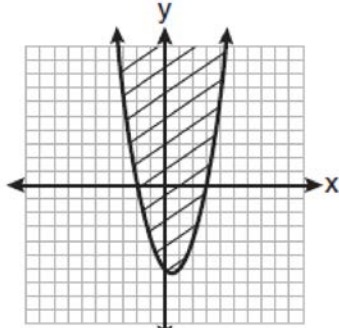
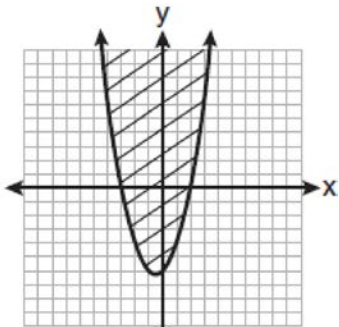


A.REI.D.11: Quadratic Inequalities 3

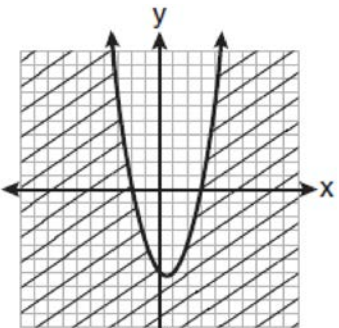
- 1 Which graph best represents the inequality $y + 6 \geq x^2 - x$?



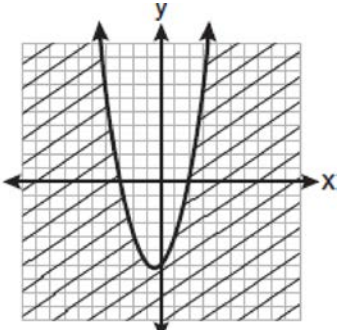
1)



2)

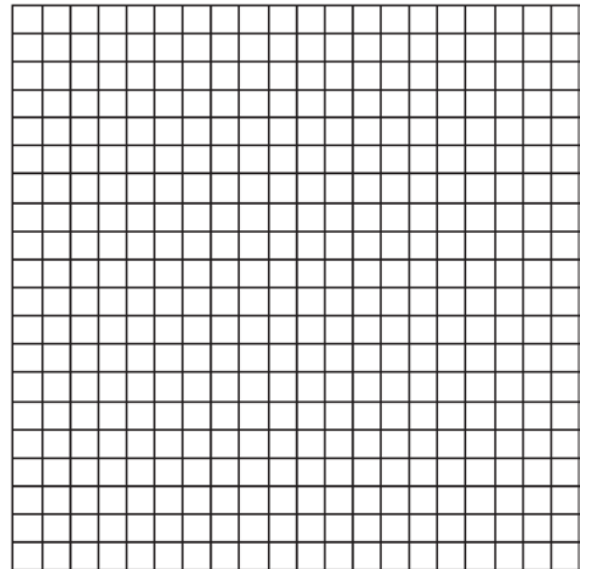


3)

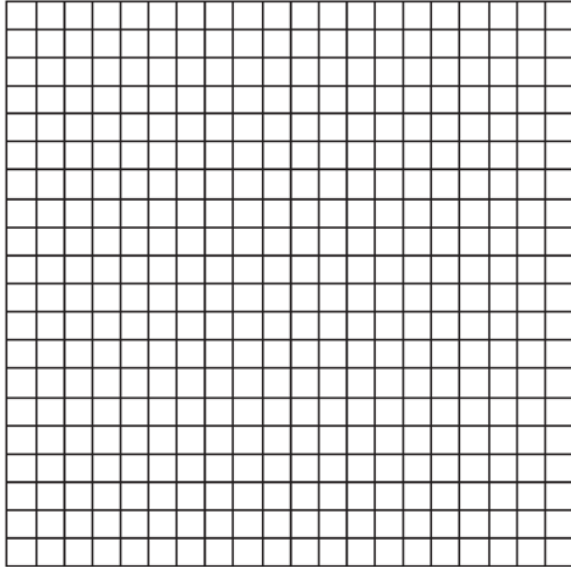


4)

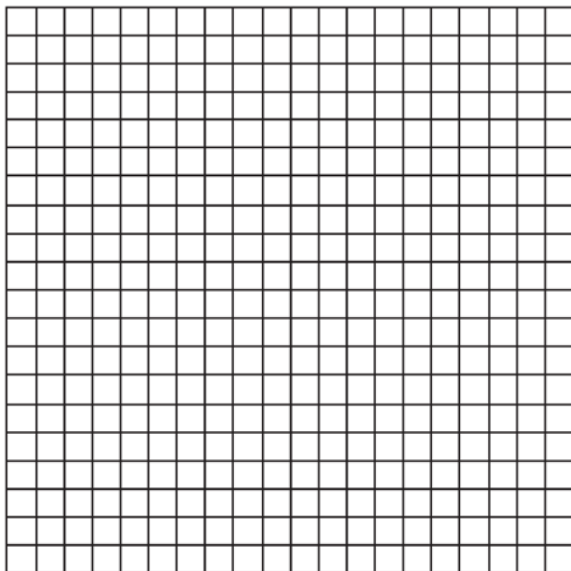
- 2 When a baseball is hit by a batter, the height of the ball, $h(t)$, at time t , $t \geq 0$, is determined by the equation $h(t) = -16t^2 + 64t + 4$. For which interval of time is the height of the ball greater than or equal to 52 feet?
- 3 The profit a coat manufacturer makes each day is modeled by the equation $P(x) = -x^2 + 120x - 2000$, where P is the profit and x is the price for each coat sold. For what values of x does the company make a profit? [The use of the grid is optional.]



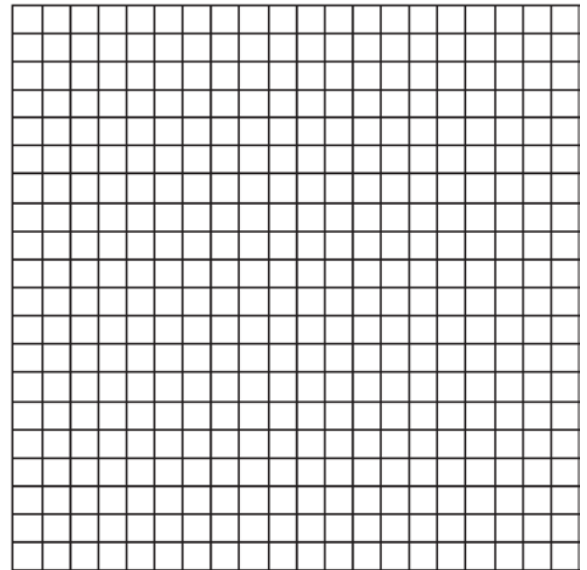
- 4 The profit, P , for manufacturing a wireless device is given by the equation $P = -10x^2 + 750x - 9,000$, where x is the selling price, in dollars, for each wireless device. What range of selling prices allows the manufacturer to make a profit on this wireless device? [The use of the grid is optional.]



- 5 The height of a projectile is modeled by the equation $y = -2x^2 + 38x + 10$, where x is time, in seconds, and y is height, in feet. During what interval of time, to the *nearest tenth of a second*, is the projectile *at least* 125 feet above ground? [The use of the accompanying grid is optional.]



- 6 A small rocket is launched from a height of 72 feet. The height of the rocket in feet, h , is represented by the equation $h(t) = -16t^2 + 64t + 72$, where t = time, in seconds. Graph this equation on the accompanying grid. Use your graph to determine the number of seconds that the rocket will remain at or above 100 feet from the ground. [Only a graphic solution can receive full credit.]



A.REI.D.11: Quadratic Inequalities 3 Answer Section

1 ANS: 1

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

$$y \geq (x-3)(x+2)$$

REF: 061017a2

2 ANS:

$-16t^2 + 64t + 4 \geq 52$ $-16t^2 + 64t - 48 \geq 0$ $t^2 - 4t + 3 \leq 0$ $(t-3)(t-1) \leq 0$	CASE 1 $t-3 < 0$ AND $t-1 > 0$ $t < 3$ $t > 1$
For the product of these binomials to be negative, either: 1) $(t-3)$ must be negative AND $(t-1)$ must be positive; or 2) $(t-3)$ must be positive AND $(t-1)$ must be negative	CASE 2 $t-3 > 0$ AND $t-1 < 0$ $t > 3$ $t < 1$ The answer is the first case, $1 \leq t \leq 3$. The second case is not possible, as t cannot be both greater than 3 and less than 1.

REF: 010231b

3 ANS:

$$20 < x < 100$$

$$-x^2 + 120x - 2000 > 0$$

$$x^2 - 120x + 2000 < 0$$

$$(x-100)(x-20) < 0$$

For the product of these binomials to be negative, either:

1. $(x-100)$ must be negative AND $(x-20)$ must be positive; or
2. $(x-100)$ must be positive AND $(x-20)$ must be negative

CASE 1

$$x-100 < 0 \quad \text{AND} \quad x-20 > 0$$

$$x < 100 \quad \text{AND} \quad x > 20$$

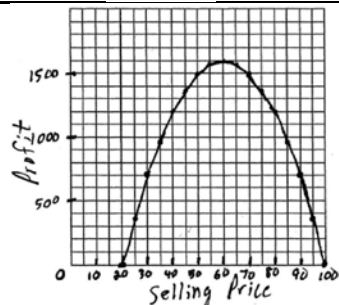
CASE 2

$$x-100 > 0 \quad \text{AND} \quad x-20 < 0$$

$$x > 100 \quad \text{AND} \quad x < 20$$

The answer is the first case, $20 < x < 100$.

The second case is not possible, as x cannot be both greater than 100 and less than 20.



REF: 080424b

4 ANS:

$$15 < x < 60$$

$$-10x^2 + 750x - 9000 > 0$$

$$x^2 - 75x + 900 < 0$$

$$(x-60)(x-15) < 0$$

For the product of these binomials to be negative, either:

1. $(x-60)$ must be negative AND $(x-15)$ must be positive; or
2. $(x-60)$ must be positive AND $(x-15)$ must be negative

CASE 1

$$x-60 < 0 \quad \text{AND} \quad x-15 > 0$$

$$x < 60 \quad \text{AND} \quad x > 15$$

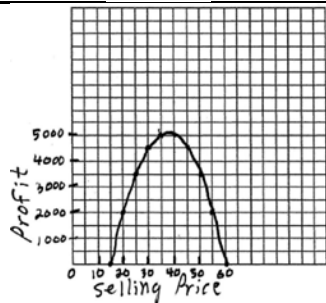
CASE 2

$$x-60 > 0 \quad \text{AND} \quad x-15 < 0$$

$$x > 60 \quad \text{AND} \quad x < 15$$

The answer is the first case, $15 < x < 60$.

The second case is not possible, as x cannot be both greater than 60 and less than 15.



REF: 080531b

5 ANS:

$$-2x^2 + 38x + 10 \geq 125$$

$$-2x^2 + 38x - 115 \geq 0$$

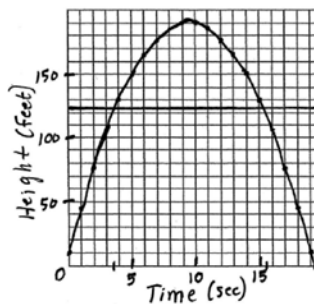
$$3.8 \leq x \leq 15.2.$$

$$\frac{-38 \pm \sqrt{38^2 - 4(-2)(-115)}}{2(-2)}$$

$$\frac{-38 \pm 22.89}{-4}$$

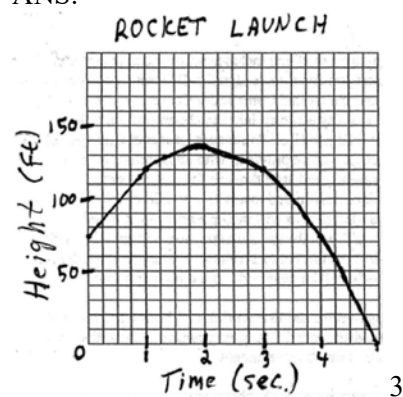
$$\frac{-38 + 22.89}{-4} \approx 3.8 \quad \frac{-38 - 22.89}{-4} \approx 15.2$$

$$3.8 \leq x \leq 15.2$$



REF: 060532b

6 ANS:



REF: 060632b