Midterm Review Name Key Per____

Algebra 1

Chapter 0

Write the following in increasing orders. ← least to greatest

1. 4, $\frac{1}{2}$, 6, -2, $\frac{2}{3}$, -1, 1 $-2, -1, -\frac{1}{2}, \frac{2}{3}, 1, 4, 6$

2. -3.1, $-3\frac{1}{2}$, -3.45, -3, -4 $-4, -3\frac{1}{2}, -3.45, -3.1, -3$

-3.5

SOLVE.

3. -35 + 41 + (-18) = -12

$6 - 18$

4. -2 – 7 + (+8) = -1

$-9 + 8$

5. -7(-6)(-2) = -84

$42(-2)$

6. $\frac{1}{2} + \frac{4}{5}$ = $1\frac{3}{10}$

$\frac{5}{10} + \frac{8}{10} = \frac{13}{10}$

7. $3\frac{2}{3} - 2\frac{1}{2}$ = $1\frac{1}{6}$

$\frac{11}{3} - \frac{5}{2}$

$\frac{22}{6} - \frac{15}{6} = \frac{7}{6}$

8. $\frac{5}{\cancel{6}_3} \cdot \frac{\cancel{8}^4}{9}$ = $\frac{20}{27}$

$\frac{40}{54}$

9. $\frac{1}{2} \div \frac{3}{5}$ = $\frac{5}{6}$

$\frac{1}{2} \cdot \frac{5}{3}$

9. $-\frac{1}{3} \div (-1\frac{1}{5})$ = $\frac{5}{18}$

$-\frac{1}{3} \div -\frac{6}{5}$

$-\frac{1}{3} \cdot (-\frac{5}{6})$

10. 0.75(-6.4) -4.8

Chapter 1

Evaluate when y=3 and x=5

11. $5y + x^2 =$ 40

$5(3)+5^2$

$15+25$

12. $2y + 9x - 7 =$ 44

$2(3)+9(5)-7$

$6+45-7$

13. $\frac{5y + x}{4} =$ 5

$\frac{5(3)+5}{4} = \frac{20}{4}$

Evaluate when a= - 2 and b=4

14. $(b - a)^3 =$ 216

$(4-(-2))^3$

6^3

15. $b^2 - a^2 =$ 12

$4^2-(-2)^2$

$16-4$

16. $(a + b)^2 =$ 4

$(-2+4)^2$

2^2

Solve **Hint- Order of Operations**

17. $5 + 8 \bullet 2 - 4 =$ 17

$5+16-4$

18. $10 - 3 + (2 + 5) =$ 14

$10-3+7$

19. $[(7 \bullet 4) + 3] + 15 =$ 46

$(28+3)+15$

$31+15$

20. $\frac{3^3+8-7}{2 \bullet 7} =$ 2

$\frac{28}{14}$

21. $\frac{4 \bullet 2^5}{16-4^2+1} =$ 128

$\frac{128}{1}$

22. $\frac{13-4}{18-4^2+1} =$ 3

$\frac{9}{3}$

23. $6 + 2^3 - (7 - 5) =$ 12

$6+8-2$

24. $(14 - 7)^2 + 5 =$ 54

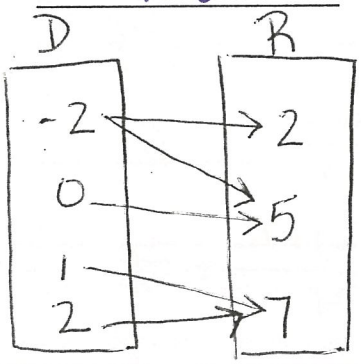
7^2+5

25. $\frac{3^3+7}{4 \bullet 2} =$ $4\frac{1}{4}$

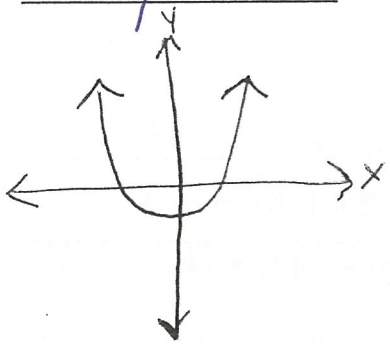
$\frac{27+7}{8} = \frac{34}{8}$

Is the following a function? Yes or no? every input has exactly 1 output.

26. No



27. yes



28. yes

X	Y
-2	3
-1	3
0	7
1	10
2	9

Evaluate each function when f(x)= 6x + 7 and g(x) = x^2 – 4 a=2 and b= -3

29. f(-3)= -11

$6(-3)+7$

$-18+7$

30. g(a) + 9= 9

$g(2) = 2^2-4$

$0+9$

31. f(2) + g(2)= 19

$f(2) = 6(2)+7$ $g(2) = 2^2-4$

$f(2) = 19$ $g(2) = 0$

$f(2)+g(2) = 19+0$

32. g(-b)= 5

$g(3) = 3^2-4$

$g(3) = 9-4$

Name the domain and range of the following functions.

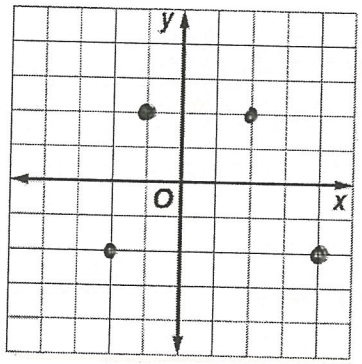
33. (-2,3) (5,4) (4,4) (7,-2) (3,6)

D: {-2, 3, 4, 5, 7}

R: {-2, 3, 4, 6}

repeats once!

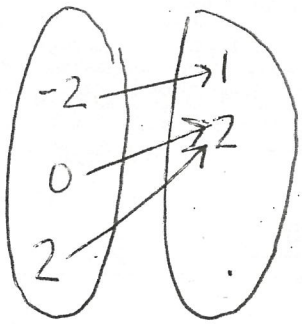
34.



D: {-2, -1, 2, 4}

R: {-2, 2}

35.



D: {-2, 0, 2}

R: {1, 2}

Simplify the following.

36. $2(x+3)$ $2x+6$

37. $3(2x+x-2)$ $9x-6$

$6x+3x-6$

38. $2x^2 - x + 2 + 5x^2$ $7x^2-x+2$

Chapter 2

Solve

39. $x - 15 = -4$ $x = 11$

$+15 \quad +15$

40. $11 = x - 4$ $x = 15$

$+4 \quad +4$

41. $x + 2 = 31$ $x = 29$

$-2 \quad -2$

42. $-4x = 24$ $x = -6$

$\frac{-4x}{-4} = \frac{24}{-4}$

43. $10x = 110$ $x = 11$

$\frac{10x}{10} = \frac{110}{10}$

$x = 11$

44. $\frac{x}{5} \cdot 5 = 6 \cdot 5$ $x = 30$

45. $3x + 5 = 11$ $x = 2$

$-5 \quad -5$

$3x = 6$

$\frac{3x}{3} = \frac{6}{3}$

46. $22x - 12x = 60$ $x = 6$

$10x = 60$

$\frac{10x}{10} = \frac{60}{10}$

47. $x - 2(3x - 2) = -6$ $x = 2$

$x - 6x + 4 = -6$

$-5x + 4 = -6$

$-4 \quad -4$

$-5x = -10$

$\frac{-5x}{-5} = \frac{-10}{-5}$

48. $11x - 21 = 17 - 8x$ $x = 2$

$+8x \quad +8x$

$19x - 21 = 17$

$+21 \quad +21$

$19x = 38$

$\frac{19x}{19} = \frac{38}{19}$

49. $3(x + 6) = 5(x - 4)$ $x = 19$

$3x + 18 = 5x - 20$

$-3x \quad -3x$

$18 = 2x - 20$

$+20 \quad +20$

$38 = 2x$

$\frac{38}{2} = \frac{2x}{2}$

50. $2(x + 4) = 2(x - 4) + 4x$ $x = 4$

$2x + 8 = 2x - 8 + 4x$

$2x + 8 = 6x - 8$

$-2x \quad -2x$

$8 = 4x - 8$

$+8 \quad +8$

$16 = 4x$

$\frac{16}{4} = \frac{4x}{4}$

51. $3(2x + 5) - 43 + 4x = 11x + 34 + x$ $x = -31$

$6x + 15 - 43 + 4x = 12x + 34$

$10x - 28 = 12x + 34$

$-10x \quad -10x$

$-28 = 2x + 34$

$-34 \quad -34$

$-62 = 2x$

$-31 = x$

52. $4(x + 1) - 15 = 6(x + 2) - 2x - 23$ infinite solutions

$4x + 4 - 15 = 6x + 12 - 2x - 23$

$4x - 11 = 4x - 11$

Evaluate when m=-8, n= 4, and p= -12

53. $|3m - n| =$ 28

$|3(-8) - 4|$

$|-28|$

54. $|-2p + m| - 3n =$ 4

$|-2(-12) + (-8)| - 3(4)$

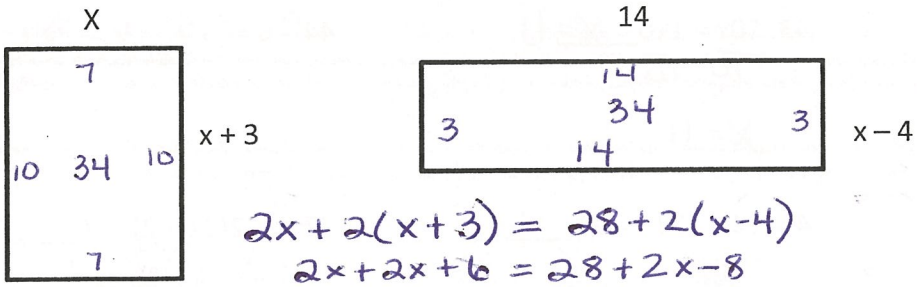
$16 - 12$

55. $-3|6n - 2p| =$ -144

$-3|6 \cdot 4 - 2(-12)|$

$-3(48)$

56. Find the value so that the two figures have the same perimeter.



$2x + 2(x+3) = 28 + 2(x-4)$

$2x + 2x + 6 = 28 + 2x - 8$

$4x + 6 = 2x + 20$

$-2x \quad -2x$

$2x + 6 = 20$

$-6 \quad -6$

$\frac{2x}{2} = \frac{14}{2}$

$x = 7$

57. State whether the percent of change is an increase or a decrease. Then find the percent of change. Round to the nearest whole percent. Original: 54 New: 45

$\frac{\text{new} - \text{original}}{\text{original}} = \frac{\%}{100}$

$\frac{-9}{54} = \frac{x}{100}$

$\frac{-900}{54} = \frac{54x}{54}$

$-16.\overline{6} = x$

About a 17% decrease.

58. Kirk wants to purchase a wide-screen TV. He sees an advertisement for a TV that was originally priced $3200 and is 20% off. Find the discounted price.

$0.2(3200) = 640$

$3200 - 640 =$

\$2560

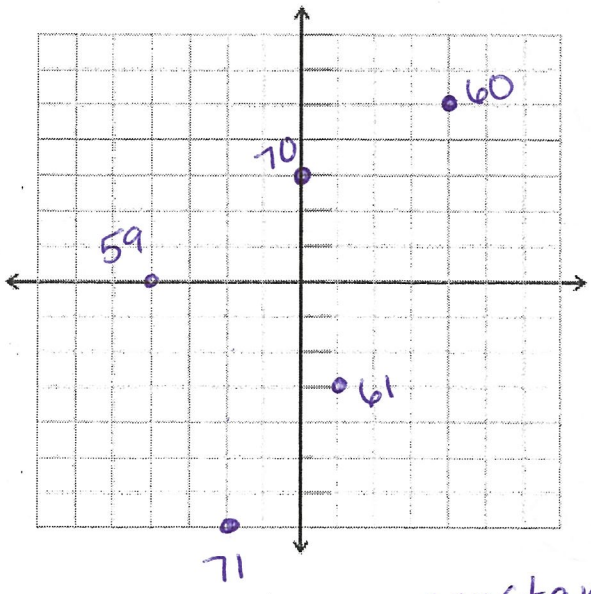
or

$0.8(3200) =$

\$2560

Chapter 3

Write the ordered pairs for each coordinate.



59. (-4, 0)
60. (4, 5)
61. (1, -3)
70. (0, 3)
71. (-2, -7)

constant rate of change → change in y / change in x

Determine if the following are linear or not. Explain.

72. a.

Cooling Water	
Time (min)	Temperature (°F)
5	95
10	90
15	86
20	82

+5, +5, +5; -5, -4, -4; $\frac{-5}{5}=-1$, $\frac{-4}{5}$, $\frac{-4}{5}$

Not linear, the rate of change is not constant.

73.

Paint Needed for Chairs	
Chairs, x	Cans of Paint, y
5	6
10	12
15	18

+5, +5; +6, +6; $\frac{6}{5}=1.2$, $\frac{6}{5}=1.2$

Linear, the rate of change is constant. It is 1.2 cans of paint per chair.

74.

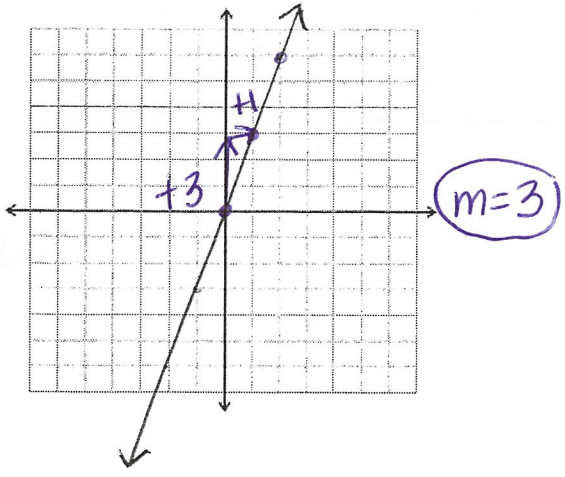
x	15	20	25	30
y	3	4	5	6

+5, +5, +5; +1, +1, +1; $\frac{1}{5}$, $\frac{1}{5}$, $\frac{1}{5}$

Linear, constant rate of change.

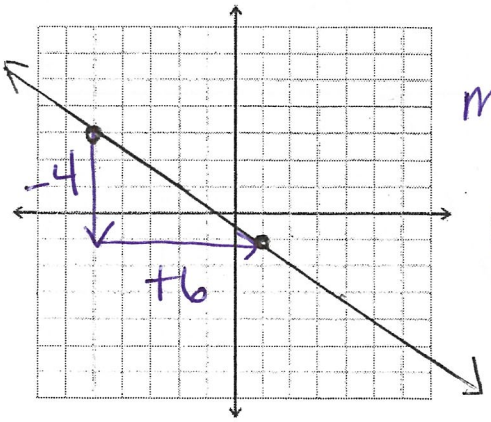
Find the slope of the following.

75.



m = 3

76.



$m=\frac{-4}{6}$

$-\frac{2}{3}$

Find the slope continued.

77. Find the slope of a line that passes through (2, -2) and (4, -6).

x_1, y_1 x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-6 + (2)}{4 - 2} = \frac{-4}{2} = -2$$

78. Find the slope of a line that passes through (5, 8) and (-3, 7).

$$m = \frac{7 - 8}{-3 - 5} = \frac{-1}{-8} = \frac{1}{8}$$

79. Find the slope of a line that passes through (6, -8) and (6, 4).

$$m = \frac{4 + 8}{6 - 6} = \frac{12}{0} = \text{undefined}$$

80. Find the slope of a line that passes through (9, -3) and (-4, -3).

$$m = \frac{-3 + 3}{-4 - 9} = \frac{0}{-13} = 0$$

Graph the following using intercepts.

81. $y = 4 + 2x$

x-int $y = 0$

$0 = 4 + 2x$

$-4 \quad -4$

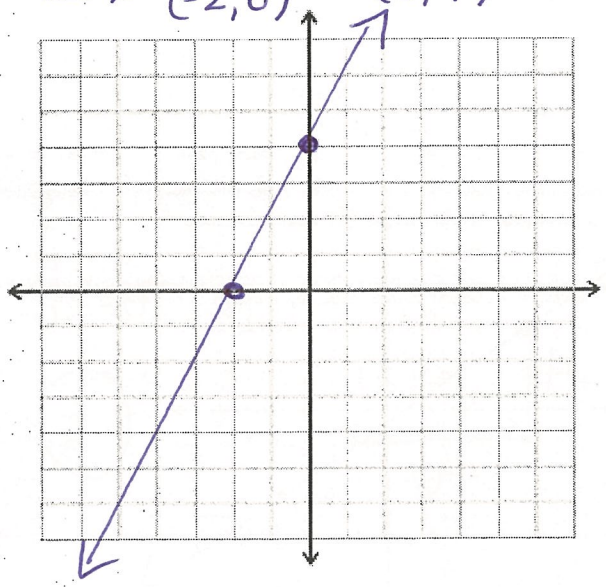
$\frac{-4}{2} = \frac{2x}{2}$

$-2 = x$ $(-2, 0)$

y-int $x = 0$

$y = 4 + 2(0)$

$y = 4$ $(0, 4)$



82. $x + y = 4$

x-int

$x = 0$

$x + 0 = 4$

$x = 4$

$(4, 0)$

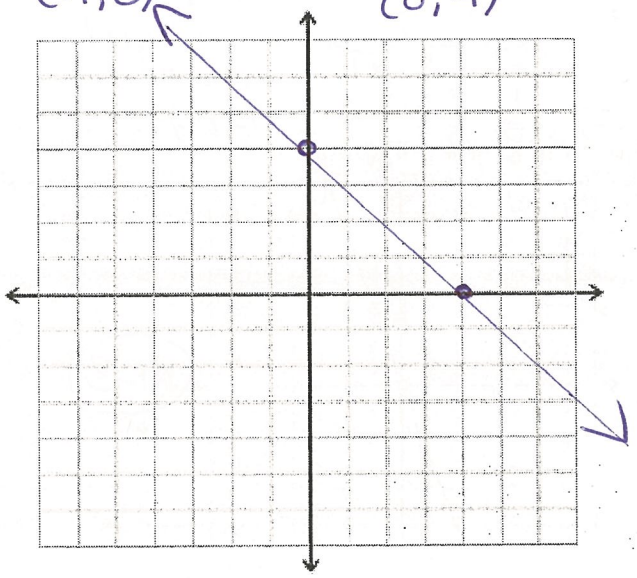
y-int

$x = 0$

$0 + y = 4$

$y = 4$

$(0, 4)$



Chapter 4

Write an equation in slope-intercept form for the following.

83. A line with a slope of 2 and a y-intercept of (0, -1)

$y = 2x - 1$

84. A line that is **parallel** to the line $y = 5x - 2$ and passes through (-2, 3)

$m = 5 \quad (-2, 3)$

$y - 3 = 5(x + 2)$

$y - 3 = 5x + 10$

$+3 \quad +3$

$y = 5x + 13$

or

$3 = 5(-2) + b$

$3 = -10 + b$

$+10 \quad +10$

$13 = b$

$y = 5x + 13$

85. A line that is **perpendicular** to the line $y = \frac{5}{7}x + 17$ and passes through (4, -6)

$m = \frac{-7}{5} \quad (4, -6)$

$5(y + 6) = \frac{-7}{5}(x - 4) \cdot 5$

$5y + 30 = -7x + 28$

$-30 \quad -30$

$\frac{5y}{5} = \frac{-7x}{5} - \frac{2}{5}$

$y = \frac{-7}{5}x - \frac{2}{5}$

or

$-6 = \frac{-7}{5} \cdot 4 + b$

$-6 = \frac{-28}{5} + b$

$\frac{28}{5} - \frac{+30}{5} = b$

$\frac{-2}{5} = b$

$y = \frac{-7}{5}x - \frac{2}{5}$

86. A line that is **perpendicular** to the line $y = 3x + \frac{3}{4}$ and passes through (-2, 1)

$m = -\frac{1}{3} \quad (-2, 1)$

$3(y - 1) = -\frac{1}{3}(x + 2) \cdot 3$

$3y - 3 = -x - 2$

$+3 \quad +3$

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

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

or

$1 = -\frac{1}{3}(-2) + b$

$1 = \frac{2}{3} + b$

$1 - \frac{2}{3} = b$

$\frac{1}{3} = b$

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

Write an equation in slope intercept form for the line that passes through the given point and has the given slope.

87. (4, -2) m=1/2

$y = mx + b$

$-2 = \frac{1}{2}(4) + b$

$-2 = 2 + b$

$-2 \quad -2$

$-4 = b$

$y = \frac{1}{2}x - 4$

88. (-5, -6) m=-3

$y = mx + b$

$-6 = -3(-5) + b$

$-6 = 15 + b$

$-15 \quad -15$

$-21 = b$

$y = -3x - 21$

Write an equation in slope-intercept form for the line that passes through the given points.

89. (-2, -8) and (-1, 0)

$m = \frac{0 + (-8)}{-1 + (+2)} = \frac{8}{1} = 8$

$y + 8 = 8(x + 2)$

$y + 8 = 8x + 16$

$-8 \quad -8$

$y = 8x + 8$

90. (-2, 5) and (2, 4)

$m = \frac{4 - 5}{2 + 2} = \frac{-1}{4}$

$y = mx + b$

$4 \cdot (y - 5) = -\frac{1}{4}(x + 2) \cdot 4$

$4y - 20 = -x - 2$

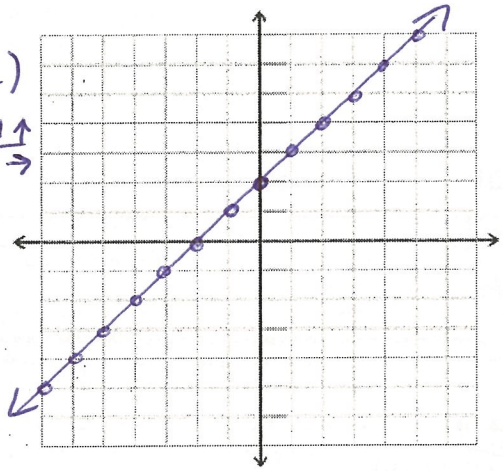
$+20 \quad +20$

$\frac{4y}{4} = \frac{-x}{4} + \frac{18}{4}$

$y = -\frac{1}{4}x + 4\frac{1}{2}$

Graph the following.

91. $y = x + 2$



(0, 2)

$m = \frac{1\uparrow}{1\rightarrow}$

92. $2x - 3y = 6$

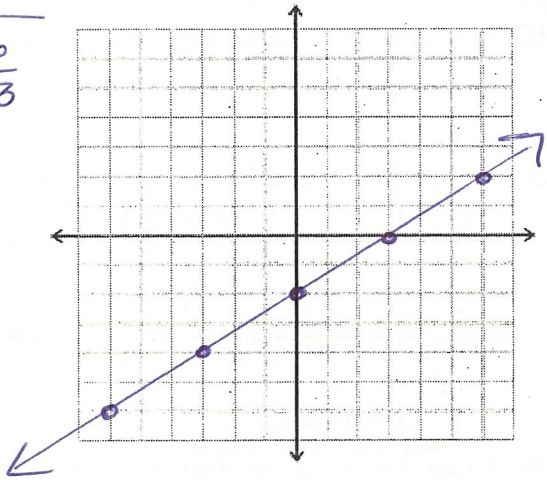
$-2x \quad -2x$

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

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

(0, −2)

$m = \frac{2\uparrow}{3\rightarrow}$



93. $4x + 5y = 20$

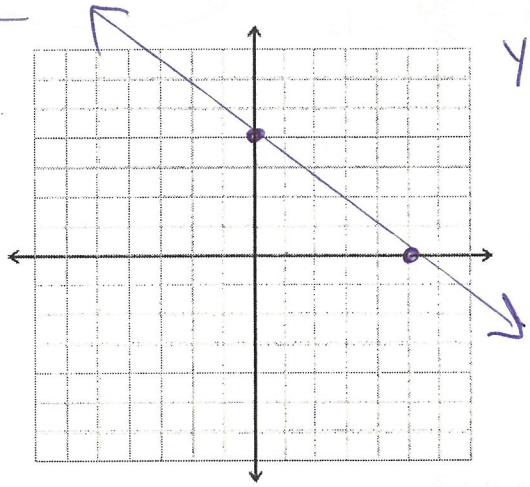
$-4x \quad -4x$

$\frac{5y}{5} = \frac{-4x}{5} + \frac{20}{5}$

$y = \frac{-4}{5}x + 4$

(0, 4)

$m = \frac{-4\downarrow}{5\rightarrow}$

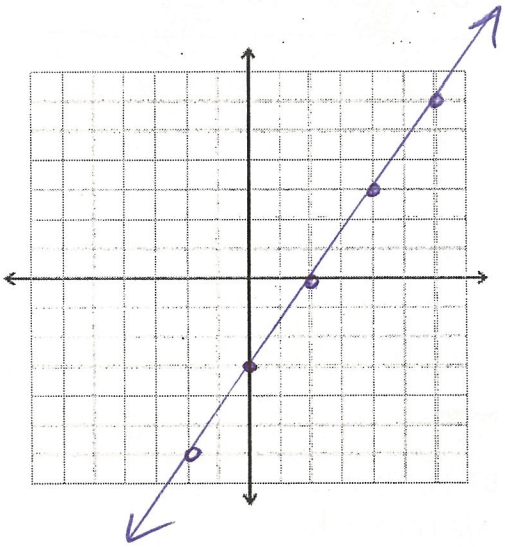


94. $\frac{2y}{2} = \frac{3x}{2} - \frac{6}{2}$

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

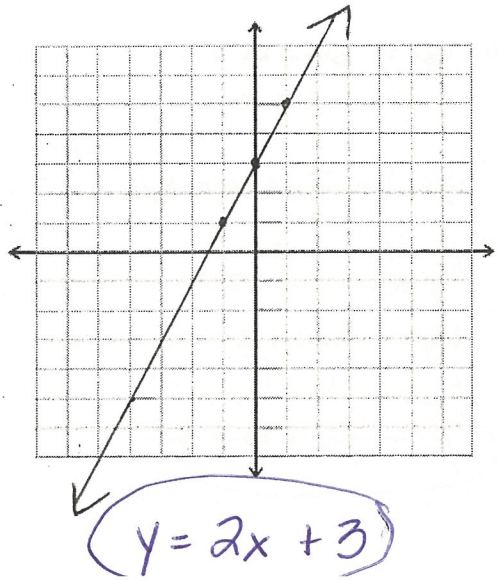
(0, −3)

$m = \frac{3\uparrow}{2\rightarrow}$



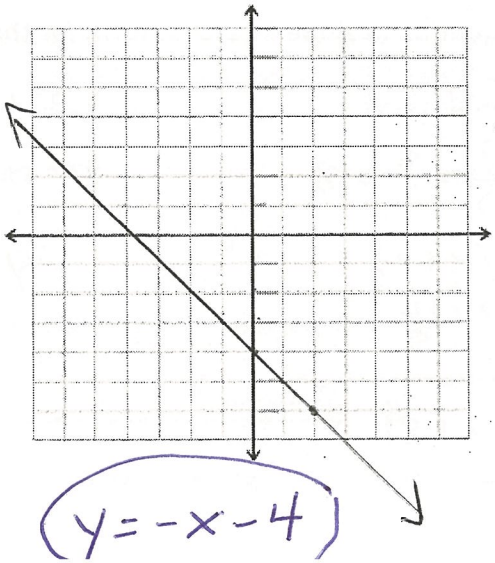
Write an equation in slope-intercept form for the following graphs.

95.



$y = 2x + 3$

96.



$y = -x - 4$

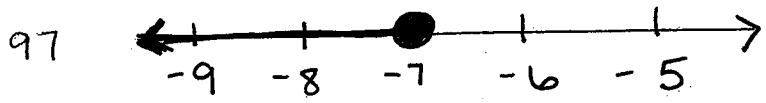
Chapter 5

Solve and graph each inequality.

97. $x + 8 \leq 1$

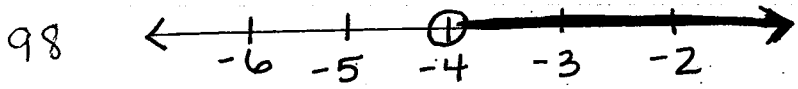
$-8 \quad -8$

$x \leq -7$



98. $\frac{-3x}{-3} < \frac{12}{-3}$ flip

$x > -4$



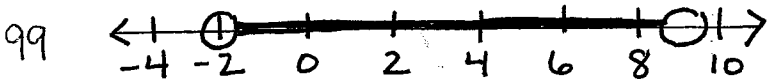
99. $-5 < x - 3 < 6$

$-5 < x - 3 \quad x - 3 < 6$

$+3 \quad +3 \quad +3 \quad +3$

$-2 < x \quad x < 9$

$-2 < x < 9$

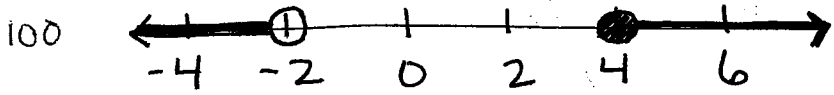


100. $x + 10 < 8$ or $3x - 7 \geq 5$

$-10 \quad -10 \quad +7 \quad +7$

$x < -2 \quad \frac{3x}{3} \geq \frac{12}{3}$

$x < -2$ or $x \geq 4$



HINT: less than AND greater than OR

101. $|10 + x| \leq 13$

$10 + x \leq 13 \quad -10 \quad -10$

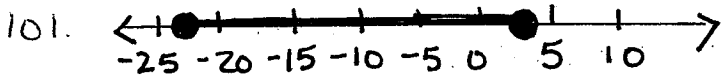
$x \leq 3$

$\frac{-(10+x)}{-1} \leq \frac{13}{-1}$

$10 + x \geq -13$

$-10 \quad -10$

$x \geq -23$



102. $|4x + 2| > 6$

$4x + 2 > 6$

$-2 \quad -2$

$\frac{4x}{4} > \frac{4}{4}$

$x > 1$

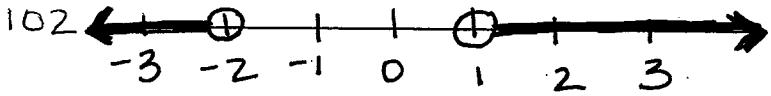
$\frac{-(4x+2)}{-1} > \frac{6}{-1}$

$4x + 2 < -6$

$-2 \quad -2$

$\frac{4x}{4} < \frac{-8}{4}$

$x < -2$



103. $|m + 19| \leq 1$

$m + 19 \leq 1$

$-19 \quad -19$

$m \leq -18$

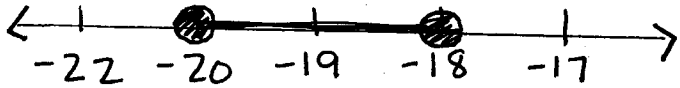
$\frac{-(m+19)}{-1} \leq \frac{1}{-1}$

$m + 19 \geq -1$

$-19 \quad -19$

$m \geq -20$

$-20 \leq m \leq -18$



Graph each inequality.

104. $y - 2x > 1$

$+2x \quad +2x$

$y > 2x + 1$

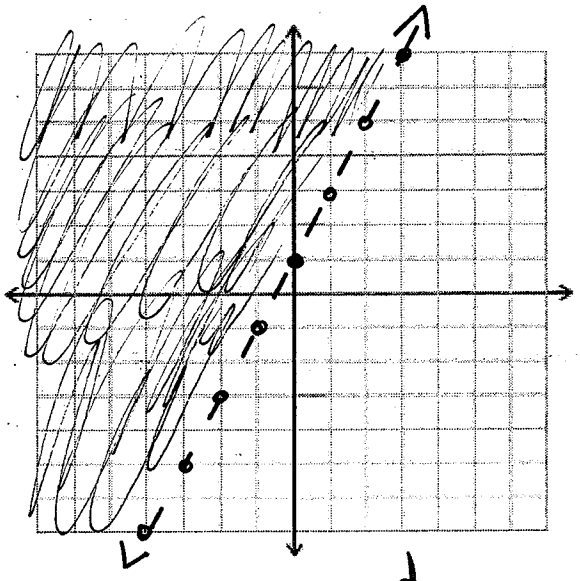
dashed

(0,1)

$m = \frac{2\uparrow}{1\rightarrow}$

(0,0)

$0 > 1$ false



105. $4x + y \geq 5$

$-4x \quad -4x$

$y \geq -4x + 5$

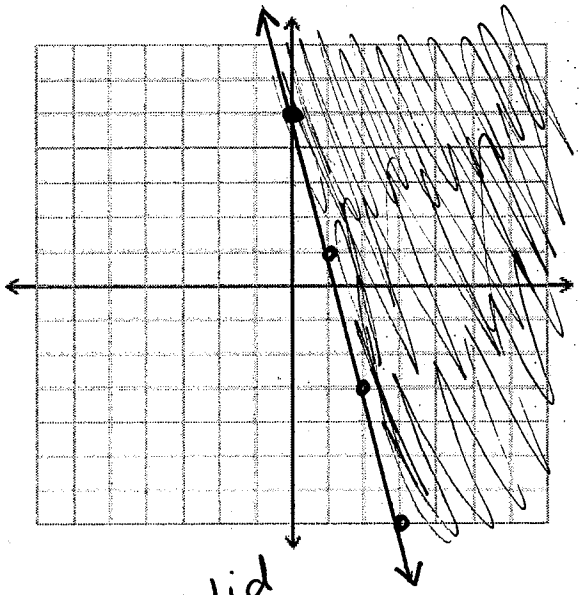
solid

(0,5)

$m = \frac{-4\downarrow}{1\rightarrow}$

(0,0)

$0 \geq 5$ false



106. $y < x - 3$

dashed

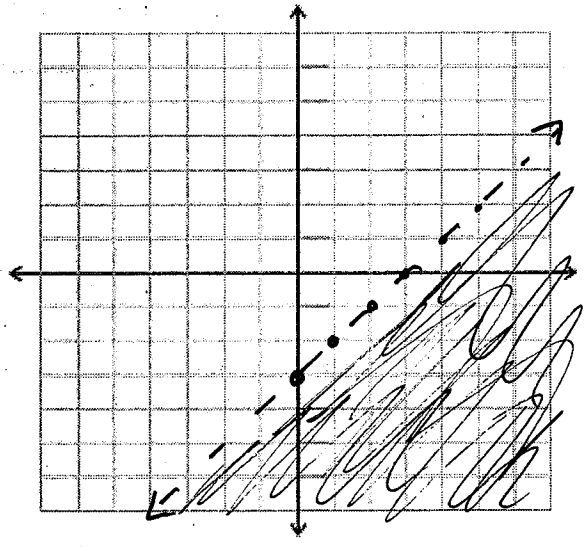
(0,-3)

$m = \frac{1\uparrow}{1\rightarrow}$

(0,0)

$0 < -3$

false



107. $10x + 2y \leq 12$

$-10x \quad -10x$

$\frac{2y}{2} \leq \frac{-10x + 12}{2}$

$y \leq -5x + 6$

(0,6)

$m = \frac{-5\downarrow}{1\rightarrow}$

solid

(0,0)

$0 \leq 12$

true