

Quadratics Review

Perform the given operation and write the complex number in standard form.

1. $(30 - i) - (18 + 6i) + 30i$

$$12 + 23i$$

2. $(-1 - i) + (9 - 3i)$

$$8 - 4i$$

3. $(12 - 9i) - (17 + 2i)$

$$-5 - 11i$$

4. $(7 + 5i)(7 - 5i)$

$$74$$

5. $(3 + 2i)^2$

$$5 + 12i$$

6. $-3i(8 - 5i)$

$$-15 - 24i$$

7. $\frac{-5-3i}{-4+2i}$

$$\frac{14 + 27i}{20}$$

8. $\frac{-7}{3-i}$

$$\frac{-21 - 7i}{10}$$

Solve the quadratic equation by factoring.

9. $2x^2 - 5x = 12$

$$x = \frac{-3}{2} \quad x = 4$$

10. $8x^2 + 17x + 9 = 0$

$$x = -1 \quad x = -\frac{9}{8}$$

11. $x^2 + 5x + 4 = 0$

$$x = -1 \quad x = -4$$

12. $x^2 - 25 = 0$

$$x = 5 \quad x = -5$$

Solve the quadratic equation by taking the square root.

13. $4(x + 1)^2 = 100$

$$x = -4 \quad x = -6$$

14. $-x^2 - 12 = -87$

$$x = \pm 5\sqrt{3}$$

or

$$x = \pm \sqrt{75}$$

$$15. 3x^2 - 270 = 0$$

$$x = \pm 3\sqrt{10}$$

or

$$x = \pm \sqrt{90}$$

$$16. \frac{1}{3}(x+5)^2 = 7$$

$$x = -5 \pm \sqrt{21}$$

Solve the quadratic equation by completing the square.

$$17. 2x^2 - 4x = 12$$

$$x = 1 \pm \sqrt{7}$$

$$18. x^2 - 4x + 7 = 0$$

$$x = 2 \pm i\sqrt{3}$$

$$19. 6x^2 + 84x + 300 = 0$$

$$x = -7 \pm i$$

$$20. x^2 = 6x - 10$$

$$x = 3 \pm i$$

Solve the quadratic equations using any method.

$$21. 3x^2 + 2x = 0$$

$$x = 0 \quad x = -\frac{2}{3}$$

$$22. 4x^2 - 1 = 0$$

$$x = \frac{1}{2} \quad x = -\frac{1}{2}$$

$$23. x^2 - 6x - 7 = 0$$

$$x = 7 \quad x = -1$$

$$24. 2x^2 - 7x = 15$$

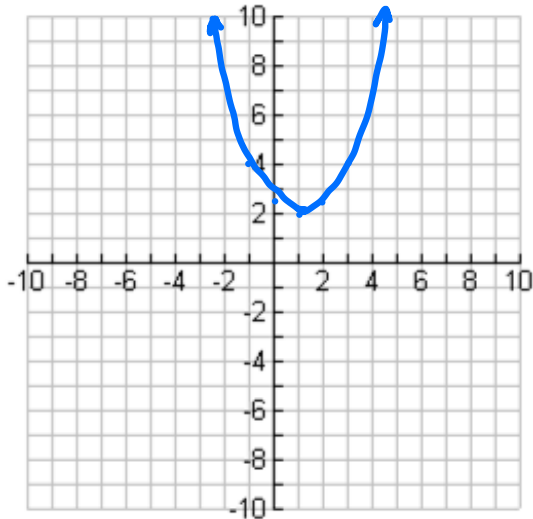
$$x = \frac{3}{2} \quad x = 5$$

Graph the quadratic equations.

25. $y = \frac{1}{2}(x - 1)^2 + 2$

Vertex: (1, 2)

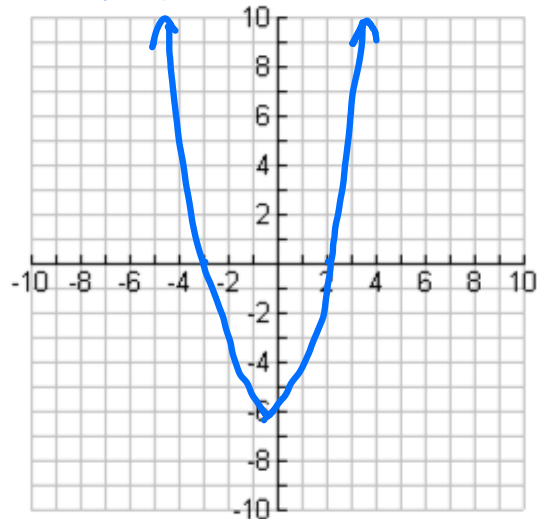
Axis of Symmetry: x = 1



26. $y = (x - 2)(x + 3)$

Vertex: (-0.5, -6.25) Axis of Symmetry: x = -0.5

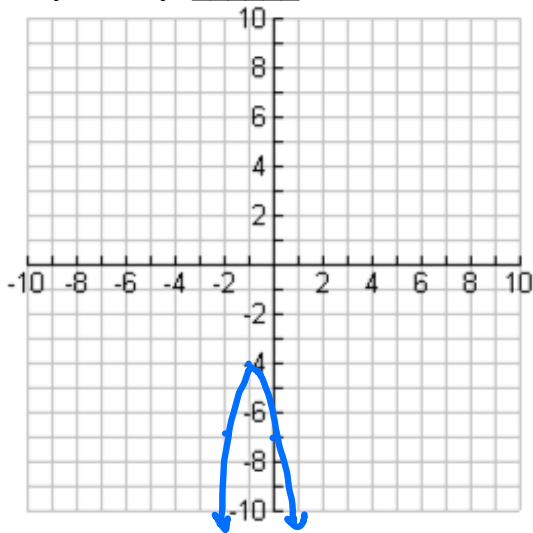
X-intercepts: (2, 0), (-3, 0)



27. $y = -3(x + 1)^2 - 4$

Vertex: (-1, -4)

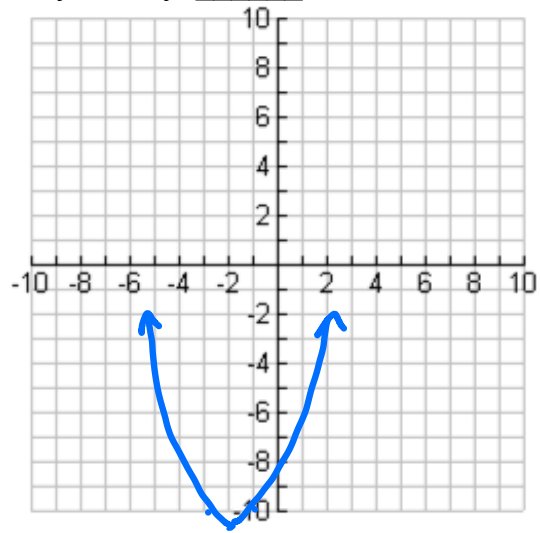
Axis of Symmetry: x = -1



28. $y = x^2 + 4x - 7$

Vertex: (-2, -11)

Axis of Symmetry: x = -2



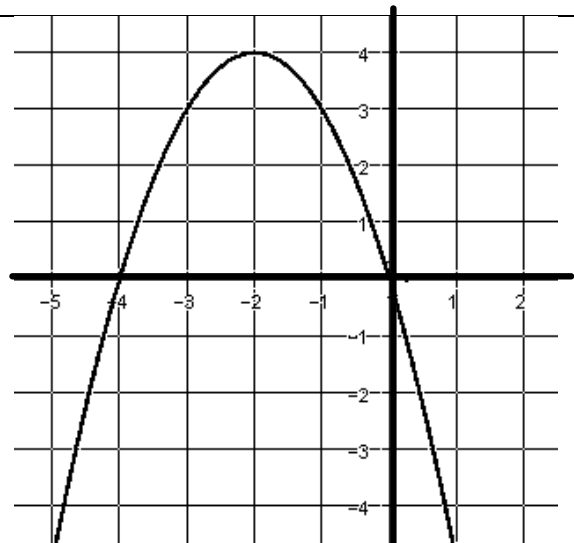
29. State the following:

Vertex: (-2, 4)

Axis of Symmetry: x = -2

X-intercepts: (-4, 0), (0, 0)

Y-intercept: (0, 0)



Application

30. Abigail tosses a coin off a bridge into a stream below. The distance, in feet, the coin is above the water is modeled by the equation $y = -\frac{1}{5}(x^2 - 13x)$. Where x represents time in seconds.

a) What is the greatest height of the coin?

8.45 ft

b) How much time will it take for the coin to hit the water?

13 seconds

31. When a gray kangaroo jumps, its path through the air can be modeled by $y = -3x^2 + 6x$ where x is the kangaroo's horizontal distance traveled (in feet) and y is its corresponding height (in feet).

a) How high can a gray kangaroo jump?

3 ft

b) How far can it jump?

2 ft

32. The height, $h(t)$, in feet, of an object shot from a cannon can be modeled by the function $h(t) = -(t - 3)^2 + 14$, where t is the time, in seconds, after the cannon is fired.

a) What is the maximum altitude that the object reaches?

14 ft

b) How much time does it take for the object to reach the ground?

6.74 seconds