

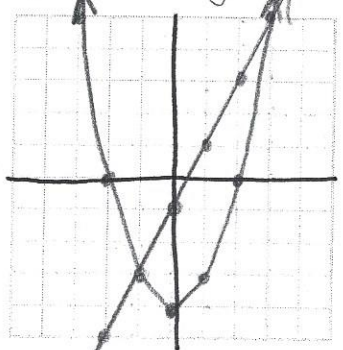
LESSON 4-3

Solving Linear-Quadratic Systems

Practice and Problem Solving: A/B

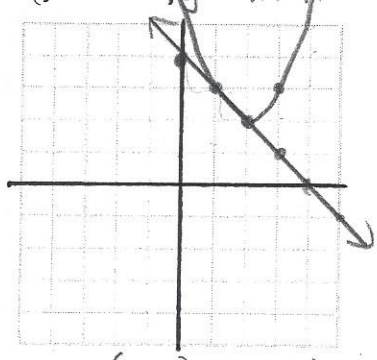
Solve each system represented by the functions graphically.

$$1. \begin{cases} y - x^2 = -4 & y = x^2 - 4 \\ y - 2x = -1 & y = 2x - 1 \end{cases}$$



(-1, -3) (3, 5)

$$2. \begin{cases} y - x^2 + 4x - 6 = 0 & y = x^2 - 4x + 6 \\ y + x = 4 & y = -x + 4 \end{cases}$$



(1, 3) (2, 2)

$$\frac{4}{2(1)} = \frac{4}{2} = 2 \quad x = 2$$

$$(2)^2 - 4(2) + 6$$

$$4 - 8 + 6 = 2$$

(2, 2)

Solve each system algebraically.

$$\begin{matrix} 9y = 6x \\ y = \frac{2}{3}x \end{matrix}$$

$$3. \begin{cases} 9y - 6x = 0 & y = \frac{2}{3}x \\ x^2 + \frac{y^2}{45} = 1 & x^2 + 9y^2 = 45 \end{cases}$$

(3, 2) (-3, -2)

$$4. \begin{cases} x^2 + y^2 = 101 \\ 10x + y = 0 & y = -10x \end{cases}$$

(-1, 10) (1, -10)

$$5. \begin{cases} 3y = 4x & y = \frac{4}{3}x \\ x^2 - y^2 = -63 \end{cases}$$

(-9, -12) (9, 12)

$$6. \begin{cases} 8y = x + 5 \\ x + 5 = \frac{1}{2}y^2 \end{cases}$$

(-5, 0) (12, 16)

$$7. \begin{cases} x^2 + y^2 = 34 & -3y = -3x + 6 \\ 3x - 3y = 6 & y = x - 2 \end{cases}$$

(5, 3) (-3, -5)

$$8. \begin{cases} -x^2 + 12x + 4y - 84 = 0 \\ 2x + y = 1 \\ y = -2x + 1 \end{cases}$$

No Solution

Solve.

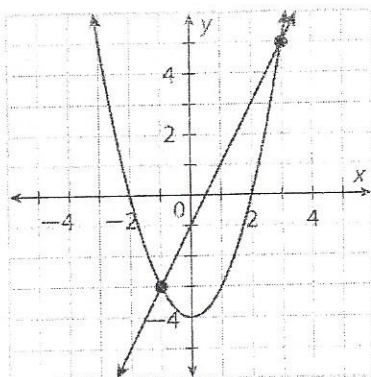
9. A model airplane takes off at a constant rate of 15 feet per second. Its height, in feet, after t seconds is given by $h = 15t$. At the same time, a ball is launched from ground level with an initial velocity of 45 feet per second. The height of the ball, in feet, after t seconds is given by $h = -16t^2 + 45t$. Will the airplane and ball collide? If so, find the time it takes for the collision to occur.

Yes. 1.875 seconds

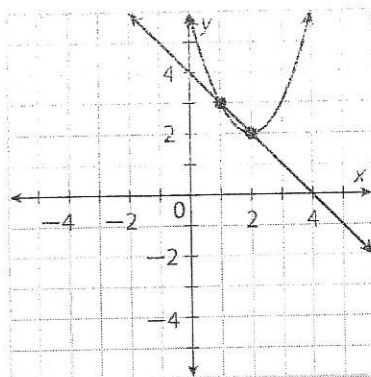
LESSON 4-3

Practice and Problem Solving: A/B

1. $(3, 5)$, $(-1, -3)$



2. $(1, 3)$, $(2, 2)$



3. $(3, 2)$, $(-3, -2)$
4. $(1, -10)$, $(-1, 10)$
5. $(9, 12)$, $(-9, -12)$
6. $(-5, 0)$, $(123, 16)$
7. $(5, 3)$, $(-3, -5)$
8. no solution
9. Yes, a collision would occur after 1.875 sec.

Solving Linear - Quad Systems

$$\textcircled{3} \quad x^2 + 9\left(\frac{2}{3}x\right)^2 = 45 \quad y = \frac{2}{3}(3)$$

$$x^2 + 9\left(\frac{4}{9}x^2\right) = 45 \quad y = 2$$

$$x^2 + 4x^2 = 45$$

$$5x^2 = 45$$

$$5x^2 - 45 = 0$$

$$5(x^2 - 9) = 0$$

$$5(x+3)(x-3) = 0$$

$$x = 3, -3$$

$$\boxed{(3, 2) \quad (-3, 2)}$$

$$y = -3\left(\frac{2}{3}\right)$$

$$y = -2$$

$$\textcircled{4} \quad x^2 + (-10x)^2 = 101 \quad y = -10(-1)$$

$$x^2 + 100x^2 = 101 \quad y = 10$$

$$101x^2 - 101 = 0$$

$$101(x^2 - 1) = 0$$

$$101(x+1)(x-1) = 0$$

$$x = -1, 1$$

$$\boxed{(-1, 10) \quad (1, 10)}$$

$$y = -10(1)$$

$$y = -10$$

$$\textcircled{5} \quad x^2 - \left(\frac{4}{3}x\right)^2 = -63 \quad y = \frac{4}{3}(-9)$$

$$x^2 - \frac{16}{9}x^2 = -63 \quad y = -12$$

$$-\frac{7}{9}x^2 + 63 = 0$$

$$-\frac{7}{9}(x^2 - 81) = 0$$

$$-\frac{7}{9}(x+9)(x-9) = 0$$

$$x = -9, 9$$

$$\boxed{(-9, -12) \quad (9, -12)}$$

$$y = \frac{4}{3}(9)$$

$$y = 12$$

$$\textcircled{6} \quad 8y = \frac{1}{2}y^2 \quad 8(0) = x+5 \quad 8(16) = x+5$$

$$y^2 = 16y$$

$$y^2 - 16y = 0$$

$$y(y-16)$$

$$y = 0, 16$$

$$0 = x+5$$

$$x = -5$$

$$128 = x+5$$

$$x = 123$$

$$\boxed{(-5, 0) \quad (123, 16)}$$

$$\textcircled{7} \quad x^2 + (x-2)(x-2) = 34$$

$$x^2 + x^2 - 2x - 2x + 4 = 34$$

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

$$2(x^2 - 2x - 15) = 0$$

$$2(x-5)(x+3) = 0$$

$$x = 5, -3$$

$$(5, 3) \quad (-3, -5)$$

$$y = 5 - 2$$

$$y = 3$$

$$y = -3 - 2$$

$$y = -5$$

$$\textcircled{8} \quad -x^2 + 12x + 4(-2x+1) - 84 = 0$$

$$-x^2 + 12x - 8x + 4 - 84 = 0$$

$$-x^2 + 4x - 80 = 0$$

$$-(x^2 - 4x + 80) = 0$$

No Solution

$$\textcircled{9} \quad 15t = -16t^2 + 45t$$

$$16t^2 + 15t - 45t = 0$$

$$16t^2 - 30t = 0$$

$$2t(8t - 15) = 0$$

$$t = 0, 1.875$$