9 \qquad x = -1$

$x \leq -1 \text{ or } x \geq 9$ (4)

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10. Solve $6x^2 + 11x - 10 < 0$

$(3x - 2)(2x + 5) < 0$

$x = \frac{2}{3} \qquad x = -2.5$

$-2.5 < x < \frac{2}{3}$

~~$\frac{2}{3} < x$~~ (4)

11. Solve $6x + 27 > x^2$

$$0 > x^2 - 6x - 27$$
$$0 > (x-9)(x+3)$$
$$x = 9 \quad x = -3$$

$-3 < x < 9$ (4)

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12. Solve $2x^2 - 11x + 9 < 0$

$$(2x - 9)(x - 1) < 0$$
$$x = 4.5 \quad x = 1$$

$1 < x < 4.5$ (4)

13. Work out the integer values that satisfy:

$$2x^2 - 10x + 10 < 0$$

$$x^2 - 5x + 5 < 0$$

$$a = 1 \qquad b = -5 \qquad c = 5$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(5)}}{2(1)}$$

$$x = 3.62 \ 2dp \qquad x = 1.38 \ (2dp)$$

2 and 3 (4)

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14. Work out the integer values that satisfy:

$$x^2 - 7x + 11 < 0$$

$$a = 1 \qquad b = -7 \qquad c = 11$$

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(1)(11)}}{2(1)}$$

$$x = 4.62 \ (2dp) \qquad x = 2.38 \ 2dp$$

3 and 4 (4)