

A2.A.4: Quadratic Inequalities 2: Solve quadratic inequalities in one and two variables, algebraically and graphically

- 1 The solution set of $x^2 - 3x < 0$ is
- 2 What is the solution of the inequality $9 - x^2 < 0$?
- 3 What is the solution set of the inequality $x^2 + 4x - 5 < 0$?
- 4 The solution set for the inequality $x^2 + 4x - 5 \geq 0$ is
- 5 What is the solution set for $x^2 - 4x - 5 < 0$?
- 6 What is the solution of the inequality $x^2 - x - 6 < 0$?
- 7 What is the solution set of $x^2 - 3x - 28 \geq 0$?
- 8 What is the solution of the inequality $x^2 + 2x - 15 < 0$?
- 9 Solve for x : $x^2 - 7x + 10 < 0$
- 10 The solution set of the inequality $x^2 - 3x > 10$ is
- 11 What is the solution set for the inequality $x^2 - 2x < 8$?
- 12 What is the solution set of the inequality $x^2 - x > 20$?
- 13 What is the solution set of the inequality $x^2 + 3x - 10 > 8$?
- 14 What is the solution set of the inequality $-2x^2 + 3x + 5 > 0$?
- 15 Find the solution of the inequality $x^2 - 4x > 5$, algebraically.

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Answer Section

1 ANS:

$$0 < x < 3$$

REF: 019833siii

2 ANS:

$$\{x|x > 3 \text{ or } x < -3\}$$

$$9 - x^2 < 0 \quad \text{or } x + 3 < 0 \text{ and } x - 3 < 0$$

$$x^2 - 9 > 0 \quad x < -3 \text{ and } x < 3$$

$$(x + 3)(x - 3) > 0 \quad x < -3$$

$$x + 3 > 0 \text{ and } x - 3 > 0$$

$$x > -3 \text{ and } x > 3$$

$$x > 3$$

REF: 061507a2

3 ANS:

$$\{x|-5 < x < 1\}$$

$x^2 + 4x - 5 < 0$ $(x + 5)(x - 1) < 0$ <p>For the product of these binomials to be negative, either:</p> <ol style="list-style-type: none"> 1. $(x + 5)$ must be negative AND $(x - 1)$ must be positive; or 2. $(x + 5)$ must be positive AND $(x - 1)$ must be negative 	<p>CASE 1</p> $x + 5 < 0 \quad \text{AND} \quad x - 1 > 0$ $x < -5 \quad \text{AND} \quad x > 1$ <p>CASE 2</p> $x + 5 > 0 \quad \text{AND} \quad x - 1 < 0$ $x > -5 \quad \text{AND} \quad x < 1$ <p>The answer is the second case, $-5 < x < 1$. The first case is not possible, as x cannot be both greater than 1 and less than -5.</p>
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REF: 080713b

4 ANS:

$$x \leq -5 \text{ or } x \geq 1$$

REF: 010232siii

5 ANS:

$$\{x|-1 < x < 5\}$$

REF: 068930siii

6 ANS:

$$-2 < x < 3$$

$x^2 - x - 6 < 0$ $(x - 3)(x + 2) < 0$ <p>For the product of these binomials to be negative, either:</p> <ol style="list-style-type: none"> 1. $(x - 3)$ must be negative AND $(x + 2)$ must be positive; or 2. $(x - 3)$ must be positive AND $(x + 2)$ must be negative 	<p>CASE 1</p> $x - 3 < 0 \quad \text{AND} \quad x + 2 > 0$ $x < 3 \quad \text{AND} \quad x > -2$ <p>CASE 2</p> $x - 3 > 0 \quad \text{AND} \quad x + 2 > 0$ $x > 3 \quad \text{AND} \quad x < -2$ <p>The answer is the first case, $-2 < x < 3$. The second case is not possible, as x cannot be both greater than 3 and less than -2.</p>
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REF: 010904b

7 ANS:

$$x \geq 7 \text{ or } x \leq -4$$

REF: 019633siii

8 ANS:

$$-5 < x < 3$$

REF: 080018siii

9 ANS:

$$2 < x < 5. \quad x^2 - 7x + 10 < 0. \quad x - 5 < 0 \text{ and } x - 2 > 0$$

$$(x - 5)(x - 2) < 0 \quad x < 5 \text{ and } x > 2$$

REF: 061024b

10 ANS:

$$\{x | x < -2 \text{ or } x > 5\}$$

$$x^2 - 3x - 10 > 0 \quad \text{or}$$

$$(x - 5)(x + 2) > 0 \quad x - 5 < 0 \text{ and } x + 2 < 0$$

$$x - 5 > 0 \text{ and } x + 2 > 0 \quad x < 5 \text{ and } x < -2$$

$$x > 5 \text{ and } x > -2 \quad x < -2$$

$$x > 5$$

REF: 01115a2

11 ANS:

$$-2 < x < 4$$

REF: 089823siii

12 ANS:

$$\{x > 5 \text{ or } x < -4\}$$

REF: 080233siii

13 ANS:
 $\{x|x < -6 \text{ or } x > 3\}$

REF: 010032siii

14 ANS:
 $\{x|-1 < x < 2.5\}$

REF: 010430siii

15 ANS:
 $x < -1 \text{ or } x > 5.$ $x^2 - 4x - 5 > 0.$ $x - 5 > 0 \text{ and } x + 1 > 0 \text{ or } x - 5 < 0 \text{ and } x + 1 < 0$
 $(x - 5)(x + 1) > 0$ $x > 5 \text{ and } x > -1$ $x < 5 \text{ and } x < -1$
 $x > 5$ $x < -1$

REF: 011228a2