Solutions by
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GCSE (9-1) Grade 8/9
Quadratic Inequalities

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – there may be more space than you need.
- **Show all your working out**

Information

- The total mark for this paper is 70.
- The marks for **each** question are shown in brackets.
  – use this as a guide as to how much time to spend on each question.
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

- Read each question carefully before you start to answer it
- Attempt every question
- Check your answers if you have time at the end

1. Solve $x^2 + 9x + 18 > 0$

$(x + 6)(x + 3) > 0$

$x > -6 \quad x < -3$

.....

(Total 3 marks)

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

$(2x - 3)(x - 4) < 0$

$3/2 < x < 4$

.....

(Total 3 marks)

3. Solve $(x-2)(x+7) > 0$

$x > 2$

$x < -7$

.....

(Total 4 marks)

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4. Solve $x(5-x) < 0$

$0 < x < 5$

.....

(Total 4 marks)

5. Solve $15 + 2x - x^2 \leq 0$

$(3 + x)(5 - x) \leq 0$

$-3 \leq x \leq 5$

.....

(Total 4 marks)

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6. Solve $(5 + x)(1 - 2x) \geq 0$

$x \leq -5$

$x \geq 0.5$

.....

(Total 4 marks)

7. Solve $16 - x^2 \leq 6x$

$0 \leq x^2 + 6x - 16$

$0 \leq (x + 8)(x - 2)$

$x \leq -8$

$x \geqslant 2$

.....

(Total 4 marks)

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8. Solve $2x^2 > 11x - 12$

$2x^2 - 11x + 12 > 0$

$(2x - 3)(x - 4) > 0$

$x > 4$

$x < 3/2$

.....

(Total 4 marks)

9. Solve $7 + 2(4x^2 - 15x) \leq 0$

$7 + 8x^2 - 30x \leq 0$

$8x^2 - 30x + 7 \leq 0$

$(4x - 1)(2x - 7) \leq 0$

$\frac{1}{4} \leq x \leq \frac{7}{2}$

(Total 4 marks)

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10. Solve $x^2 - 4(x + 6) > 8$

$x^2 - 4x - 24 > 8$

$x^2 - 4x - 32 > 0$

$(x - 8)(x + 4) > 0$

$x > 8$

$x < -4$

(Total 4 marks)

11. Solve $7 + 2(4x^2 - 15x) \leq 0$

$7 + 8x^2 - 30x \leq 0$

$8x^2 - 30x + 7 \leq 0$

$(4x - 1)(2x - 7) \leq 0$

$\frac{1}{4} \leq x \leq \frac{7}{2}$

.....

(Total 4 marks)

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12. Solve $(x + 5)^2 \geq 1$

$x^2 + 10x + 25 \geq 1$

$x^2 + 10x + 24 \geq 0$

$(x + 6)(x + 4) \geq 0$

$x \geq -4$

$x \leq -6$

.....

(Total 4 marks)

13. Solve $x^2 \leq 25$

$x^2 - 25 \leq 0$

$(x+5)(x-5) \leq 0$

$-5 \leq x \leq 5$

.....

(Total 4 marks)

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14. Solve $x^2 - 100 > 0$

$(x+10)(x-10) > 0$

$x > 10$

$x < -10$

.....

(Total 4 marks)

15. Solve $\frac{x^2+12}{2} \geq 4x$

$x^2 + 12 \geq 8x$

$x^2 - 8x + 12 \geq 0$

$(x - 6)(x - 2) \geq 0$

$x \geq 6$

$x \leq 2$

.....

(Total 4 marks)

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16. Find the solution set for which $15 + 2x \leq x^2$

$0 \leq x^2 - 2x - 15$

$0 \leq (x - 5)(x + 3)$

$x \geq 5$

$x \leq -3$

.....

(Total 4 marks)

17. Find the set of values for which $6 + x \geq x^2$ and $x + 2 < x^2$

$6+x \geq x^2$

$0 \geq x^2 - x - 6$

$x^2 - x - 6 \leq 0$

$(x-3)(x+2) \leq 0$

$-2 \leq x \leq 3$

$x+2 < x^2$

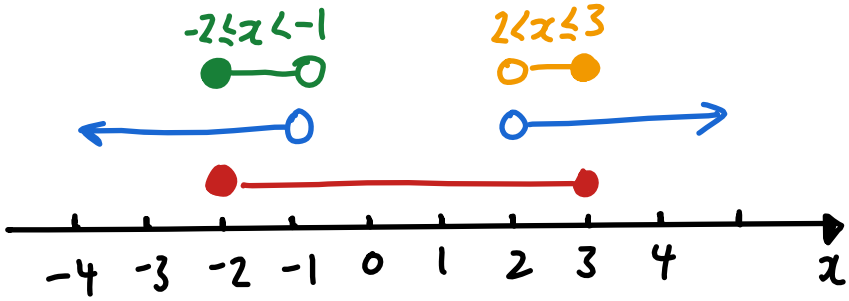
$0 < x^2 - x - 2$

$x^2 - x - 2 > 0$

$(x-2)(x+1) > 0$

$x > 2$

$x < -1$



$-2 \leq x < -1$

$2 < x \leq 3$

(Total 4 marks)

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18. Find the solution set for $(x - 3)(2x + 3) < 2x(1 - 2x) - 5$

$2x^2 - 3x - 9 < 2x - 4x^2 - 5$

$6x^2 - 5x - 4 < 0$

$(2x + 1)(3x - 4) < 0$

$-1 < x < \frac{4}{3}$

(Total 4 marks)

TOTAL FOR PAPER IS 70 MARKS