Review Exercises (Ch. 4)

1)

a) $m = \frac{6-2}{2-1} = \frac{4}{1} = 4$

b) $m = \frac{2-(-6)}{-8-(-5)} = \frac{8}{-3} = -\frac{8}{3}$

c) $m = \frac{0-3}{1-(-2)} = \frac{-3}{3} = -1$

d) $m = \frac{-6-2}{1-1} = \frac{-8}{0} \Rightarrow m$ is undefined

e) $m = \frac{-1-(-1)}{7-4} = \frac{0}{3} = 0$

f) $m = \frac{4-2}{-7-(-3)} = \frac{2}{-4} = -\frac{1}{2}$

3)

a) $-\frac{100}{3}$

b) For every \$3 decrease in price, Vitomax can sell 100 more supplements. So if they sell 5000 supplements for a price of \$20 [as indicated by the point (5000, 20)], they sell 5000 + 100 = 5100 supplements for \$20 – \$3 = \$17. Thus we have the ordered pair (5100, 17).

c) From (5100, 17), we can conclude the point (5100 + 100, 17 – 3) = (5200, 14) lies on the graph.

d) $m = -\frac{100}{3}$

5) A ∫ 4, B ∫ 3, C ∫ 1, D ∫ 2

7)

a) 5 inches of snow

b) $2 \frac{\text{in}}{\text{hr}}$

c) $y = 2x + 5$

9)

a) $y = 1800 - 300x$

11)

a) $y = 6x + 2$

b) $y = \frac{1}{3}x + 4$

c) $y = 2x + 1$

d) $y = \frac{1}{2}x - 5$

e) $y = x - 3$

f) $y = -x + 5$

13) Solving for y in terms of x is the same as writing the equation in slope-intercept ("$y =$") form:

$$3x - 4y = 12$$
$$-4y = -3x + 12$$
$$y = \frac{3}{4}x - 3$$

15) We already know the rate of change (slope) of the graph is $-\frac{100}{3}$. We also know the graph contains the point (5000, 20). We can now write the equation in point-slope form and then solve for y in terms of x:

$$y - 20 = -\frac{100}{3}(x - 5000)$$
$$y - 20 = -\frac{100}{3}x + \frac{500{,}000}{3}$$
$$y = -\frac{100}{3}x + \frac{500{,}060}{3}$$

17)

a) $m = \dfrac{10\text{ in} - 6\text{ in}}{5\text{ hr} - 3\text{ hr}} = \dfrac{4\text{ in}}{2\text{ hr}} = 2\ \frac{\text{in}}{\text{hr}}$

b) Use either point to first write the equation in point slope form:

$y - 10 = 2(x - 5)$ OR $y - 6 = 2(x - 3)$

$y - 10 = 2x - 10$ OR $y - 6 = 2x - 6$

$y = 2x$ $y = 2x$

19) First find the slope of the line connecting both points and use either point to first write the equation of the line in point-slope form:

a) $m = \dfrac{6 - 4}{2 - 1} = \dfrac{2}{1} = 2$

$y - 4 = 2(x - 1)$ OR $y - 6 = 2(x - 2)$

$y - 4 = 2x - 2$ OR $y - 6 = 2x - 4$

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

b) $m = \dfrac{3 - (-1)}{5 - 4} = \dfrac{4}{1} = 4$

$y - (-1) = 4(x - 4)$ OR $y - 3 = 4(x - 5)$

$y + 1 = 4(x - 4)$ OR $y - 3 = 4x - 20$

$y + 1 = 4x - 16$ $y = 4x - 17$

$y = 4x - 17$

c) $m = \dfrac{-8-6}{6-2} = \dfrac{-14}{4} = -\dfrac{7}{2}$

$y - 6 = -\frac{7}{2}(x-2)$ OR $y - (-8) = -\frac{7}{2}(x-6)$

$y - 6 = -\frac{7}{2}x + 7$ OR $y + 8 = -\frac{7}{2}x + 21$

$y = -\frac{7}{2}x + 13$ OR $y = -\frac{7}{2}x + 13$

d) $m = \dfrac{7-4}{-9-0} = \dfrac{3}{-9} = -\dfrac{1}{3}$

$y - 4 = -\frac{1}{3}(x-0)$ OR $y - 7 = -\frac{1}{3}[x-(-9)]$

$y - 4 = -\frac{1}{3}x$ OR $y - 7 = -\frac{1}{3}(x+9)$

$y = -\frac{1}{3}x + 4$ OR $y - 7 = -\frac{1}{3}x - 3$

$y = -\frac{1}{3}x + 4$

21)

a) (5,0) (0,5)
b) (4,0) (0,$^-$2)
c) (2,0) (0,3)
d) (20,0) (0,$^-$2)
e) (2,0) (0,$^-$12)
f) $(\frac{9}{4},0)$ $(0,\frac{9}{5})$

23) (1,4)

25) Inconsistent System è No solution

27) Approximate Solution: (3.67, 1.33)
Exact Solution: $(\frac{11}{3},\frac{4}{3})$

29) Let l be the number of advertising lines. Let C_1 denote the cost of advertising in the first newspaper. Let C_2 be the cost of advertising in the second newspaper. We have

$C_1 = 0.65l + 7$
$C_2 = 0.52l + 8.30$

Both costs will be the same when $C_1 = C_2$. This occurs when
$0.65l + 7 = 0.52l + 8.30$
$0.13l + 7 = 8.3$
$0.13l = 1.3$
$l = 10$

Both newspapers charge the same amount for 10 lines of advertising.

31) $y = 5x + 1$
$x + y = -11$

$x + (5x + 1) = -11$
$x + 5x + 1 = -11$
$6x + 1 = -11$
$6x = -12$
$x = -2$

Substituting $^-2$ for x in either equation and then solving for y gives $y = {}^-9$.
Solution: $(^-2, ^-9)$

33) $y = 3x$
$y = 7x - 2$

$3x = 7x - 2$
$-4x = -2$
$x = \frac{1}{2}$

Substituting $\frac{1}{2}$ for x in either equation and then solving for y gives $y = \frac{3}{2}$.
Solution: $(\frac{1}{2}, \frac{3}{2})$

35) $x - 5y = 10$
$2x + 6y = 4$

Multiplying both sides of the first equation by $^-2$ gives the system
$-2x + 10y = -20$
$2x + 6y = 4$

Adding both equations and then solving for y gives
$16y = -16$
$y = -1$

Substituting $^-1$ for y in either equation and then solving for x gives $x = 5$.
Solution: $(5, ^-1)$

37) Substitution is easier:

$x + 2(9x - 6) = -12$
$x + 18x - 12 = -12$
$19x - 12 = -12$
$19x = 0$
$x = 0$

Substituting 0 for x in either equation and then solving for y gives $y = -6$.
Solution: $(0, -6)$

39)

a) $x + y = 180$

b) $y = 2x - 30$

c) One angle measures 70° and the other measures 110°.

41) Let l and w denote the length and width of the rectangle respectively (in cm) . We have

$$2l + 2w = 94$$
$$l = w + 4$$

$$2(w + 4) + 2w = 94$$
$$2w + 8 + 2w = 94$$
$$4w + 8 = 94$$
$$4w = 86$$
$$w = 21.5$$

Substituting 21.5 for w in either equation and then solving for l gives $l = 25.5$.
The dimensions of the rectangle are 21.5 cm and 25.5 cm.