1. a. 15
   b. 6
   c. $19.47

2. About 66 or 67

3. a. 20
   b. $\frac{5}{6}$

4. Crystal's

5. Player 1: .324 batting average
   Player 2: .322 batting average
   Player 3: .320 batting average
   Player 4: .334 batting average

   Player 4 is the best hitter because he has the highest ratio of hits to number of times at bat.

6. a. I
   b. II

7. a. 8
   b. –6
   c. $[-9,10]$ or $-9 \le x \le 10$
   d. $[-6,8]$ or $-6 \le x \le 8$
   e. $[-9,-7) \cup (-3,1)$ or $-9 \le x < 7 \quad -3 < x < 1$
   f. $(-7,-3) \cup (1,10]$ or $-7 < x < -3 \quad 1 < x \le 10$

For 7e and 7f, closed intervals are acceptable.

8. $w = \frac{p}{2} - l$

9. $x = 2(y - r)$ or $x = 2y - 2r$

10. $t = \frac{3}{2}(v - m)$ or $t = \frac{3}{2}v - \frac{3}{2}m$

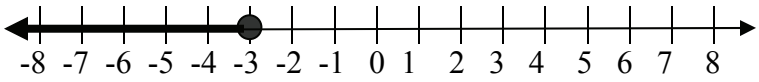
11. $x = -3$

12. $x = 8$

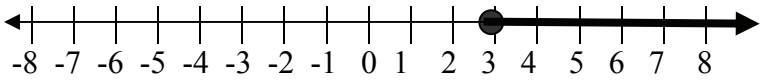
13. $x = \frac{5}{8}$

14. $x = -3$

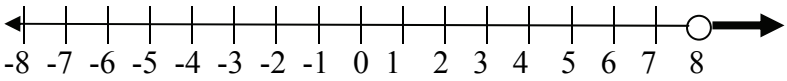
15. $x \leq -3$



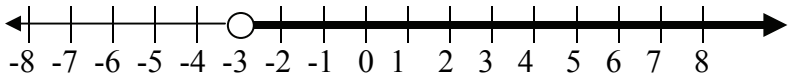
16. $x \geq 3$



17. $x > 8$



18. $x > -3$



19. **B**

20. a. $15 + .75x < 18$

    b. $x < 4$

    c. Paolo's large pizza with 0, 1, 2, or 3 toppings is less expensive than Pete's large pizza with any number of toppings.

21. $P = 30 + 45x$ where x is the number of hours

22. a. $6 + 4x \leq 20$ or $3 + 2x \leq 10$

    b. $x \leq 3.5$

    c. You will still have to walk 1.5 miles to get to school.
    The taxi ride will take you 1.5 miles from school. (other answers possible)

23. Line 2

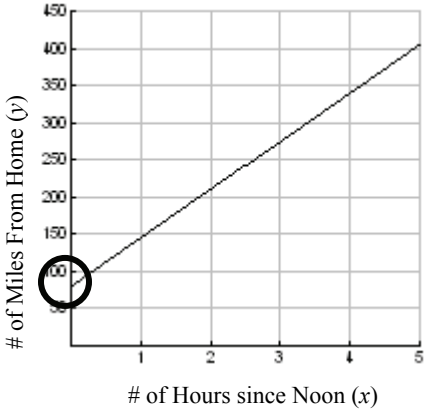
24. y-intercept = 80

Equation: $y = 80 + 65x$

Table:

Hours Since Noon	Miles from Home
0	80
1	145
2	210
3	275
4	340
5	405

Graph:



b. Marina is 80 miles from home at noon.

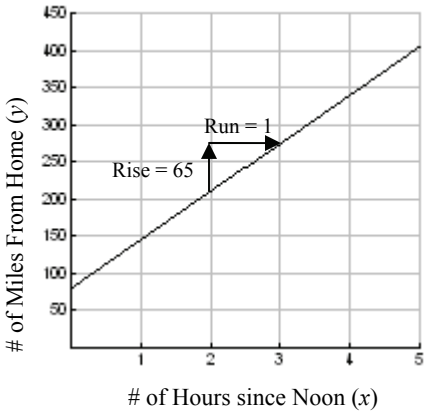
c. slope (rate of change) = 65

Equation: $y = 80 + 65x$

Table:

Hours Since Noon	Miles from Home
0	80
1	145
2	210
3	275
4	340
5	405

Graph:



d. Marina is traveling at a constant rate (speed) of 65 miles per hour.

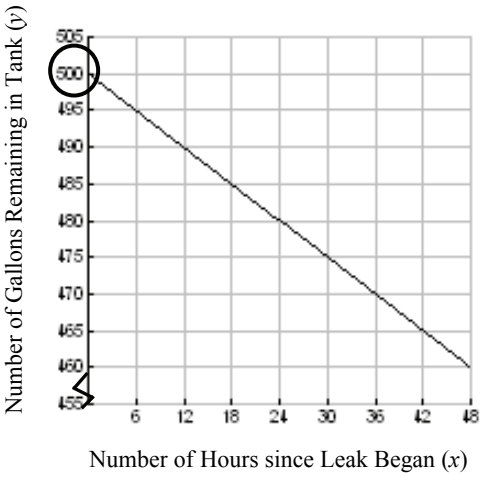
25. a. y-intercept = 500

Equation: $y = 500 - \frac{5}{6}x$

Table:

Number of Hours since Leak Began	Number of Gallons Remaining in Tank
0	500
1	$499\frac{1}{6}$
6	495
12	490
18	485
24	480

Graph:



b. The tank contains 500 gallons of water when the leak occurs.

c. slope (rate of change) = $-\frac{5}{6}$

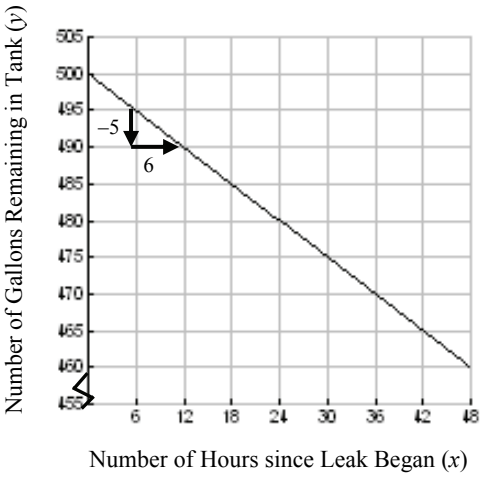
Equation: $y = 500 - \frac{5}{6}x$

Table:

Number of Hours since Leak Began	Number of Gallons Remaining in Tank	
0	500	
1	$499\frac{1}{6}$	$-\frac{5}{6}$
6	495	$-\frac{25}{6}$
12	490	-5
18	485	-5
24	480	-5

(1, 5, 6, 6, 6 mark the differences between consecutive rows.)

Graph:



d. The water leaks out of the tank at a steady rate of $\frac{5}{6}$ gallons per hour.

26. No When $x = -1,$ and $x = 5, y$ has 2 different values.

27. Yes Every x has exactly one y.

28. No The vertical line test shows that some x's have two y's.

29. Yes The vertical line test shows that every x has exactly one y.

30.

x	y
–3	5
–2	3
–1	**1**
0	**–1**
1	**–3**
2	**–5**
3	**–7**

31.

Number of Cups of Juice Concentrate, x	Number of Cups of Water, y
0	0
1	**1.5**
2	3
3	**4.5**
4	**6**
5	**7.5**
6	**9**

32. a. fish per week

b. $0 \le x \le 3$, $3 \le x \le 5$, $5 \le x \le 10$

c. $$f(x) = \begin{cases} -500x + 2000, & \text{if } 0 \le x \le 3 \\ 500, & \text{if } 3 \le x \le 5 \\ 50x + 250, & \text{if } 5 \le x \le 10 \end{cases}$$

d.
During weeks **1 – 3**, the fish population changed at a rate of **-500** fish per week.
During weeks **4 – 5**, the fish population changed at a rate of **0** fish per week.
During weeks **6 – 10**, the fish population changed at a rate of **50** fish per week.

e. – 250 fish per week

f. While there was actual variation in the slope during the time interval $x = 1$ to $x = 5$, by the end of the 4 weeks, there were 1000 fewer fish than at the beginning of those four weeks. $\frac{-1000 \text{ fish}}{4 \text{ weeks}} = \frac{-250 \text{ fish}}{1 \text{ week}} = -250 \text{ fish/week}$

33. a. No equation. This could be represented by $2300x + 400y$ which is an expression, not an equation.
    b. IV
    c. I

34. a. II
    b. VI
    c. V

35. a. $y = -.256x + 25.879$

    b. $-.256$ feet per year.

    c. According to the regression line, the cliff erodes 0.256 feet each year. That is, the distance from the house to the edge of the cliff decreases by 0.256 feet each year.

    d. 25.879

    e. According to the regression line, the distance from the house to the edge of the cliff was 25.879 feet in 1975.

    f. 15.639 feet

    g. The year 2076.

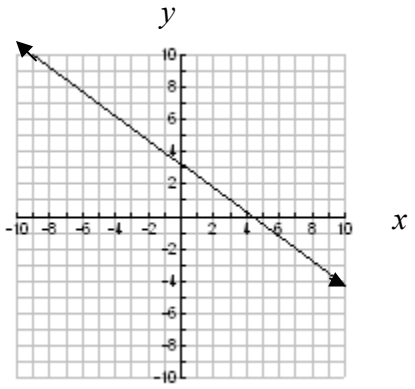
36. a. Graph 1
    b. Graph 3
    c. Graph 2
    d. Graph 3
    e. Graph 4
    f. Graph 2

37. $x = 1$, $y = -2$. This could also be written as the point $(1, -2)$.

38. $x = 4$, $y = 0$. This could also be written as the point $(4, 0)$.

39. a. Since the equations are mathematically equivalent, there is an infinite number of solutions.

b. The solutions include all of the coordinate pairs along the line.



40. a. Since the lines have the same slope and different y-intercepts, they are parallel and there are no solutions.

b. The lines are parallel, therefore, there are no points that satisfy both equations, and thus there are no solutions.

41. a. $y = 3000 + 1250x$

b. 3000. It is the sign-on bonus Victor receives before he begins to work at Computer Industries.

c. 1250 dollars per week. Victor would earn $1250 per week at Computer Industries.

d. $y = 1600x$

e. 0. Victor does not receive any money from Ideal Imaging before he begins to work.

f. 1600 dollars per week. Victor would earn $1600 per week at Ideal Imaging.

g. $\begin{cases} y = 3000 + 1250x \\ y = 1600x \end{cases}$

h. $x = 8.571, \quad y = 13714.286$ There may be slight variation depending on whether the full or rounded value of x is used to determine y.

i. After about 8 ½ weeks, Victor would have earned about $13,714 whether he worked at Computer Industries or Ideal Imaging. Before this point, his total earnings would have been more at Computer Industries. After this point, his total earnings would be more at Ideal Imaging.

42. a. $\begin{cases} 15x + 25y = 110 \\ x + y = 6 \end{cases}$

b. $\begin{bmatrix} 15 & 25 \\ 1 & 1 \end{bmatrix} \bullet \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 110 \\ 6 \end{bmatrix}$

c. $x = 4, \quad y = 2$

d. Lisa jogged 4 miles and walked 2 miles.

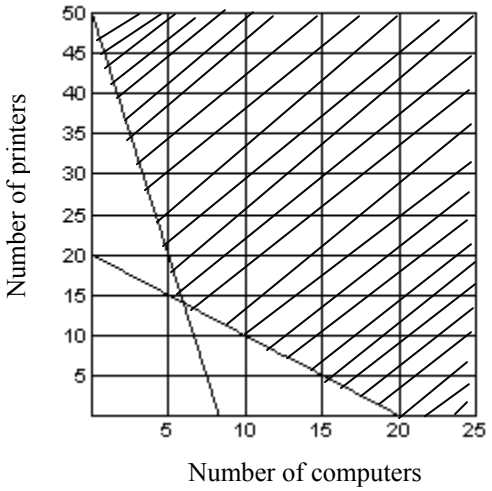
43. a.
$$\begin{array}{c} \\ \text{T's} \\ \text{Sweats} \end{array} \begin{array}{c} \text{Cost} \\ \begin{bmatrix} \$1074.00 \\ \$887.80 \end{bmatrix} \end{array}$$

b. $1961.80

44. a. Graph III
b. Graph I
c. Graph II
d. Graph IV

45. a. $\begin{cases} 2400x + 400y \geq 20,000 \\ x + y \geq 20 \end{cases}$

b. see graph below.



c. Sample responses include:
5 computers and 25 printers
17 computers and 7 printers
10 computers and 15 printers
20 computers and 5 printers
22 computers and 0 printers

46. $f(x)=\begin{cases}2x, & \text{if } 1\le x\le 5\\ 10+1(x-5), & \text{if } x\ge 6\end{cases}$

47. a. $\begin{bmatrix}6 & 8\\ 10 & 12\end{bmatrix}$ The dimensions are 2 x 2.

b. $\begin{bmatrix}6 & 8\\ 10 & 12\end{bmatrix}$ The dimensions are 2 x 2.

c. They are identical. The dimensions of both matrices are 2 x 2.

48. a. $\begin{bmatrix}-4 & -4\\ -4 & -4\end{bmatrix}$ The dimensions are 2 x 2.

b. $\begin{bmatrix}4 & 4\\ 4 & 4\end{bmatrix}$ The dimensions are 2 x 2.

c. They are additive inverses. The dimensions of both matrices are 2 x 2.

49. a. $\begin{bmatrix}19 & 22\\ 43 & 50\end{bmatrix}$ The dimensions are 2 x 2.

b. $\begin{bmatrix}23 & 34\\ 31 & 46\end{bmatrix}$ The dimensions are 2 x 2.

c. Multiplication is not commutative with these matrices.
Both matrices are 2 x 2.

50. a. -2

b. $\begin{bmatrix}-2 & 1\\ \frac{3}{2} & -\frac{1}{2}\end{bmatrix}$

c. $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

d. $\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$

e. Multiplying a matrix by its inverse matrix is commutative and results in the identity matrix.

51. a. 2 x 3

b. 2 x 3

c. The product is not possible.

d. 2 x 1

52. a. $\begin{bmatrix} -14 & -15 & 3 \\ 11.5 & 11.5 & -.5 \end{bmatrix}$ The dimensions are 2 x 3.

b. $\begin{bmatrix} -31 \\ 27.5 \end{bmatrix}$ The dimensions are 2 x 1.