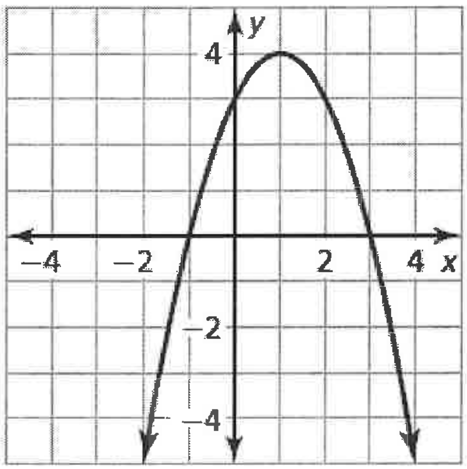
ANSWER PRESENTATION TOOL

2. The equation is in standard form. Graph the related function $y = -x^2 + 2x + 3$.



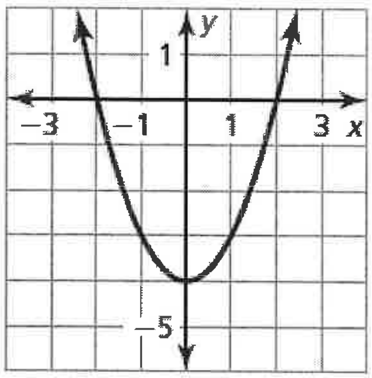
The x-intercepts are 3 and -1. The solutions, or roots, are $x = 3$ and $x = -1$.

4. Rewrite the equation in standard form.

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

$$x^2 - 4 = 0$$

Graph the related function $y = x^2 - 4$.



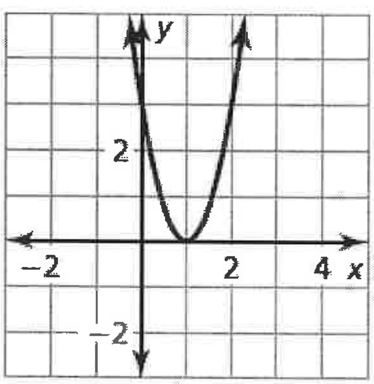
The x-intercepts are -2 and 2. The solutions, or roots, are $x = -2$ and $x = 2$.

6. Rewrite the equation in standard form.

$$3x^2 = 6x - 3$$

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

Graph the related function $y = 3x^2 - 6x + 3$.

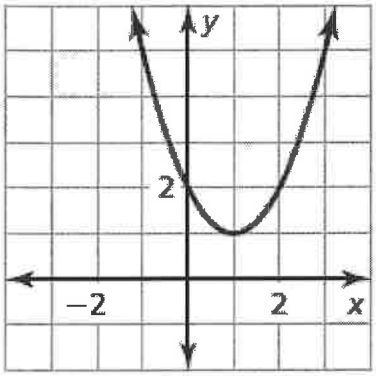


The x-intercept is 1. The solution, or root, is $x = 1$.

8. Rewrite the equation in standard form.

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

Graph the related function $y = x^2 - 2x + 2$.

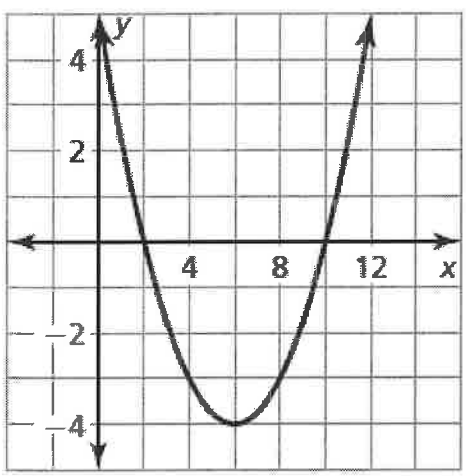


There is no x-intercept. The equation has no real solution.

10. Rewrite the equation in standard form.

$$3x = \frac{1}{4}x^2 + 5$$
$$0 = \frac{1}{4}x^2 - 3x + 5$$

Graph the related function $y = \frac{1}{4}x^2 - 3x + 5$.



The x-intercepts are 2 and 10. The solutions, or roots, are $x = 2$ and $x = 10$.

12. $a^2 = 81$

$$a = \pm\sqrt{81}$$

$$a = \pm 9$$

The solutions are $a = 9$ and $a = -9$.

14. $(p - 4)^2 = 49$

$$p - 4 = \pm\sqrt{49}$$

$$p - 4 = \pm 7$$

$$p = 4 \pm 7$$

The solutions are $p = -3$ and $p = 11$.

16. $2(x + 2)^2 - 5 = 8$

$$2(x + 2)^2 = 13$$

$$(x + 2)^2 = \frac{13}{2}$$

$$x + 2 = \pm\sqrt{\frac{13}{2}}$$

$$x + 2 = \pm\frac{\sqrt{13}}{\sqrt{2}}$$

$$x + 2 = \pm\frac{\sqrt{26}}{2}$$

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

The solutions are $x = -2 - \frac{\sqrt{26}}{2}$ and $x = -2 + \frac{\sqrt{26}}{2}$.

18. $\frac{1}{5}x^2 + 2 = \frac{3}{5}x^2$

$-\frac{2}{5}x^2 + 2 = 0$

$-\frac{2}{5}x^2 = -2$

$x^2 = 5$

$x = \pm\sqrt{5}$

The solutions are $x = -\sqrt{5}$ and $x = \sqrt{5}$.

20. The square root of -4 is not a real number.

$-2x^2 - 8 = 0$

$-2x^2 = 8$

$x^2 = -4$

The equation has no real solution.

22. $0 = z^2 - 10z + 25$

$0 = (z - 5)^2$

$z - 5 = 0$

$z = 5$

So, the solution of the equation is $z = 5$.

24. $x^2 - 11x = -30$

$x^2 - 11x + 30 = 0$

$(x - 5)(x - 6) = 0$

$x - 5 = 0$ or $x - 6 = 0$

$x = 5$ or $x = 6$

So, the solutions of the equation are $x = 5$ and $x = 6$.

26. $a^2 - 49 = 0$

$$a^2 = 49$$

$$a = \pm\sqrt{49}$$

$$a = \pm 7$$

So, the solutions of the equation are $a = -7$ and $a = 7$.

28. $6t^2 + 14 = -25t$

$$6t^2 + 25t + 14 = 0$$

$$(3t + 2)(2t + 7) = 0$$

$$3t + 2 = 0 \quad \text{or} \quad 2t + 7 = 0$$

$$3t = -2 \quad \text{or} \quad 2t = -7$$

$$t = -\frac{2}{3} \quad \text{or} \quad t = -\frac{7}{2}$$

The solutions are $t = -\frac{2}{3}$ and $t = -\frac{7}{2}$.

30. $-y + 28 + y^2 = 2y + 2y^2$

$$0 = y^2 + 3y - 28$$

$$0 = (y + 7)(y - 4)$$

$$y + 7 = 0 \quad \text{or} \quad y - 4 = 0$$

$$y = -7 \quad \text{or} \quad y = 4$$

So, the solutions of the equation are $y = -7$ and $y = 4$.

32. The equation can be written in the form $u^2 = d$, so solve by using square roots.

$$\frac{t^2}{20} + 8 = 15$$

$$\frac{t^2}{20} = 7$$

$$t^2 = 140$$

$$t = \pm\sqrt{140}$$

$$t = \pm 2\sqrt{35}$$

The solutions of the equation are $t = -2\sqrt{35}$ and $t = 2\sqrt{35}$.

34. The equation can be written in the form $u^2 = d$, so solve by using square roots.

$$-2(x + 2)^2 = 5$$

$$(x + 2)^2 = -\frac{5}{2}$$

There is no real solution.

36. The equation can be factored, so solve by factoring.

$$t^2 + 8t + 16 = 0$$

$$(t + 4)^2 = 0$$

$$t + 4 = 0$$

$$t = -4$$

The solution of the equation is $t = -4$.

38. The equation can be written in the form $u^2 = d$, so solve by using square roots.

$$x^2 - 1.75 = 0.5$$
$$x^2 = 2.25$$
$$x = \pm\sqrt{2.25}$$
$$x = \pm 1.5$$

The solutions of the equation are $x = -1.5$ and $x = 1.5$.

40. To find the zeros of the function, find the x-values for which $f(x) = 0$.

$$x^2 - 8x + 16 = 0$$
$$(x - 4)^2 = 0$$
$$x - 4 = 0$$
$$x = 4$$

The zero of the function is $x = 4$.

42. To find the zeros of the function, find the x-values for which $g(x) = 0$.

$$x^2 + 11x = 0$$
$$x(x + 11) = 0$$
$$x = 0 \quad \text{or} \quad x + 11 = 0$$
$$x = 0 \quad \text{or} \quad x = -11$$

The zeros of the function are $x = 0$ and $x = -11$.

44. To find the zeros of the function, find the x-values for which $h(x) = 0$.

$$x^2 + 19x + 84 = 0$$
$$(x + 12)(x + 7) = 0$$
$$x + 12 = 0 \quad \text{or} \quad x + 7 = 0$$
$$x = -12 \quad \text{or} \quad x = -7$$

The zeros of the function are $x = -12$ and $x = -7$.

46. To find the zeros of the function, find the x-values for which $f(x) = 0$.

$$4x^2 - 12x + 9 = 0$$
$$(2x - 3)^2 = 0$$
$$2x - 3 = 0$$
$$x = \frac{3}{2}$$

The zero of the function is $x = \frac{3}{2}$.

48. To find the zeros of the function, find the x-values for which $q(x) = 0$.

$$10x^2 - 3x - 4 = 0$$
$$(5x - 4)(2x + 1) = 0$$
$$5x - 4 = 0 \quad \text{or} \quad 2x + 1 = 0$$
$$5x = 4 \quad \text{or} \quad 2x = -1$$
$$x = \frac{4}{5} \quad \text{or} \quad x = -\frac{1}{2}$$

The zeros are $x = \frac{4}{5}$ or $x = -\frac{1}{2}$.

50. Step 1 Define the variables. Let x represent the price increase and $R(x)$ represent the daily revenue.

Step 2 Write a verbal model. Then write and simplify a quadratic equation.

Monthly revenue	=	Number of pairs of shoes	•	Price per pair of shoe

$$R(x) = (200 - 2x)(120 + 2x)$$

$$R(x) = 4(100 - x)(60 + x)$$

Step 3 Identify the zeros and find their average. Then find how much each pair of shoes should cost to maximize the monthly revenue.

The zeros of the revenue function are 100 and -60.

The average of the zeros is $\frac{100 + (-60)}{2} = 20$.

To maximize the revenue, each pair of shoes should cost $\$120 + \$40 = \$160$.

Step 4 Find the maximum daily revenue.

$$R(20) = 4(100 - 20)(60 + 20) = \$25{,}600$$

52. a. The situation can be modeled by the function $h(t) = -16t^2 + 196$. The acceleration due to gravity is $-16t^2$ feet and the initial height is 196 feet. To find how long the rock takes to hit the ground, find the zeros of the function.

$$h(t) = -16t^2 + 196$$
$$0 = -16t^2 + 196$$
$$16t^2 = 196$$
$$t^2 = \frac{49}{4}$$
$$\sqrt{t^2} = \pm\sqrt{\frac{49}{4}}$$
$$t = \pm\frac{7}{2}$$
$$t = \pm 3.5$$

Reject the negative solution, -3.5, because time is positive. The rock will fall for 3.5 seconds before it hits the ground.

b. $h(1.25) = -16(1.25)^2 + 196$
$= -16(1.5625) + 196$
$= 171$

$h(2.5) = -16(2.5)^2 + 196 = -16(6.25) + 196 = 96$

$h(1.25) - h(2.5) = 171 - 96 = 75$

So, the rock fell 75 feet between 1.25 seconds and 2.5 seconds.