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)

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 \( x^2 - 5x - 24 > 0 \)

\[ (x - 8)(x + 3) > 0 \]

\[ x = 8 \quad x = -3 \]

\[ x < -3 \quad \text{or} \quad x > 8 \] (3)

4. Solve \( x^2 - 12x + 35 < 0 \)

\[ (x - 7)(x - 5) < 0 \]

\[ x = 7 \quad x = 5 \]

\[ 5 < x < 7 \] (3)
5. Solve $x^2 - 7x + 12 \leq 0$

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

$x = 3 \quad x = 4$

$3 \leq x \leq 4 \quad (3)$

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

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

$x = -7 \quad x = 5$

$x \leq -7 \quad \text{or} \quad x \geq 5 \quad (3)$
7. Solve \( x^2 \leq 100 \)

\[ x^2 - 100 \leq 0 \]

\[ (x+10)(x-10) \leq 0 \]

\[ x = -10 \quad x = 10 \]

\[ -10 \leq x \leq 10 \quad (4) \]

8. Solve \( x^2 - 49 > 0 \)

\[ (x+7)(x-7) > 0 \]

\[ x = -7 \quad x = 7 \]

\[ x < -7 \cup x > 7 \quad (4) \]
9. Solve \( x^2 > 8x + 9 \)

\[
x^2 - 8x - 9 > 0
\]

\[
(x - 9)(x + 1) > 0
\]

\[
x = 9 \quad x = -1
\]

\[
x \leq -1 \quad x > 9
\] (4)

10. Solve \( 6x^2 + 11x - 10 < 0 \)

\[
(3x - 2)(2x + 5) < 0
\]

\[
x = \frac{2}{3} \quad x = -2.5
\]

\[-2.5 < x < \frac{2}{3}\]

\[.......................... \] (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 \quad (4)

12. Solve $2x^2 - 11x + 9 < 0$
\[
(2x - 9)(x - 1) < 0
\]
x = 4.5  \quad x = 1

1 < x < 4.5 \quad (4)
13. Work out the integer values that satisfy:

\[ 2x^2 - 10x + 10 < 0 \]

\[ x^2 - 5x + 5 < 0 \]

\[ a = 1 \quad b = -5 \quad c = 5 \]

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

\[ x = 3.62 \quad 2dp \quad x = 1.38 \quad 2dp \]

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14. Work out the integer values that satisfy:

\[ x^2 - 7x + 11 < 0 \]

\[ a = 1 \quad b = -7 \quad c = 11 \]

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

\[ x = 4.62 \quad 2dp \quad x = 2.38 \quad 2dp \]

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