2. $3x^2 + 6x + 3 = 0$

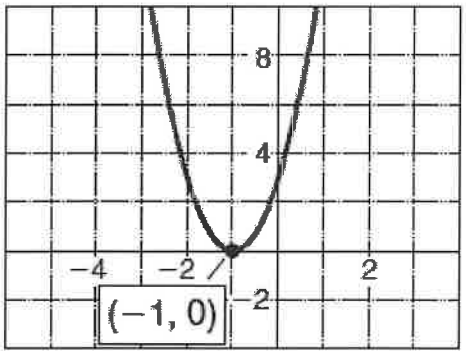
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(3)(3)}}{2(3)}$$

$$x = \frac{-6 \pm 0}{6}$$

$$x = -1$$

So, the solution is $x = -1$.



4. $6x^2 - 2x + 1 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(6)(1)}}{2(6)}$$

$$x = \frac{2 \pm \sqrt{-20}}{12}$$

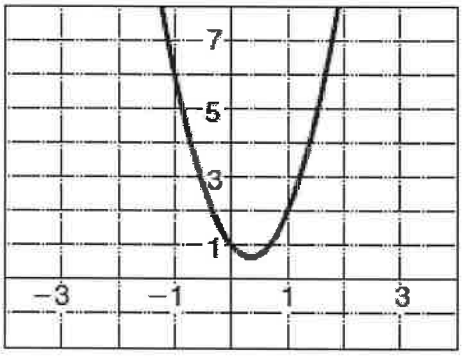
$$x = \frac{2 \pm 2i\sqrt{5}}{12}$$

$$x = \frac{1 \pm i\sqrt{5}}{6}$$

So, the solutions are

$x = \frac{1 + i\sqrt{5}}{6}$ and

$x = \frac{1 - i\sqrt{5}}{6}$.



6. $2x^2 + 4x = 30$

$2x^2 + 4x - 30 = 0$

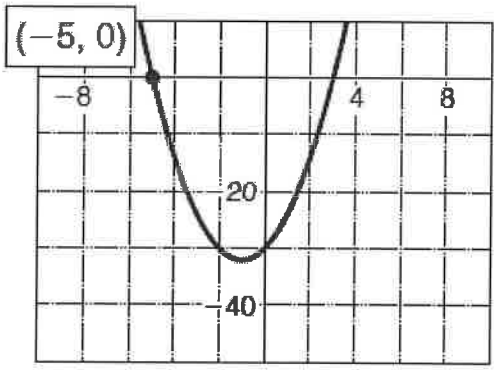
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4(2)(-30)}}{2(2)}$$

$$x = \frac{-4 \pm \sqrt{256}}{4}$$

$$x = \frac{-4 \pm 16}{4}$$

So, the solutions are $x = -5$ and $x = 3$.



8. $-3x = 2x^2 - 4$

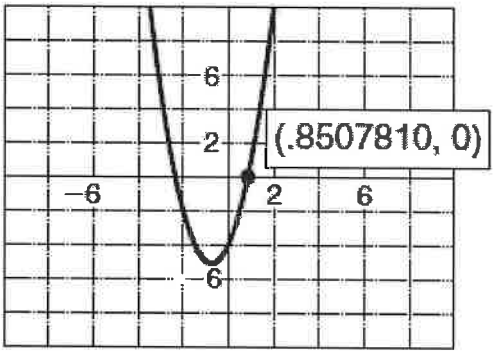
$2x^2 + 3x - 4 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(2)(-4)}}{2(2)}$$

$$x = \frac{-3 \pm \sqrt{41}}{4}$$

So, the solutions are $x = \frac{-3 - \sqrt{41}}{4}$ and $x = \frac{-3 + \sqrt{41}}{4}$.



10. $-5x^2 - 6 = -4x$

$-5x^2 + 4x - 6 = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

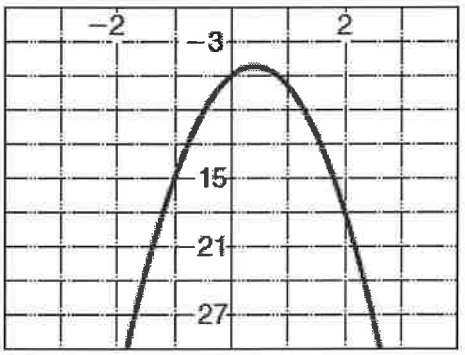
$$x = \frac{-4 \pm \sqrt{4^2 - 4(-5)(-6)}}{2(-5)}$$

$$x = \frac{-4 \pm \sqrt{-104}}{-10}$$

$$x = \frac{-4 \pm 2i\sqrt{26}}{-10}$$

$$x = \frac{2 \pm i\sqrt{26}}{5}$$

So, the solutions are $x = \frac{2 - i\sqrt{26}}{5}$ and $x = \frac{2 + i\sqrt{26}}{5}$.



12. $x^2 + 121 = -22x$

$x^2 + 22x + 121 = 0$

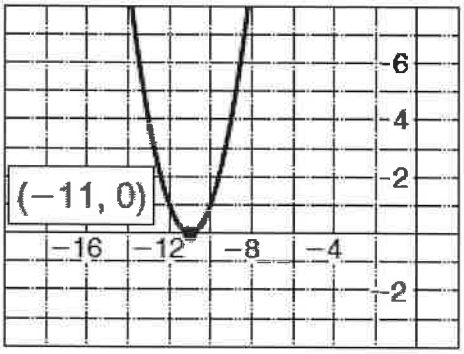
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-22 \pm \sqrt{22^2 - 4(1)(121)}}{2(1)}$$

$$x = \frac{-22 \pm \sqrt{0}}{2}$$

$$x = -11$$

So, the solution is $x = -11$.



14. $-7w + 6 = -4w^2$

$4w^2 - 7w + 6 = 0$

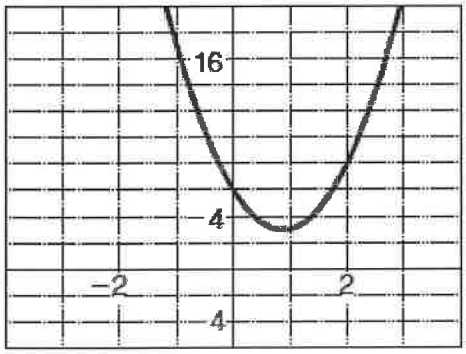
$$w = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$w = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(4)(6)}}{2(4)}$$

$$w = \frac{7 \pm \sqrt{-47}}{8}$$

$$w = \frac{7 \pm i\sqrt{47}}{8}$$

So, the solutions are $w = \frac{7 - i\sqrt{47}}{8}$ and $w = \frac{7 + i\sqrt{47}}{8}$.



16. Equation: $x^2 - x + 6 = 0$

Discriminant: $b^2 - 4ac = (-1)^2 - 4(1)(6) = -23$

The equation has two imaginary solutions.

Solutions: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-(-1) \pm \sqrt{-23}}{2(1)}$$

$$x = \frac{1 \pm i\sqrt{23}}{2}$$

18. Equation: $-x^2 + 2x + 12 = 0$

Discriminant: $b^2 - 4ac = 2^2 - 4(-1)(12) = 52$

The equation has two real solutions.

Solutions: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-2 \pm \sqrt{52}}{2(1)}$$

$$x = -1 \pm \sqrt{13}$$

20. Equation: $p^2 + 18p + 81 = 0$

Discriminant: $b^2 - 4ac = 18^2 - 4(1)(81) = 0$

The equation has one real solution.

Solution: $p = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \dfrac{-18 \pm \sqrt{0}}{2(1)} = -9$

22. Equation: $-2x^2 - x - 6 = 0$

Discriminant: $b^2 - 4ac = (-1)^2 - 4(-2)(-6) = -47$

The equation has two imaginary solutions.

Solutions: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$$x = \frac{-(-1) \pm \sqrt{-47}}{2(-2)}$$

$$x = \frac{-1 \pm i\sqrt{47}}{4}$$

24. D; The discriminant is $(-20)^2 - 4(2)(50) = 0$, so the graph has one x-intercept.

26. B; The discriminant is $(-10)^2 - 4(5)(-35) = 800$, so the graph has two x-intercepts and a y-intercept of -35.

28. The equation was not written in standard form when the quadratic equation was used.

$x^2 + 6x + 8 = 2$

$x^2 + 6x + 6 = 0$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(6)}}{2(1)}$$

$$= \frac{-6 \pm \sqrt{12}}{2}$$

$$= \frac{-6 \pm 2\sqrt{3}}{2}$$

$$= -3 \pm \sqrt{3}$$

$$= -3 - \sqrt{3} \quad \text{or} \quad -3 + \sqrt{3}$$

30. *Sample answer:* For a quadratic equation to have two real solutions, the discriminant must be positive. So, set the discriminant equal to any positive number.

$b^2 - 4ac = 24$

$6^2 - 4ac = 24$

$36 - 4ac = 24$

$-4ac = -12$

$ac = 3$

Because $ac = 3$, choose two integers whose product is 3, such as $a = -3$ and $c = -1$. So, one possible equation is $-3x^2 + 6x - 1 = 0$.