Study Guide - Chapter 2

Date_____ Period_____

Solve each equation.

1) $-(n + 10) = 3(n + 6)$

$-n - 10 = 3n + 18$

$\quad +10 \qquad\qquad +10$

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$-n = 3n + 28$

$-3n \quad -3n$

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$\dfrac{-4n}{-4} = \dfrac{28}{-4}$ $\boxed{n = -7}$

2) $19 - 10a = 10(6a - 7) - 7(1 + 10a)$

$19 - 10a = 60a - 70 - 7 - 70a$

$19 - 10a = -10a - 77$

$19 \neq -77$

$\boxed{\text{No Solution}}$

3) $7(-3x + 8) = -7 - 3(10x - 9)$

$-21x + 56 = -7 - 30x + 27$

$-21x + 56 = -30x + 20$

$+30x \qquad\quad +30x$

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$9x + 56 = 20$

$\quad -56 \;\; -56$ $\boxed{x = -4}$
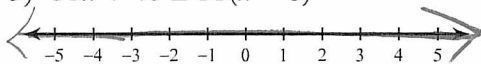
$\dfrac{9x}{9} = \dfrac{-36}{9}$

4) $2x + 4 - 5x = -3x + 4$

$-3x + 4 = -3x + 4$

$\boxed{\mathbb{R}}$

Solve each inequality and graph its solution.

5) $11x + 40 \geq 11(x - 6)$

$11x + 40 \geq 11x - 66$

$\quad +66 \qquad\quad +66$

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$11x + 106 \geq 11x$

$-11x \qquad\quad -11x$

_____

$106 \geq 0$

$\boxed{\begin{array}{c}\mathbb{R}\\(-\infty, \infty)\end{array}}$

6) $5(12 - 2a) - 12(a - 9) \leq -9a + 11a$

$60 - 10a - 12a + 108 \leq -9a + 11a$

$-22a + 168 \leq 2a$

$+22a \qquad\quad +22a$

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$\dfrac{168}{24} \leq \dfrac{24a}{24}$

$\boxed{\begin{array}{c}7 \leq a\\ \text{or}\\ a \geq 7\\ [7, \infty)\end{array}}$

7) $6(3r - 2) \leq 6 + 4(5r - 10)$

$18r - 12 \leq 6 + 20r - 40$

$18r - 12 \leq 20r - 34$

$\quad +34 \qquad\quad +34$

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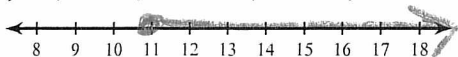
$18r + 22 \leq 20r$

$-18r \qquad\quad -18r$

_____

$\dfrac{22}{2} \leq \dfrac{2r}{2}$

$\boxed{\begin{array}{c}11 \leq r\\ \text{or}\\ r \geq 11 \quad [11, \infty)\end{array}}$
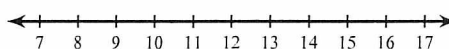
8) $-(1 + 3n) \geq -3n + 5$

$-1 - 3n \geq -3n + 5$

$-1 \geq 5$ $\boxed{\varnothing}$

Solve each proportion.

9) $-\dfrac{2}{5} = \dfrac{8}{x}$

$-\dfrac{2}{5} = \dfrac{8}{x}$

$\dfrac{-2x}{-2} = \dfrac{40}{-2}$

$\boxed{x = -20}$

10) $\dfrac{n-7}{n-10} = \dfrac{6}{8}$

$8(n-7) = 6(n-10)$

$8n - 56 = 6n - 60$

$-6n \qquad\qquad -6n$

$8n - 56 = -60$

$+56 \qquad +56$

$\dfrac{2n}{2} = \dfrac{-4}{2}$

$\boxed{n = -2}$

Write the equation and solve.

11) Shanti has just joined a DVD rental club. She pays a monthly membership fee of $4.95 and each DVD rental is $1.95. If Shanti's budget for DVD rentals in a month is $42, how many DVDs can Shanti rent in her first month if she doesn't want to go over her budget?

$4.95 + 1.95x = 42 \qquad x = \#$ of DVD's

$-4.95 \qquad\qquad -4.95$

$\dfrac{1.95x}{1.95} = \dfrac{37.05}{1.95}$

$x = 19$

$\boxed{19 \text{ DVD's}}$

12) The tree in front of Luke's house casts a 6-foot shadow at the same time as the house casts a 22-foot shadow. If the tree is 9 feet tall, how tall is the house?

$x = $ height of tree

$\dfrac{9}{6} = \dfrac{x}{22}$

$\dfrac{198}{6} = \dfrac{6x}{6}$

$\boxed{x = 33 \text{ft}}$

In #13 & 14, tell whether the given function is linear. If not...why?
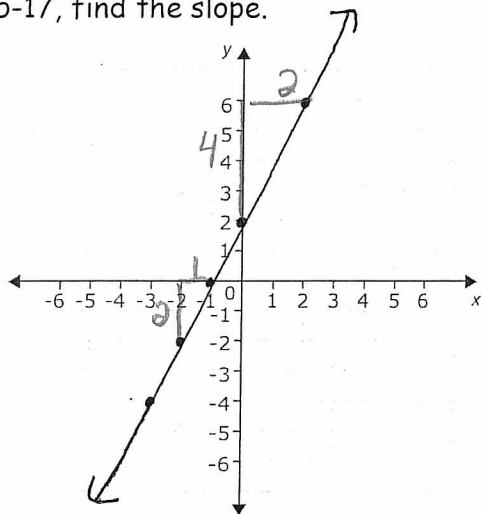
13. $f(x) = 2x^3 - 6$

No - cubic

14. $f(x) = \frac{2}{3}x + 7$

Yes

In #15-17, find the slope.

15.

m = ____2____

16. line passing through (-5, -4) and (0, 16)

$$\frac{16+4}{0+5} = \frac{20}{5} = 4$$

m = ____4____

17. line passing through (2, 4) and (6, 8)

$$\frac{8-4}{6-2} = \frac{4}{4} = 1$$

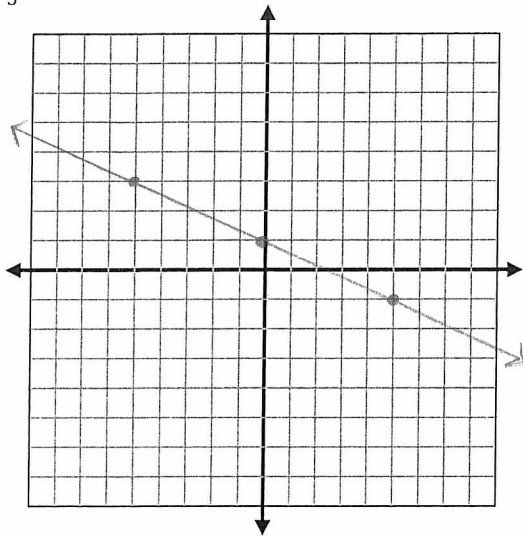m = ____1____

In #18 & 19, graph the following functions using <u>slope and the y-intercept</u>.
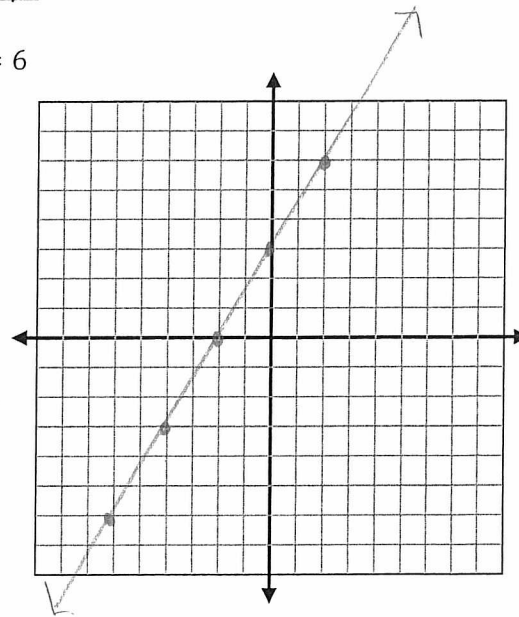
18. $f(x) = -\frac{2}{5}x + 1$

m = _____ $-2/5$

b = _____ 1

19. $-3x + 2y = 6$

m = _____ $3/2$

b = _____ 3

$-3x + 2y = 6$
$+3x \qquad +3x$
_____
$2y = 3x + 6$
$\frac{2y}{2} = \frac{3x}{2} + \frac{6}{2}$
$y = \frac{3}{2}x + 3$
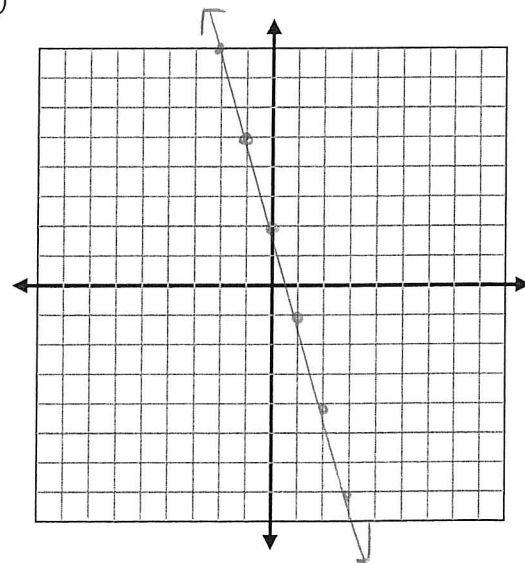
In #20 & 21, graph using <u>the slope and a point</u>.

20. m = -2, passes through (1, 5)
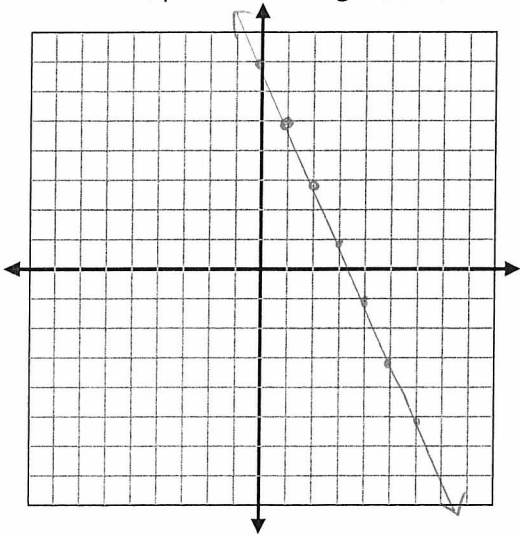
21. $y - 5 = -3(x + 1)$

m = _____ -3

point = _____ $(-1, 5)$

Graph using a table.

22. $-2x - 3y = 9$

x	y
-6	1
-3	-1
0	-3
3	-5
6	-7

$-2x - 3y = 9$
$+2x \qquad +2x$
_____
$\dfrac{-3y}{-3} = \dfrac{2x}{-3} + \dfrac{9}{-3}$
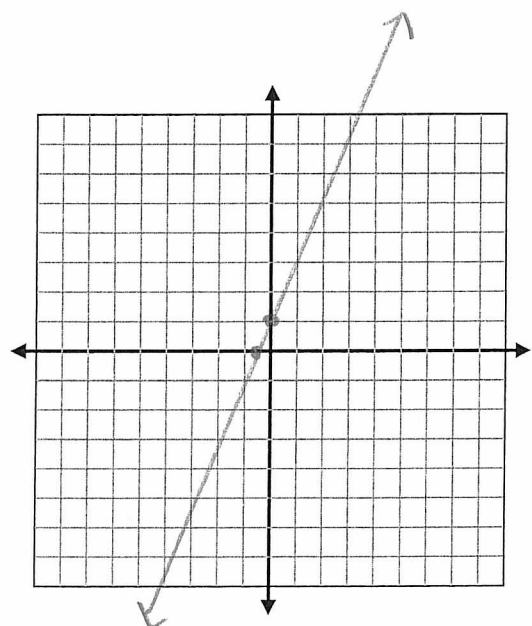
$y = -\dfrac{2}{3}x - \dfrac{9}{3}$
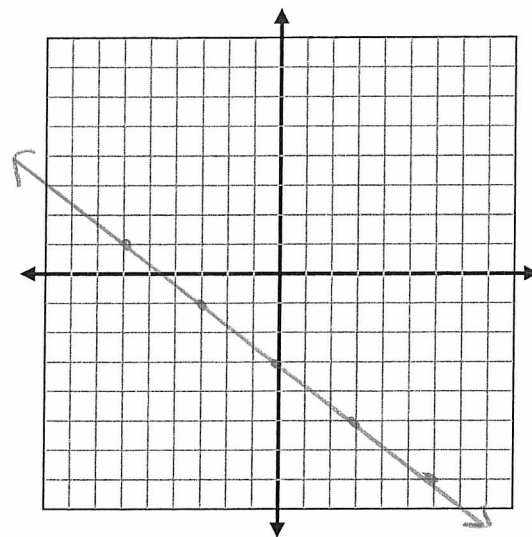
In #23 & 24, graph using the x and y-intercepts.

23. $f(x) = 2x + 1$

x – intercept: $\left(-\dfrac{1}{2}, 0\right)$

y – intercept: $(0, 1)$

X-int (y=0)
$0 = 2x + 1$
$\underline{-1 \qquad -1}$
$\dfrac{-1}{2} = \dfrac{2x}{2} \qquad x = -\dfrac{1}{2}$

y-int (x=0)
$y = 2(0) + 1$
$y = 1$

24. $2x - 2y = 8$

x – intercept: $(4, 0)$

y – intercept: $(0, -4)$

X-int (y=0)
$2x - 2(0) = 8$
$\dfrac{2x}{2} = \dfrac{8}{2}$
$x = 4$

y-int (x=0)
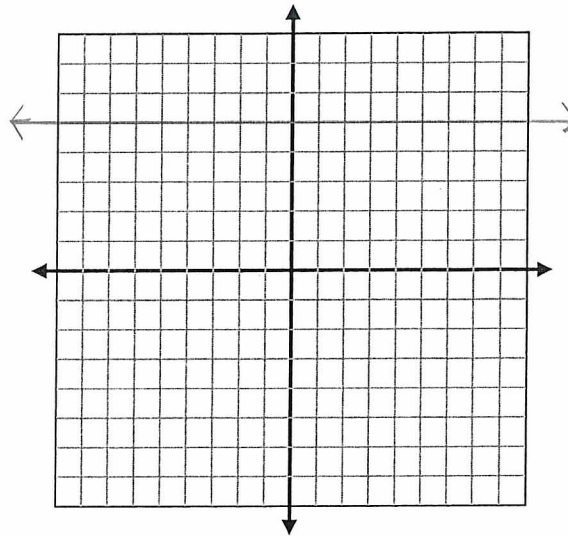$2(0) - 2y = 8$
$-2y = 8$
$y = -4$
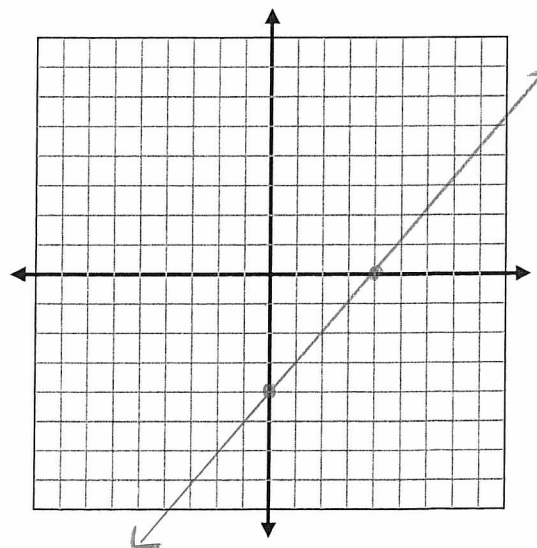
In #25 & 26, graph each line.

25. $x = -2$
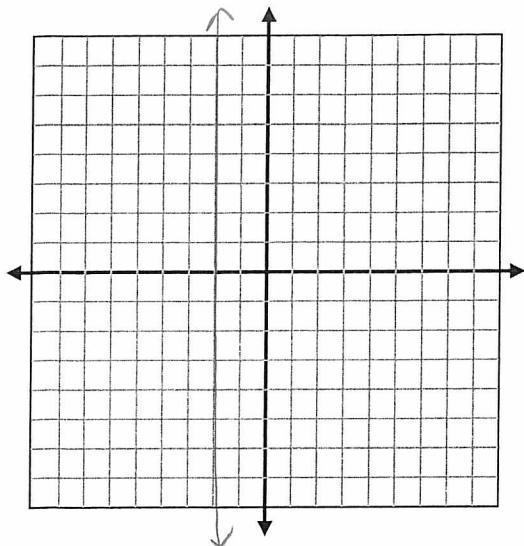
26. $y = 5$

In #27 & 28, graph each linear inequality.
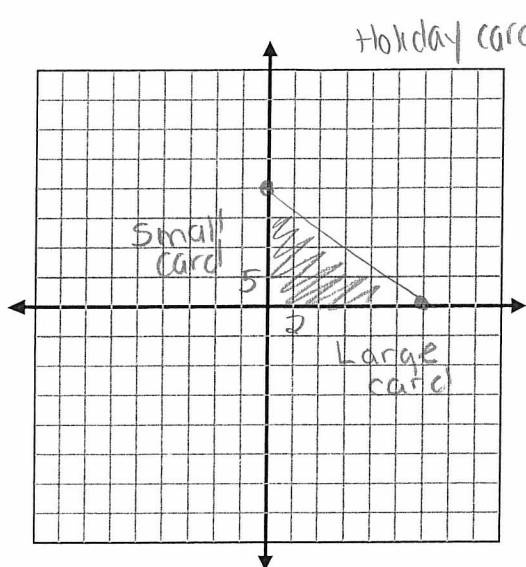
27. $y < -2x + 2$
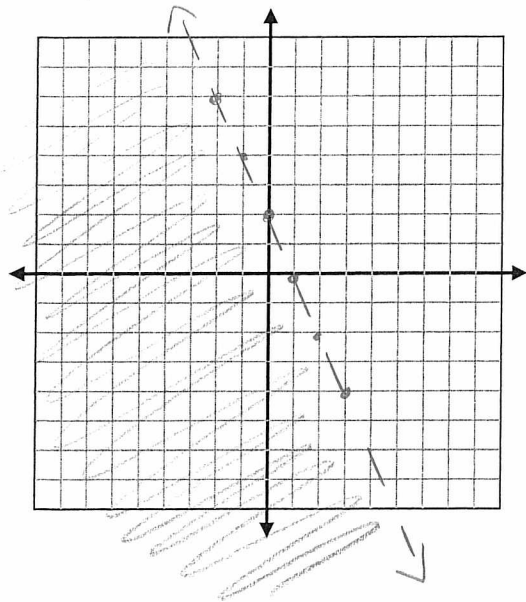
28. $3x - 4y > 5x + 12$
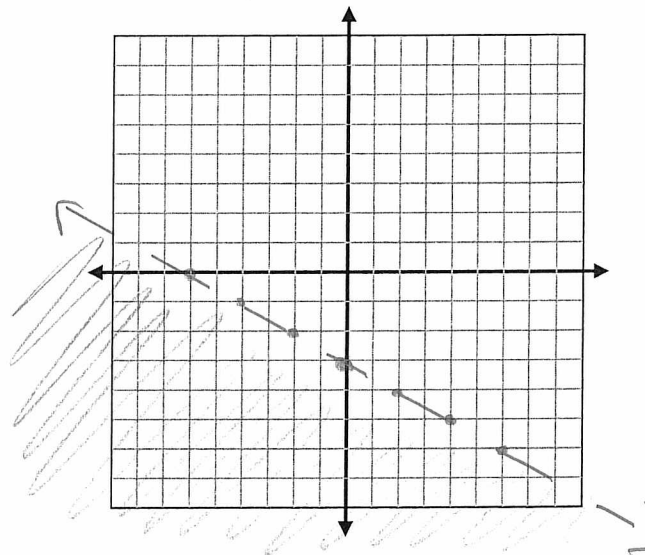
$$3x - 4y > 5x + 12$$
$$-3x \qquad\qquad -3x$$
$$\overline{}$$
$$\frac{-4y}{-4} > \frac{2x}{-4} + \frac{12}{-4}$$
$$y < -\tfrac{1}{2}x - 3$$

29. Dorothy has $30 to spend on holiday cards. Large cards cost $2.50 each and small cards cost $1.50 each.

a.) Write and graph an inequality for the number of cards Dorothy can purchase.

Holiday cards

Small card

Large card

$x = $ large card
$y = $ small card

$$2.50x + 1.50y \le 30$$

X-int
$$2.50x + 1.5(0) = 30$$
$$2.5x = 30$$
$$x = 12$$
$$(12, 0)$$

Y-int
$$2.5(0) + 1.5y = 30$$
$$1.5y = 30$$
$$y = 20$$
$$(0, 20)$$

b.) If Dorothy buys 5 large cards and 8 small cards will she be over budget? no

$$2.5(5) + 1.5(8) \le 30$$
$$24.5 \le 30 \checkmark$$

In #30-45:
Find the equation for each and write it in <u>slope-intercept form</u> AND <u>point-slope form</u>.

30. $m = -5$ and $b = 6$ $m = -5$ $(0, 6)$ $y - 6 = -5(x - 0)$

$$\boxed{y = -5x + 6}$$
$$\boxed{y - 6 = -5(x - 0)}$$

31. Slope is $-\frac{1}{2}$ and y – intercept is 5 $m = -1/2$, $b = 5$ $(0, 5)$

$$\boxed{y = -1/2x + 5}$$
$$\boxed{y - 5 = -1/2(x - 0)}$$

32. Line passes through $(2, 6)$ and has a slope of -2
$m = -2$ $(2, 6)$
$\quad\quad x\ y$
$6 = -2(2) + b$
$6 = -4 + b$
$+4\ \ +4$
$\quad\quad b = 10$

$\begin{cases} m = -2 \quad (2, 6) \\ \quad\quad\quad x_1\ y_1 \\ y - 6 = -2(x - 2) \end{cases}$

$$\boxed{y = -2x + 10}$$
$$\boxed{y - 6 = -2(x - 2)}$$

33. Line passes through $(0, 5)$ and has a slope of $\frac{2}{3}$

$\begin{cases} (0, 5) \quad m = 2/3 \\ y - 5 = 2/3(x - 0) \end{cases}$

y-int
b = 5

$$\boxed{y = 2/3x + 5}$$
$$\boxed{y - 5 = 2/3(x - 0)}$$

34. Line passes through $(3, 12)$ and $(6, 27)$
$(3, 12)(6, 27)$
$$\frac{27 - 12}{6 - 3} = \frac{15}{3} \quad m = 5$$

$(3, 12)$ $m = 5$
$12 = 5(3) + b$
$12 = 15 + b$
$-15\ -15$
$\quad\quad b = -3$

$\begin{cases} m = 5 \quad (3, 12) \\ y - 12 = 5(x - 3) \end{cases}$

$$\boxed{y = 5x - 3}$$
$$\boxed{y - 12 = 5(x - 3)}$$
or
$$y - 27 = 5(x - 6)$$

35. Line passes through points $f(-2) = 6$ and $f(4) = 12$

$(-2,6)(4,12)$ $\dfrac{12-6}{4+2} = \dfrac{6}{6}$ $m=1$ $(4,12)\ m=1$
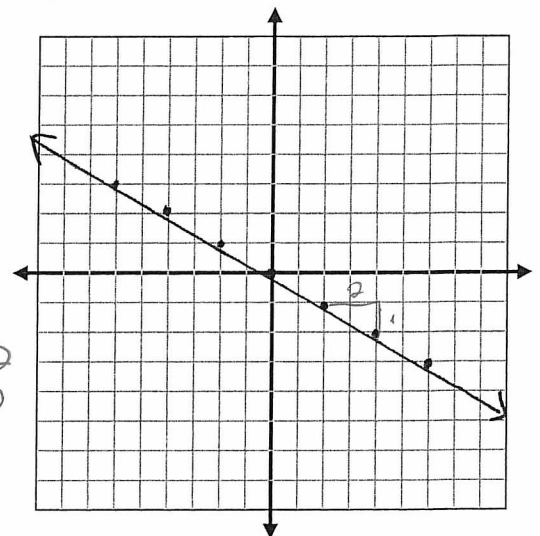$12 = 1(4) + b$
$12 = 4 + b$
$\underline{-4\quad -4}$
$8 = b$

$\boxed{y = x + 8}$
$y - 12 = 1(x-4)$ or
$m=1 \ (4,12)$ $y - 6 = 1(x+2)$
$y - 12 = 1(x-4)$

36.

Slope = zero
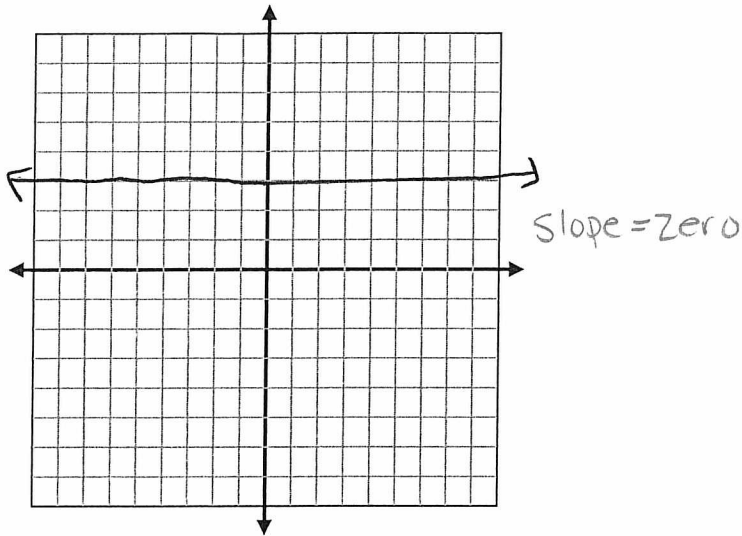
$y = 3$

37.

$m = \frac{1}{2}$
$b = 0$

$y = -\frac{1}{2}x$

38. Parallel to $y = \frac{3}{2}x - 6$ and through $(-6, 2)$

$m = 3/2 \ (-6, 2)$ $2 = 3/2(-6) + b$
$2 = -9 + b$
$\underline{+9\quad +9}$
$b = 11$

$\boxed{y = 3/2 x + 11}$
$y - 2 = 3/2(x+6)$

39. Passes through $(4, 7)$ and is parallel to the line $2x + 2y = 6$

$2x + 2y = 6$
$\dfrac{2y}{2} = \dfrac{-2x}{2} + \dfrac{6}{2}$
$y = -x + 3$

$m = -1 \ (4,7)$ $7 = -1(4) + b$
$7 = -4 + b$
$\underline{+4\quad +4}$
$11 = b$

$\boxed{y = -x + 11}$
$y - 7 = -1(x-4)$

40. Passes through $(5,3)$ and is perpendicular to $5x + 2y = 8$

$5x + 2y = 8$
$\dfrac{2y}{2} = \dfrac{-5x}{2} + \dfrac{8}{2}$
$y = -5/2 x + 4$

$m = 2/5 \ (5,3)$
$3 = 2/5(5) + b$
$3 = 2 + b$
$b = 1$

$\boxed{y = 2/5 x + 1}$
$y - 3 = 2/5(x-5)$

41. Perpendicular to $y = -2x + 6$ and through $(4, 9)$

$m = \frac{1}{2} \ (4,9)$ $9 = \frac{1}{2}(4) + b$
$9 = 2 + b$
$\underline{-2\quad -2}$
$7 = b$

$\boxed{y = 1/2 x + 7}$
$y - 9 = 1/2(x-4)$

42. Line passes through $(-5, 2)$ and $(-5, 3)$ $x = -5$

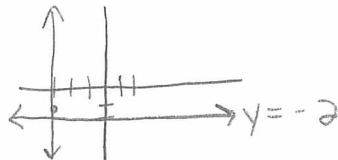$$\frac{3-2}{-5+5} = \frac{1}{0} \quad m = \text{undefined}$$

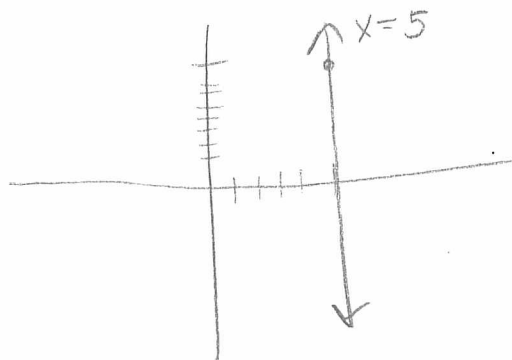43. Line with a slope of 0, passing through $(4, 6)$ $y = 6$

$$m = 0 \quad (4, 6)$$

44. Line passes through $(-3, -1)$ and perpendicular to $y = -2$ $x = -3$

45. Line passes through $(5, 8)$ and parallel to $x = 5$ $x = 5$