

Quadratics_4

Tuesday, May 5, 2015
12:08 PM

Multiply

1. $(x-3)^2 - 3x$

$$(x-3)(x-3) = x^2 - 6x + 9$$

Multiply

2. $(4x-1)(2x-6)$

$$8x^2 - 26x + 6$$

Factor

3. $-3x^2 - 33x - 90$

$$-3(x^2 + 11x + 30)$$

$$-3(x+6)(x+5)$$

Solve

4. $6x^2 - 29x + 28 = 0$

$$(3x-4)(2x-7) = 0$$

$3x-4=0 \Rightarrow x = \frac{4}{3}$ $2x-7=0 \Rightarrow x = \frac{7}{2}$

5. Rectangle Problem: A square with unknown side lengths was transformed into a rectangle by doubling the length and by subtracting 3 from the width. The resulting area of the rectangle is 20 units². What were the lengths of the square?

$A = l \cdot w$
 $20 = 2x \cdot (x-3)$
 $20 = 2x^2 - 6x$
 $0 = 2x^2 - 6x - 20$

$0 = 2(x^2 - 3x - 10)$
 $0 = 2(x-5)(x+2)$
 $x = 5$ $x = -2$

The lengths of the square were 5 units long

Graph

6. $y = 2x^2 - 14x + 20$

① vertex: $(3.5, -4.5)$

axis of symmetry $x = \frac{-b}{2a}$

$$x = \frac{-(-14)}{2(2)} = \frac{14}{4} = 3.5$$

$$y = 2(3.5)^2 - 14(3.5) + 20$$

$$y = 24.5 - 49 + 20$$

$$y = -4.5$$

② y-intercept: $(0, 20)$

$$y = 2(0)^2 - 14(0) + 20$$

$$y = 0 + 0 + 20$$

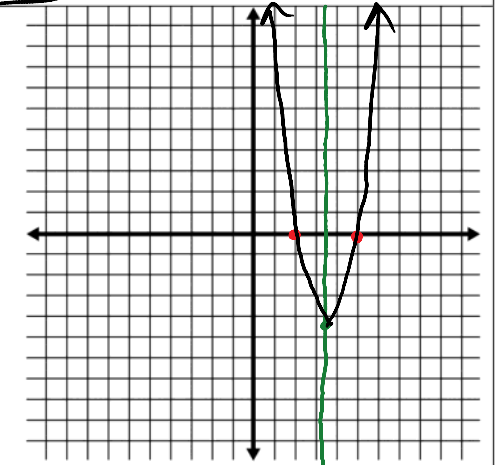
$$y = 20$$

③ x-intercepts:

$$0 = 2x^2 - 14x + 20$$

$$0 = 2(x^2 - 7x + 10)$$

$$0 = 2(x-5)(x-2)$$

$$x = 5 \quad x = 2$$


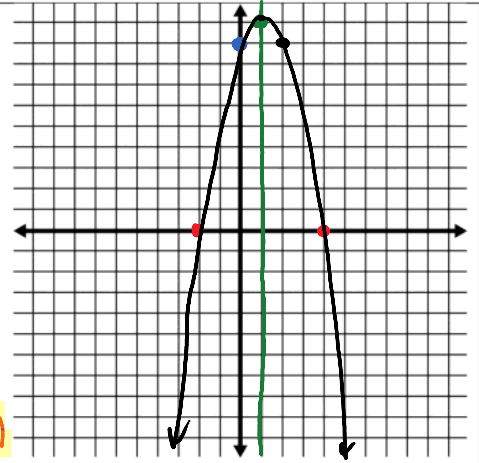
Graph

7. $y = -x^2 + 2x + 8$

① Vertex: $(1, 9)$
 $x = \frac{-b}{2a}$ $x = \frac{-2}{2(-1)}$ $x = \frac{-2}{-2}$ $x = 1$
 $y = -(1)^2 + 2(1) + 8$
 $y = -1 + 2 + 8$ $y = 9$

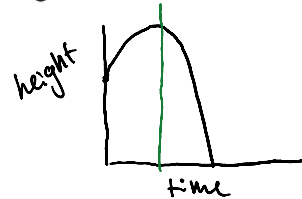
② y-intercept: $(0, 8)$ $0 = -1(x-4)(x+2)$
 $x = 4$ $x = -2$

③ x-intercepts:
 $0 = -x^2 + 2x + 8$
 $0 = -1(x^2 - 2x - 8)$ $(4, 0), (-2, 0)$



8. A ball thrown into the air off the top of a 90 story building. The height of the ball can be modeled with the equation, $h = -16t^2 + 64t + 960$, where h is the ball's height in feet and t is the time in seconds after the ball is thrown.

a. Sketch a graph of the problem situation



b. How long does it take the ball to reach its maximum height?

Ax.3 of symmetry
 $x = \frac{-b}{2a}$ $t = \frac{-(64)}{2(-16)}$ $t = \frac{-64}{-32}$ $t = 2$

c. What is the maximum height of the ball?

$h = -16(2)^2 + 64(2) + 960$ $h = 1088$
 $h = -64 + 128 + 960$

d. How long does it take the ball to reach the ground?

$0 = -16t^2 + 64t + 960$ $0 = -16(t-10)(t+6)$
 $0 = -16(t^2 - 4t - 60)$ $t = 10$ or $t = -6$

e. What is the height of the ball at 3 seconds?

$h = -16(3)^2 + 64(3) + 960$ $h = 1008$
 $h = -144 + 192 + 960$

f. How long does it take the ball to reach 448 feet above the ground?

$h = 448$
 $448 = -16t^2 + 64t + 960$
 -448 -448
 $0 = -16t^2 + 64t + 512$ $t = -4$
 $0 = -16(t^2 - 4t - 32)$ $t = 8$
 $0 = -16(t+4)(t-8)$

$\frac{60}{5} = 12$
 10.6