

A.REI.D.11: Quadratic Inequalities 1a

- 1 The solution set of $x^2 - 3x < 0$ is
 - 1) $0 < x < 3$
 - 2) $x > 3$
 - 3) $x < 0$ or $x > 3$
 - 4) $x < 0$
- 2 What is the solution of the inequality $9 - x^2 < 0$?
 - 1) $\{x \mid -3 < x < 3\}$
 - 2) $\{x \mid x > 3 \text{ or } x < -3\}$
 - 3) $\{x \mid x > 3\}$
 - 4) $\{x \mid x < -3\}$
- 3 What is the solution set of the inequality $x^2 + 4x - 5 < 0$?
 - 1) $\{x \mid x < -1 \text{ or } x > 5\}$
 - 2) $\{x \mid x < -5 \text{ or } x > 1\}$
 - 3) $\{x \mid -1 < x < 5\}$
 - 4) $\{x \mid -5 < x < 1\}$
- 4 The solution set for the inequality $x^2 + 4x - 5 \geq 0$ is
 - 1) $-5 \leq x \leq 1$
 - 2) $x \leq -1$ or $x \geq 5$
 - 3) $x \leq -5$ or $x \geq 1$
 - 4) $-1 \leq x \leq 5$
- 5 What is the solution set for $x^2 - 4x - 5 < 0$?
 - 1) $\{x \mid -1 < x < 5\}$
 - 2) $\{x \mid -5 < x < 1\}$
 - 3) $\{x \mid x > 5 \text{ or } x < -1\}$
 - 4) $\{x \mid x < -1\}$
- 6 What is the solution of the inequality $x^2 - x - 6 < 0$?
 - 1) $-3 < x < -2$
 - 2) $-2 < x < 3$
 - 3) $1 < x < 6$
 - 4) $-3 < x < 2$
- 7 What is the solution set of $x^2 - 3x - 28 \geq 0$?
 - 1) $x \geq 7$ or $x \leq -4$
 - 2) $x \leq 7$ or $x \geq -4$
 - 3) $-4 \leq x \leq 7$
 - 4) $-4 < x < 7$
- 8 What is the solution of the inequality $x^2 + 2x - 15 < 0$?
 - 1) $x < -5$ or $x > 3$
 - 2) $-5 < x < 3$
 - 3) $x < -3$ or $x > 5$
 - 4) $-3 < x < 5$
- 9 The solution set of the inequality $x^2 - 3x > 10$ is
 - 1) $\{x \mid -2 < x < 5\}$
 - 2) $\{x \mid 0 < x < 3\}$
 - 3) $\{x \mid x < -2 \text{ or } x > 5\}$
 - 4) $\{x \mid x < -5 \text{ or } x > 2\}$
- 10 What is the solution set for the inequality $x^2 - 2x < 8$?
 - 1) $-2 < x < 4$
 - 2) $-4 < x < 2$
 - 3) $x < -2$ or $x > 4$
 - 4) $x < -4$ or $x > 2$

11 What is the solution set of the inequality

$$x^2 - x > 20?$$

- 1) $\{x > 5\}$
- 2) $\{-4 < x < 5\}$
- 3) $\{x > 5 \text{ or } x < -4\}$
- 4) $\{x > 0\}$

12 What is the solution set of the inequality

$$x^2 + 3x - 10 > 8?$$

- 1) $\{x \mid -6 < x < 3\}$
- 2) $\{x \mid x < -6 \text{ or } x > 3\}$
- 3) $\{x \mid -3 < x < 6\}$
- 4) $\{x \mid x < -3 \text{ or } x > 6\}$

13 What is the solution set of the inequality

$$-2x^2 + 3x + 5 > 0?$$

- 1) $\{x \mid -1 < x < 2.5\}$
- 2) $\{x \mid -2.5 < x < 1\}$
- 3) $\{x \mid x < -1 \text{ or } x > 2.5\}$
- 4) $\{x \mid x < -2.5 \text{ or } x > 1\}$

14 Solve for x : $x^2 - 7x + 10 < 0$

15 Find the solution of the inequality $x^2 - 4x > 5$, algebraically.

16 Solve the inequality $x^2 - 3x - 4 > 0$ algebraically for x .

17 Determine algebraically the solution to $4x^2 - 5x \geq 6(5 - 4x)$.

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Answer Section

1 ANS: 1 REF: 019833siii

2 ANS: 2

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

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

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

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

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

$$x > 3$$

REF: 061507a2

3 ANS: 4

$x^2 + 4x - 5 < 0$ $(x + 5)(x - 1) < 0$ <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: 3 REF: 010232siii

5 ANS: 1 REF: 068930siii

6 ANS: 2

$x^2 - x - 6 < 0$ $(x - 3)(x + 2) < 0$ <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: 1 REF: 019633siii

8 ANS: 2 REF: 080018siii

9 ANS: 3

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

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

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

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

$$x > 5$$

REF: 011115a2

10 ANS: 1 REF: 089823siii

11 ANS: 3 REF: 080233siii

12 ANS: 2 REF: 010032siii

13 ANS: 1 REF: 010430siii

14 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

15 ANS:

$$x < -1 \text{ or } x > 5. \quad x^2 - 4x - 5 > 0. \quad x-5 > 0 \text{ and } x+1 > 0 \text{ or } x-5 < 0 \text{ and } x+1 < 0$$

$$(x-5)(x+1) > 0 \quad x > 5 \text{ and } x > -1 \quad x < 5 \text{ and } x < -1$$

$$x > 5$$

$$x < -1$$

REF: 011228a2

16 ANS:

$$x^2 - 3x - 4 > 0. \quad x-4 > 0 \text{ and } x+1 > 0 \text{ or } x-4 < 0 \text{ and } x+1 < 0$$

$$(x-4)(x+1) > 0 \quad x > 4 \text{ and } x > -1 \quad x < 4 \text{ and } x < -1$$

$$x > 4$$

$$x < -1$$

REF: 011735a2

17 ANS:

$$4x^2 - 5x \geq 30 - 24x \quad 4x-5 \geq 0 \text{ and } x+6 \geq 0 \text{ or } 4x-5 \leq 0 \text{ and } x+6 \leq 0$$

$$4x^2 + 19x - 30 \geq 0$$

$$x \geq \frac{5}{4} \text{ and } x \geq -6$$

$$x \leq \frac{5}{4} \text{ and } x \leq -6$$

$$(4x-5)(x+6) \geq 0$$

$$x \geq \frac{5}{4}$$

$$x \leq -6$$

REF: 081637a2