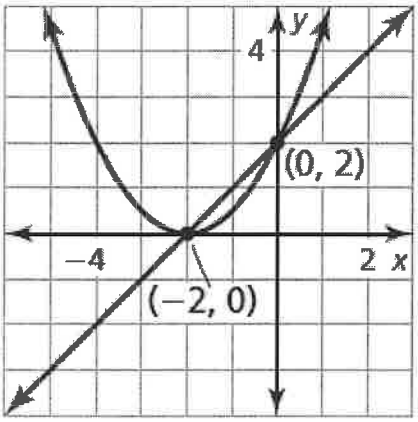
ANSWER PRESENTATION TOOL

1. There is no real solution because the graphs do not intersect.

3. The solutions are $(-6, 3)$ and $(-2, 3)$.

5.



The solutions are $(-2, 0)$ and $(0, 2)$.

Check:

$x = -2$:

$y = x + 2 = (-2) + 2 = 0$

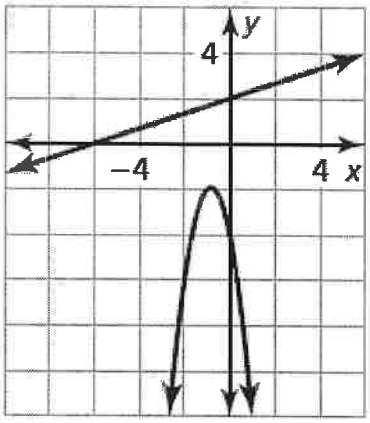
$y = 0.5(x + 2)^2 = 0.5(-2 + 2)^2 = 0$

$x = 0$:

$y = x + 2 = 0 + 2 = 2$

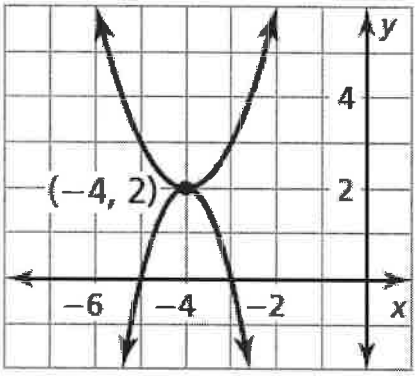
$y = 0.5(x + 2)^2 = 0.5(0 + 2)^2 = 2$

7.



The graphs do not intersect, so there is no real solution.

9.



The solution is $(-4, 2)$.

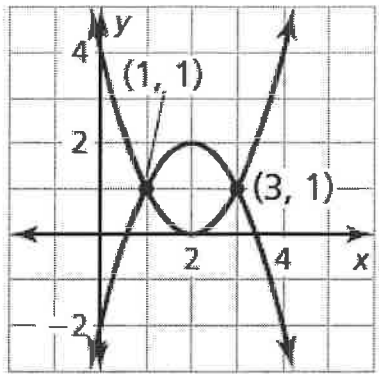
Check:

$x = -4$:

$y = x^2 + 8x + 18 = (-4)^2 + 8(-4) + 18 = 2$

$y = -2x^2 - 16x - 30 = -2(-4)^2 - 16(-4) - 30 = 2$

11.



The solutions are (1, 1) and (3, 1).

Check:

$x = 1$:

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

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

$x = 3$:

$y = (x - 2)^2 = (3 - 2)^2 = 1$

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

13. Substitute $x + 5$ for y in Equation 2 and solve for x.

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

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

$0 = (x - 3)(x + 1)$

$x - 3 = 0$ or $x + 1 = 0$

$x = 3$ or $x = -1$

To solve for y, substitute $x = 3$ and $x = -1$ into the equation $y = x + 5$.

$y = x + 5 = 3 + 5 = 8$

$y = x + 5 = -1 + 5 = 4$

The solutions are $(3, 8)$ and $(-1, 4)$.

15. Substitute $2x - 10$ for y in Equation 1 and solve for x.

$$x^2 + (2x - 10)^2 = 20$$
$$x^2 + 4x^2 - 40x + 100 = 20$$
$$5x^2 - 40x + 80 = 0$$
$$x^2 - 8x + 16 = 0$$
$$(x - 4)^2 = 0$$
$$x = 4$$

To solve for y, substitute $x = 4$ into the equation $y = 2x - 10$.

$$y = 2x - 10 = 2(4) - 10 = -2$$

The solution is $(4, -2)$.

17. Begin by solving for y in Equation 2.

$$y = 2x - 4$$

Next, substitute $2x - 4$ for y in Equation 1 and solve for x.

$$2x^2 + 4x - (2x - 4) = -3$$
$$2x^2 + 2x + 4 = -3$$
$$2x^2 + 2x + 7 = 0$$
$$x = \frac{-2 \pm \sqrt{2^2 - 4(2)(7)}}{2(2)}$$
$$x = \frac{-2 \pm \sqrt{-52}}{4}$$
$$x = \frac{-2 \pm 2i\sqrt{13}}{4}$$

Because x is an imaginary number, the system does not have a real solution.

19. Substitute $x^2 - 1$ for y in Equation 2 and solve for x.

$$-7 = -x^2 - (x^2 - 1)$$
$$-7 = -x^2 - x^2 + 1$$
$$-8 = -2x^2$$
$$4 = x^2$$
$$\pm 2 = x$$

To solve for y, substitute $x = -2$ and $x = 2$ into the equation $y = x^2 - 1$.

$$y = x^2 - 1 = (-2)^2 - 1 = 3$$
$$y = x^2 - 1 = (2)^2 - 1 = 3$$

The solutions are $(-2, 3)$ and $(2, 3)$.

21. Begin by solving for x in Equation 2.

$$x = 21 - 3y$$

Next, substitute $21 - 3y$ for x in Equation 1 and solve for y.

$$(21 - 3y)^2 + y^2 = 7$$
$$441 - 126y + 9y^2 + y^2 = 7$$
$$10y^2 - 126y + 434 = 0$$
$$5y^2 - 63y + 217 = 0$$
$$x = \frac{63 \pm \sqrt{(-63)^2 - 4(5)(217)}}{2(5)}$$
$$x = \frac{63 \pm \sqrt{-371}}{10}$$
$$x = \frac{63 \pm i\sqrt{371}}{10}$$

Because x is an imaginary number, the system does not have a real solution.

23. Add the equations to eliminate the y-term and obtain a quadratic equation in x.

$$2x^2 - 3x - y = -5$$
$$-x + y = 5$$
$$\overline{2x^2 - 4x = 0}$$
$$2x(x - 2) = 0$$
$$x = 0 \quad \text{or} \quad x = 2$$

To solve for y, substitute $x = 0$ and $x = 2$ into the equation $y = x + 5$.

$$y = x + 5 = 0 + 5 = 5$$
$$y = x + 5 = 2 + 5 = 7$$

The solutions are $(0, 5)$ and $(2, 7)$.

25. Add the equations to eliminate the y-term and obtain a quadratic equation in x.

$$-3x^2 + y = -18x + 29$$
$$-3x^2 - y = 18x - 25$$
$$\overline{-6x^2 = 4}$$
$$x = \pm i\frac{\sqrt{6}}{3}$$

Because x is an imaginary number, the system has no real solution.

27. Add the equations to eliminate the y-term and obtain a quadratic equation in x.

$$\begin{array}{r} y + 2x = -14 \\ \underline{-x^2 - y - 6x = 11} \\ -x^2 - 4x = -3 \end{array}$$

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

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(-1)(3)}}{2(-1)}$$

$$x = \frac{4 \pm \sqrt{28}}{-2}$$

$$x = \frac{4 \pm 2\sqrt{7}}{-2}$$

$$x = -2 \pm \sqrt{7}$$

To solve for y, substitute $x = -2 - \sqrt{7}$ and $x = -2 + \sqrt{7}$ into the equation $y = -2x - 14$.

$$y = -2x - 14 = -2(-2 - \sqrt{7}) - 14 = -10 + 2\sqrt{7}$$

$$y = -2x - 14 = -2(-2 + \sqrt{7}) - 14 = -10 - 2\sqrt{7}$$

The solutions are $(-2 - \sqrt{7}, -10 + 2\sqrt{7})$ and $(-2 + \sqrt{7}, -10 - 2\sqrt{7})$.

29. Subtract the equations to eliminate the y-term and obtain a quadratic equation in x.

$$\begin{aligned} y &= -3x^2 - 30x - 76 \\ -(y &= 2x^2 + 20x + 44) \\ \hline 0 &= -5x^2 - 50x - 120 \\ 0 &= x^2 + 10x + 24 \end{aligned}$$

$$(x + 6)(x + 4) = 0$$

$$x + 6 = 0 \quad \text{or} \quad x + 4 = 0$$

$$x = -6 \quad \text{or} \quad x = -4$$

To solve for y, substitute $x = -6$ and $x = -4$ into the equation $y = 2x^2 + 20x + 44$.

$$y = 2x^2 + 20x + 44 = 2(-6)^2 + 20(-6) + 44 = -4$$

$$y = 2x^2 + 20x + 44 = 2(-4)^2 + 20(-4) + 44 = -4$$

The solutions are $(-6, -4)$ and $(-4, -4)$.

31. $2x^2$ and $-x$ are not like terms.

$$\begin{aligned} y &= 2x^2 \quad\quad -26 \\ -y &= \quad\quad -x - 10 \\ \hline 0 &= 2x^2 - x - 36 \end{aligned}$$

$$(2x - 9)(x + 4) = 0$$

$$2x - 9 = 0 \quad \text{or} \quad x + 4 = 0$$

$$x = \frac{9}{2} \quad \text{or} \quad x = -4$$

33. Use the elimination method because there is a y and a $-y$ on the left-hand sides of the equations.

Add the equations to eliminate the y-term and obtain a quadratic equation in x.

$$\begin{aligned} y &= x^2 - 1 \\ -y &= 2x^2 + 1 \\ \hline 0 &= 3x^2 \\ 0 &= x \end{aligned}$$

To solve for y, substitute $x = 0$ into the equation $y = x^2 - 1$.

$y = x^2 - 1 = 0^2 - 1 = -1$

The solution is $(0, -1)$.

35. Use the substitution method because one equation is solved for y.

Substitute 10 for y in Equation 1 and solve for x.

$$\begin{aligned} -2x + 10 + 10 &= \frac{1}{3}x^2 \\ 0 &= \frac{1}{3}x^2 + 2x - 20 \\ 0 &= x^2 + 6x - 60 \\ x &= -3 \pm \sqrt{69} \end{aligned}$$

The solutions are $(-3 - \sqrt{69}, 10)$ and $(-3 + \sqrt{69}, 10)$.

37. Use the substitution method because one equation is solved for y.

Substitute $-3(x-4)^2+6$ for y in Equation 2 and solve for x.

$$(x-4)^2+2-\left[-3(x-4)^2+6\right]=0$$

$$(x-4)^2+2+3(x-4)^2-6=0$$

$$4(x-4)^2-4=0$$

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

$$x-4=\pm 1$$

$$x=4\pm 1$$

$$x=3 \quad \text{or} \quad x=5$$

To solve for y, substitute $x=3$ and $x=5$ into the equation $y=-3(x-4)^2+6$.

$$y=-3(x-4)^2+6=-3(3-4)^2+6=3$$

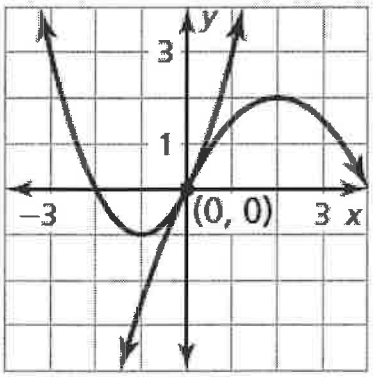
$$y=-3(x-4)^2+6=-3(5-4)^2+6=3$$

The solutions are (3, 3) and (5, 3).

39. Write a system of equations using each side of the original equation.

Equation	*System*
$x^2 + 2x = -\frac{1}{2}x^2 + 2x$	$y = x^2 + 2x$
	$y = -\frac{1}{2}x^2 + 2x$

Graph the equations in the same plane.

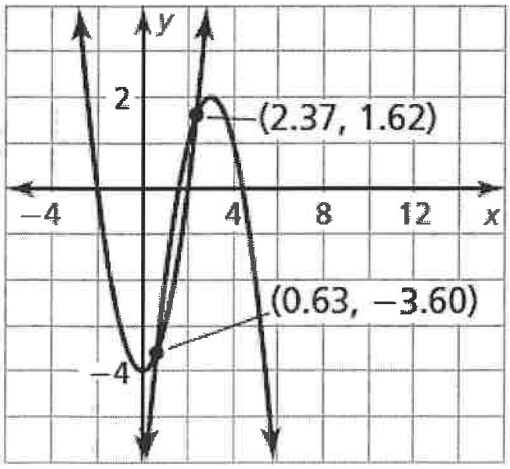


The solution is $x = 0$.

41. Write a system of equations using each side of the original equation.

Equation	*System*
$(x + 2)(x - 2) = -x^2 + 6x - 7$	$y = (x + 2)(x - 2)$
	$y = -x^2 + 6x - 7$

Graph the equations in the same plane.

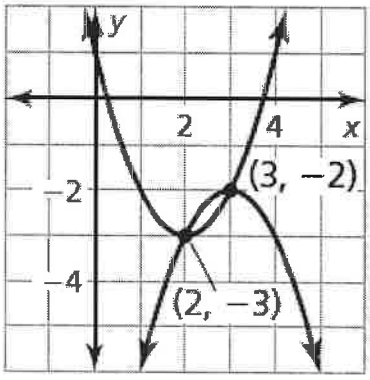


The solutions are $x \approx 0.63$ and $x \approx 2.37$.

43. Write a system of equations using each side of the original equation.

Equation	*System*
$(x - 2)^2 - 3 =$	$y = (x - 2)^2 - 3$
$(x + 3)(-x + 9) - 38$	$y = (x + 3)(-x + 9) - 38$

Graph the equations in the same plane.



The solutions are $x = 2$ and $x = 3$.