

Math 135: Intermediate Algebra

Homework 4 Solutions

Section 3.4

1.

$$\begin{array}{rcl} y - 2x & = & 0 \\ +2x & & +2x \\ \hline y & = & 2x \end{array}$$

Slope 2, y -intercept $(0, 0)$.

3.

$$\begin{array}{rcl} 12x + 3y & = & -18 \\ -12x & & -12x \\ \hline 3y & = & -12x - 18 \\ \div 3 & & \div 3 \\ \hline y & = & -4x - 6 \end{array}$$

Slope -4 , y -intercept $(0, -6)$.

5.

$$\begin{array}{rcl} 3x - 6y & = & 6 \\ -3x & & -3x \\ \hline -6y & = & -3x + 6 \\ \div -6 & & \div -6 \\ \hline y & = & \frac{1}{2}x - 1 \end{array}$$

Slope $\frac{1}{2}$, y -intercept $(0, -1)$.

7.

$$\begin{array}{rcl} 10y - 8x & = & 100 \\ +8x & & +8x \\ \hline 10y & = & 8x + 100 \\ \div 10 & & \div 10 \\ \hline y & = & \frac{4}{5}x + 10 \end{array}$$

Slope $\frac{4}{5}$, y -intercept $(0, 10)$.

9.

$$\begin{array}{rcl} 3x + 2y - 1 & = & 0 \\ -3x + 1 & & -3x + 1 \\ \hline 2y & = & -3x + 1 \\ \div 2 & & \div 2 \\ \hline y & = & -\frac{3}{2}x + \frac{1}{2} \end{array}$$

Slope $-\frac{3}{2}$, y -intercept $(0, \frac{1}{2})$.

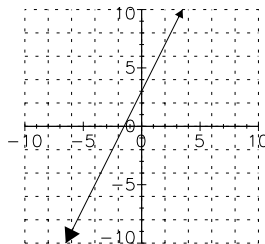
11.

$$\begin{array}{rcl} y - 5 & = & -3(x - 8) \\ y - 5 & = & -3x + 24 \\ +5 & & +5 \\ \hline y & = & -3x + 29 \end{array}$$

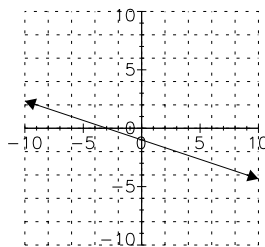
Slope -3 , y -intercept $(0, 29)$.

13. b

15. a

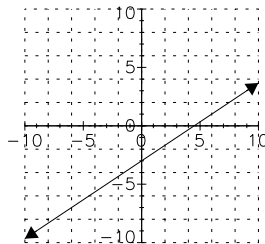


17.



19.

21. $y = \frac{2}{3}x - 3$



33. $y - 8 = -\frac{3}{5}(x - 0)$

35. Slope of first line $m = -\frac{3}{9} = -\frac{1}{3}$. Parallel line is $y = -\frac{1}{3}x - 4$.

37. Slope of first line is $m = \frac{4}{2} = 2$. Perpendicular slope $m_{\perp} = -\frac{1}{2}$. Perpendicular line is $y - 0 = -\frac{1}{2}(x + 5)$.

39. $x = -2.3$

41. $y - 2 = -(x - 3)$

43. $y - 5 = \frac{3}{2}(x + 6)$

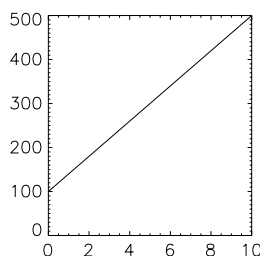
45. Slope of first line is $m = -\frac{2}{4} = -\frac{1}{2}$. Parallel line is $y + 1 = \frac{1}{2}(x - 2)$.

47. Slope of first line is $m = \frac{5}{4}$. Perpendicular slope is $m_{\perp} = -\frac{4}{5}$. Perpendicular line is $y + 6 = -\frac{4}{5}(x + 10)$.

51. Slope $m = \frac{-4-1}{3-0} = -\frac{5}{3}$. Using point slope form, $y - 1 = -\frac{5}{3}(x - 0)$.

53. Slope $m = \frac{1-(-2)}{6-(-4)} = \frac{3}{10}$. Using point slope form, $y + 2 = \frac{3}{10}(x + 4)$.

55. a. The 3 extra consultations cost \$40 each, or \$120 total, so the base fee is $\$220 - \$120 = \$100$. The total cost for x additional consultations is $A = 40x + 100$.



b.

c. The A -intercept represents the initial consultation fee.

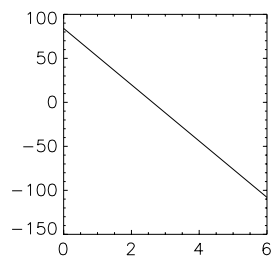
57. a. Slope $m = \frac{0-(-30)}{32-(-22)} = \frac{5}{9}$. Line is $C = \frac{5}{9}(F - 32)$.

b.

$$\begin{array}{rcl} -85 & = & \frac{5}{9}(F - 32) \\ \times \frac{9}{5} & & \times \frac{9}{5} \\ -153 & = & F - 32 \\ +32 & & +32 \\ -121 & = & F \end{array}$$

Hydrogen chloride boils at -121° F.

59. a. The velocity is decreasing by $84 - 20 = 20 - (-44) = 64$ ft every 2 seconds, so the slope is $m = \frac{20-84}{2} = -32$. The initial velocity is 84 ft per sec, so this is intercept. The equation is $v = -32t + 84$.



b.

c. The slope is the rate at which the velocity decrease, i.e. the deceleration.

d. The t intercept is the initial velocity of the object, i.e. the velocity at time zero.

61. a. The fare is \$10.25 for a 6 mile ride. Of this, \$1.25 is the flat fare, so the customer is paying $\$10.25 - \$1.25 = \$9.00$ for the 6 miles. Thus, the slope is $m = 9/6 = 1.5$, or \$1.50 per mile. The equation is $f = 1.5m + 1.25$, where f is the fare and m is the number of miles driven.

b. The slope represents the cost per mile.

c.

$$\begin{array}{rcl} 20.75 & = & 1.5m + 1.25 \\ -1.25 & & -1.25 \\ 19.5 & = & 1.5m \\ \div 1.5 & & \div 1.5 \\ 13 & = & m \end{array}$$

The passenger went 13 miles.

Section 3.6

1. Is a function (no repeated values in domain)

3. Not a function (repeated value in domain)

5. Not a function (fails vertical line test)

7. Is a function (no repeated values in domain)

13. Domain: $[-4, -3, -2, -1, 0, 1, 2, 3, 4]$. Range: $[-8, -5, 0, 7]$.

15. Domain: $[-4, -2, 0, 1, 2, 3.5, 5]$. Range: $[1, 3, 5]$.

17. Domain: $[-7, -3, -1, 2, 4]$. Range: $[-4, -2, 1, 3, 7]$.

19. Domain: $[2000, 2001, 2002, 2003, 2004]$. Range: $[20, 23, 32, 34, 38]$.

21. a. $f(2) = 8 - 5(2) = -2$

b. $f(-1) = 8 - 5(-1) = -13$

c. $f(\frac{3}{5}) = 8 - 5(\frac{3}{5}) = 8 - 3 = 5$

d. $f(1.8) = 8 - 5(1.8) = 8 - 9 = -1$

23. a. $g(5) = 2.4(5) - 7 = 5$

b. $g(-2) = 2.4(-2) - 7 = -11.8$

c. $g(a) = 2.4a - 7$

d. $g(a^2) = 2.4a^2 - 7$

25. a. $f(0) = |\frac{1}{2}(0) + 3| = 3$

b. $f(-8) = |\frac{1}{2}(-8) + 3| = |-4 + 3| = 1$

c. $f(-4t) = |\frac{1}{2}(-4t) + 3| = |-2t + 3|$

d. $f(t-6) = |\frac{1}{2}(t-6) + 3| = |\frac{1}{2}t - 3 + 3| = |\frac{1}{2}t|$

27. a. $h(2) = 3(2)^2 - 6(2) - 9 = 12 - 12 - 9 = -9$

a. $h(-1) = 3(-1)^2 - 6(-1) - 9 = 3 + 6 - 9 = 0$

a. $h(-n) = 3(-n)^2 - 6(-n) - 9 = 3n^2 + 6n - 9$

a. $h(2n) = 3(2n)^2 - 6(2n) - 9 = 12n^2 - 12n - 9$

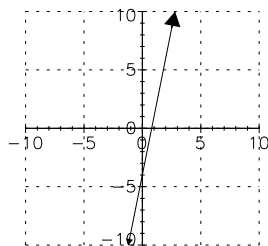
29. a. $g(7) = 10$

b. $g(-150) = 10$

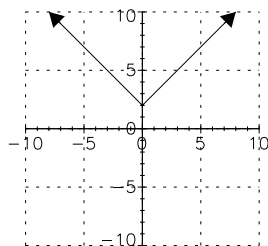
c. $g(t) = 10$

d. $g(5 - 9t) = 10$

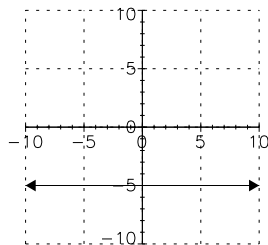
31. Domain: $(-\infty, \infty)$. Range: $(-\infty, \infty)$.



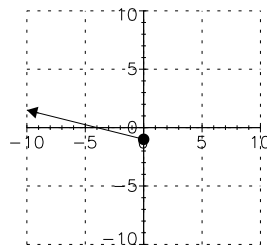
33. Domain: $(-\infty, \infty)$. Range: $[2, \infty)$.



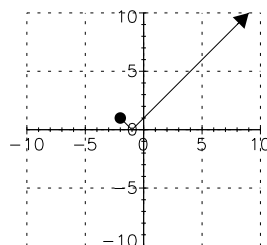
35. Domain: $(-\infty, \infty)$. Range: $[-5]$.



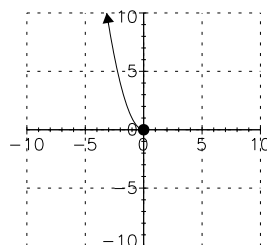
37. Domain: $(-\infty, 0]$. Range: $[-1, \infty)$.



39. Domain: $[-2, \infty)$. Range: $[0, \infty)$.

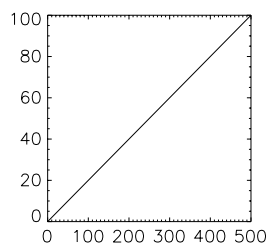


41. Domain: $(-\infty, 0]$. Range: $[0, \infty)$.



51. a. $d(a) = 0.2a$

b. $d(150) = 0.2(150) = 30$. The customer saved \$30.

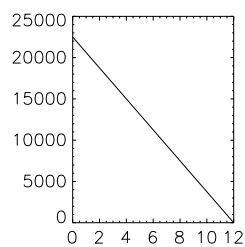


c.

d. Domain: $[0, \infty)$. Range: $[0, \infty)$.

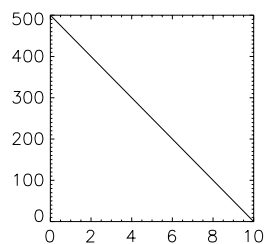
53. a. $V(t) = 22500 - 1875t$

b. $V(6)$ represents the value of the car after 6 years. $V(6) = 22500 - 1875(6) = 11250$. The car is worth \$11,250 after 6 years.



c.

- 55.** **a.** $d(x) = 500 - 50x$
 b. $d(2) = 500 - 50(2) = 400$. The meaning is that after 2 weeks the patient's dosage will be 400 mg.



c.

- 57.** **a.** $h(0.5) = 180$. $h(3) = 160$.
 b. No, we cannot consider $t > 5$. The object hits the ground at $t = 5$ seconds.