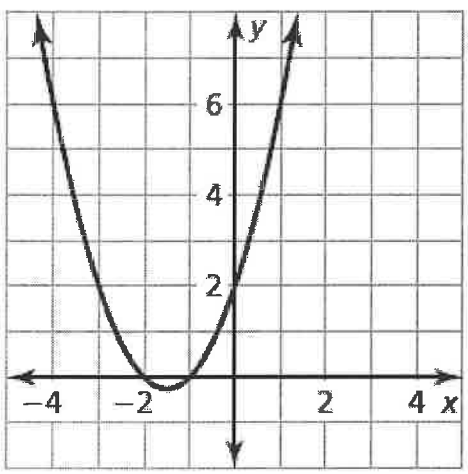
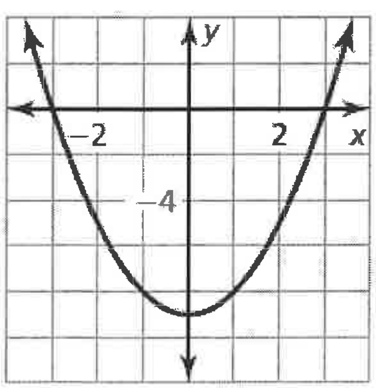
ANSWER PRESENTATION TOOL

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



The x-intercepts are -1 and -2. The solutions, or roots, are $x = -1$ and $x = -2$.

3. The equation is in standard form. Graph the related function $y = x^2 - 9$.



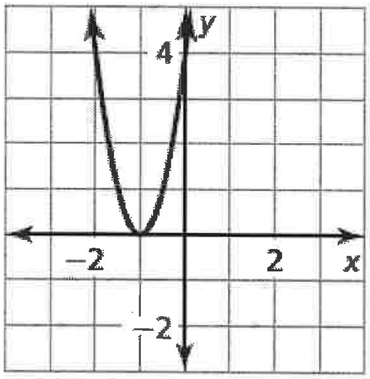
The x-intercepts are -3 and 3. The solutions, or roots, are $x = -3$ and $x = 3$.

5. Rewrite the equation in standard form.

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

$4x^2 + 8x + 4 = 0$

Graph the related function $y = 4x^2 + 8x + 4$.



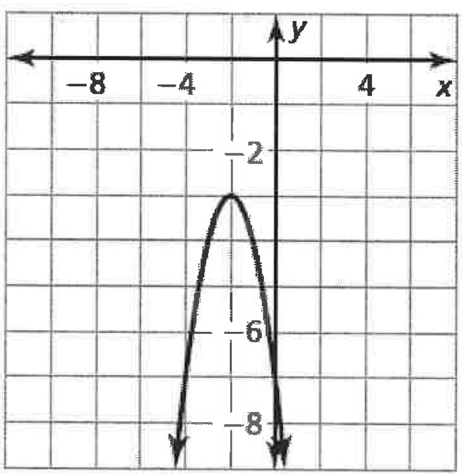
The x-intercept is -1. The solution, or root, is $x = -1$.

7. Rewrite the equation in standard form.

$7 = -x^2 - 4x$

$0 = -x^2 - 4x - 7$

Graph the related function $y = -x^2 - 4x - 7$.



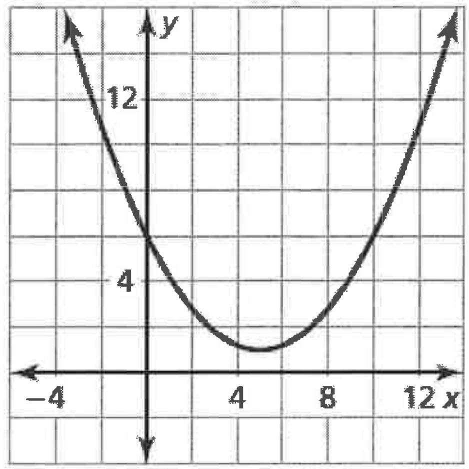
There is no x-intercept. The equation has no real solution.

9. Rewrite the equation in standard form.

$$\frac{1}{5}x^2 + 6 = 2x$$

$$\frac{1}{5}x^2 - 2x + 6 = 0$$

Graph the related function $y = \frac{1}{5}x^2 - 2x + 6$.



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

11. $s^2 = 144$

$$s = \pm\sqrt{144}$$

$$s = \pm 12$$

The solutions are $s = 12$ and $s = -12$.

13. $(z - 6)^2 = 25$

$$z - 6 = \pm\sqrt{25}$$

$$z - 6 = \pm 5$$

$$z = 6 \pm 5$$

The solutions are $z = 1$ and $z = 11$.

15. $4(x-1)^2+2=10$

$$4(x-1)^2=8$$

$$(x-1)^2=2$$

$$x-1=\pm\sqrt{2}$$

$$x=1\pm\sqrt{2}$$

The solutions are $x=1-\sqrt{2}$ and $x=1+\sqrt{2}$.

17. $\frac{1}{2}r^2-10=\frac{3}{2}r^2$

$$-r^2-10=0$$

$$-r^2=10$$

$$r^2=-10$$

The square of a real number cannot be negative. So, the equation has no real solution.

19. The $\pm$ was not used when taking the square root; $2(x+1)^2+3=21$; $2(x+1)^2=18$; $(x+1)^2=9$; $x+1=\pm3$; $x=2$ and $x=-4$

21. $0=x^2+6x+9$

$$0=(x+3)^2$$

$$x+3=0$$

$$x=-3$$

So, the solution of the equation is $x=-3$.

23. $x^2 - 8x = -12$

$x^2 - 8x + 12 = 0$

$(x - 2)(x - 6) = 0$

$x - 2 = 0$ or $x - 6 = 0$

$x = 2$ or $x = 6$

So, the solutions of the equation are $x = 2$ and $x = 6$.

25. $n^2 - 6n = 0$

$n(n - 6) = 0$

$n = 0$ or $n - 6 = 0$

$n = 0$ or $n = 6$

So, the solutions of the equation are $n = 0$ and $n = 6$.

27. $3p^2 + 11p = 4$

$3p^2 + 11p - 4 = 0$

$(3p - 1)(p + 4) = 0$

$3p - 1 = 0$ or $p + 4 = 0$

$3p = 1$ or $p = -4$

$p = \frac{1}{3}$

The solutions are $p = \frac{1}{3}$ and $p = -4$.

29. $2w^2 - 16w = 12w - 48$

$2w^2 - 28w + 48 = 0$

$w^2 - 14w + 24 = 0$

$(w - 2)(w - 12) = 0$

$w - 2 = 0$ or $w - 12 = 0$

$w = 2$ or $w = 12$

So, the solutions of the equation are $w = 2$ and $w = 12$.

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

$u^2 = -9u$

$u^2 + 9u = 0$

$u(u + 9) = 0$

$u = 0$ or $u + 9 = 0$

$u = 0$ or $u = -9$

The solutions of the equation are $u = 0$ and $u = -9$.

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

$-(x + 9)^2 = 64$

$(x + 9)^2 = -64$

There is no real solution.

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

$$7(x-4)^2 - 18 = 10$$
$$7(x-4)^2 = 28$$
$$(x-4)^2 = 4$$
$$x - 4 = \pm\sqrt{4}$$
$$x - 4 = \pm 2$$
$$x = 4 \pm 2$$

The solutions of the equation are $x = 2$ and $x = 6$.

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

$$x^2 + 3x + \frac{5}{4} = 0$$
$$4x^2 + 12x + 5 = 0$$
$$(2x+1)(2x+5) = 0$$
$$2x + 1 = 0 \quad \text{or} \quad 2x + 5 = 0$$
$$x = -\frac{1}{2} \quad \text{or} \quad x = -\frac{5}{2}$$

So, the solutions of the equation are $x = -\frac{1}{2}$ and $x = -\frac{5}{2}$.

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

$$x^2 + 6x + 8 = 0$$
$$(x+2)(x+4) = 0$$
$$x + 2 = 0 \quad \text{or} \quad x + 4 = 0$$
$$x = -2 \quad \text{or} \quad x = -4$$

The zeros of the function are $x = -2$ and $x = -4$.

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

$$x^2 + 7x - 30 = 0$$
$$(x + 10)(x - 3) = 0$$
$$x + 10 = 0 \quad \text{or} \quad x - 3 = 0$$
$$x = -10 \quad \text{or} \quad x = 3$$

The zeros of the function are $x = -10$ and $x = 3$.

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

$$x^2 + 22x + 121 = 0$$
$$(x + 11)^2 = 0$$
$$x + 11 = 0$$
$$x = -11$$

The zero of the function is $x = -11$.

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

$$2x^2 - 2x - 12 = 0$$
$$x^2 - x - 6 = 0$$
$$(x - 3)(x + 2) = 0$$
$$x - 3 = 0 \quad \text{or} \quad x + 2 = 0$$
$$x = 3 \quad \text{or} \quad x = -2$$

The zeros of the function are $x = 3$ and $x = -2$.

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

$$8x^2 - 19x + 6 = 0$$
$$(8x - 3)(x - 2) = 0$$
$$8x - 3 = 0 \quad \text{or} \quad x - 2 = 0$$
$$8x = 3 \quad \text{or} \quad x = 2$$
$$x = \frac{3}{8}$$

The zeros are $x = \frac{3}{8}$ or $x = 2$.

49. 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.

Daily revenue = Number of sandwiches • Price per sandwich

$$R(x) = (330 + 15x)(6 - 0.25x)$$

Step 3 Identify the zeros and find their average. Then find how much each sandwich should cost to maximize the daily revenue.

The zeros of the revenue function are -22 and 24.

The average of the zeros is $\frac{-22 + 24}{2} = 1$.

To maximize the revenue, each sandwich should cost $\$6.00 - \$0.25 = \$5.75$.

Step 4 Find the maximum daily revenue.

$$R(1) = [330 + 15(1)][6 - 0.25(1)] = \$1983.75.$$

51. a. The situation can be modeled by the function $h(t) = -16t^2 + 40$. The acceleration due to gravity is $-16t^2$ feet and the initial height is 40 feet. To find how long the seashell is in the air, find the zeros of the function.

$$h(t) = -16t^2 + 40$$
$$0 = -16t^2 + 40$$
$$16t^2 = 40$$
$$t^2 = \frac{5}{2}$$
$$t = \pm\sqrt{\frac{5}{2}}$$
$$t = \pm\frac{\sqrt{10}}{2}$$
$$t \approx \pm 1.6$$

Reject the negative solution because time is positive. So, the seashell is in the air for about 1.6 seconds.

b. $h(0.5) = -16(0.5)^2 + 40$
$= -16(0.25) + 40$
$= -4 + 40$
$= 36$

$h(1) = -16(1)^2 + 40$
$= -16 + 40$
$= 24$

$h(0.5) - h(1) = 36 - 24 = 12$

The seashell fell 12 feet between 0.5 second and 1 second.