

Homework 38.1

1. A baseball is thrown into the air and its height (h), in feet, can be modeled by the equation $h = -16t^2 + 29t + 6$, where t represents time in seconds.

How many seconds will it take for the baseball to hit the ground ($h=0$) after it is thrown into the air?

Answer $t = 2$ seconds

$$0 = -16t^2 + 29t + 6$$

$$0 = -16t^2 - 3t + 32t + 6$$

$$0 = -t(16t + 3) + 2(16t + 3)$$

$$0 = (-t + 2)(16t + 3) \quad 16t + 3 = 0 \quad t = -\frac{3}{16}$$

$$t = 2$$

$$\begin{array}{r} -96 \\ 1 \quad 96 \\ -2 \quad 48 \\ -3 \quad 32 \\ 4 \quad 24 \\ 6 \quad 16 \\ 8 \quad 12 \end{array}$$

2. Suppose a football player kicks a ball and the height (h) of the football in feet can be modeled by the equation $h = -16t^2 + vt + c$, where t is the time in seconds after the ball is kicked, v is the initial upward velocity, and c is the starting height.

Write an equation that can be used to find the height (h) of the ball after t seconds if the initial upward velocity is 47 ft/sec and the starting height is 3 ft.

Answer $h = -16t^2 + 47t + 3$

$$h = -16t^2 + vt + c$$

$$v = 47$$

$$c = 3$$

If the ball is not touched, how long will it take for the ball to reach the ground?

Answer $t = 3$ second

$$t = 3 \text{ or } -\frac{1}{16}$$

$$0 = -16t^2 + 47t + 3$$

$$0 = -16t^2 - t + 48t + 3$$

$$0 = -t(16t + 1) + 3(16t + 1)$$

$$0 = (-t + 3)(16t + 1)$$

$$\begin{array}{r} -48 \\ -1 \quad 48 \\ 2 \quad 24 \\ 4 \quad 12 \\ 3 \quad 16 \\ 6 \quad 8 \end{array}$$

3. A woman is going to jump into a pool from a diving board that is 50 ft above the water. Her height (h) above the pool can be modeled by the equation $h = -16t^2 + vt + c$, where t is the time in seconds after the woman jumps, v is the initial upward velocity, and c is her starting height.

Write an equation that can be used to find the height (h) of the woman after t seconds if her initial upward velocity is 5 ft/sec.

Answer $h = -16t^2 + 5t + 50$

$$a = -16$$

$$b = 5$$

$$c = 50$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4(-16)(50)}}{2(-16)}$$

$$x = \frac{-5 \pm \sqrt{3225}}{-32}$$

How many seconds will it take for the woman to hit the water?

Answer 1.93 sec

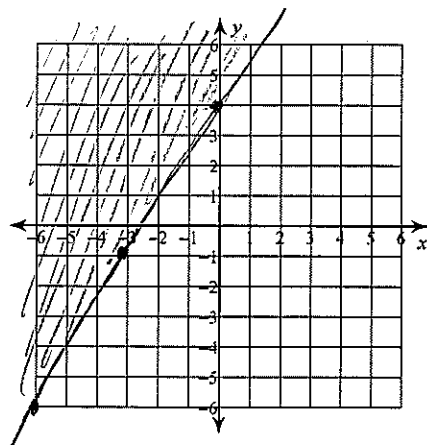
$$= \frac{-5 - 56.79}{-32}$$

$$= \frac{-61.79}{-32}$$

$$= 1.93$$

Sketch the graph of each linear inequality.

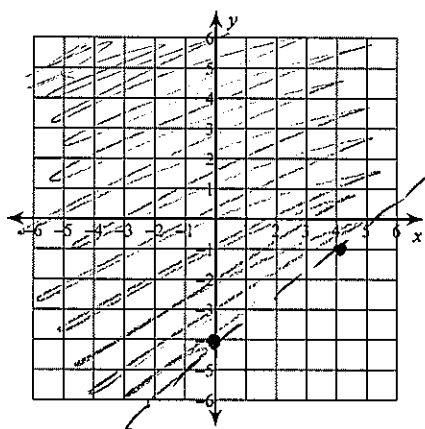
4. $y \geq \frac{5}{3}x + 4$



$$m = \frac{5}{3}$$

$$b = 4$$

5. $y > \frac{3}{4}x - 4$



$$m = \frac{3}{4}$$

$$b = -4$$

Divide.

6. $(3v^3 + 2v^2 + 4v) \div 9v$

$$\frac{3v^3}{9v} + \frac{2v^2}{9v} + \frac{4v}{9v}$$

$$\frac{v^2}{3} + \frac{2v}{9} + \frac{4}{9}$$

7. $(3x^3 + 12x^2 + 3x) \div 6x$

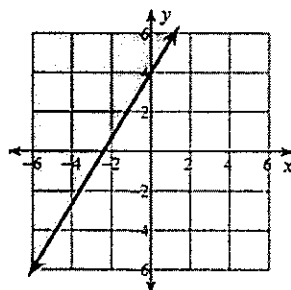
$$\frac{3x^3}{6x} + \frac{12x^2}{6x} + \frac{3x}{6x}$$

$$\frac{x^2}{2} + 2x + \frac{1}{2}$$

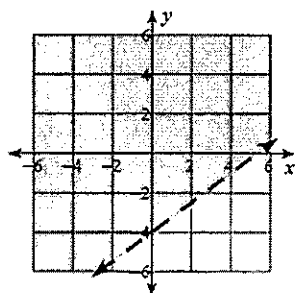
Answers to Homework 38.1

1. 2 seconds

2. $h = -16t^2 + 47t + 3$; 3 seconds



3. $h = -16t^2 + 5t + 50$; 1.9 seconds, 4.



5.

6. $\frac{v^2}{3} + \frac{2v}{9} + \frac{4}{9}$

7. $\frac{x^2}{2} + 2x + \frac{1}{2}$