

Algebra I: Semester 1 Review Packet for Chapters 1 - 5 and 7.

1. Write an algebraic expression for the phrase 2 less than a number. $x - 2$
2. Write an algebraic expression for the phrase 8 times the sum of 12 and x. $8(12 + x)$

3. Evaluate $(xyz)^3$ for $x = -1, y = 2, z = 3$

$$\begin{aligned} &= (-1 \cdot 2 \cdot 3)^3 \\ &= -216 \end{aligned}$$

4. Evaluate $|2y - z|$ for $y = 5, z = -4$

$$\begin{aligned} &y = 5, z = -4 \\ &= |2 \cdot 5 - (-4)| \\ &= |10 - (-4)| \\ &= |10 + 4| \\ &= |14| \\ &= 14 \end{aligned}$$

5. Simplify $\frac{2}{3} - \frac{3}{4}$

$$\begin{aligned} &= \frac{\quad}{12} - \frac{\quad}{12} \\ &= \frac{8}{12} - \frac{9}{12} \\ &= -\frac{1}{12} \end{aligned}$$

6. Simplify $\frac{-5}{8} + \frac{4}{5}$

$$\begin{aligned} &= \frac{-25}{40} + \frac{32}{40} \\ &= \frac{7}{40} \end{aligned}$$

7. Write an equation to model the data shown in the table:

a	b
3	7
4	8
5	9
6	10
7	11

$$b = a + 4$$

8. Simplify $(-5)^3$

$$\begin{aligned} &= (-5)(-5)(-5) \\ &= -125 \end{aligned}$$

9. Simplify -5^3

$$\begin{aligned} &= -(5)(5)(5) \\ &= -125 \end{aligned}$$

10. Simplify -4^4

$$\begin{aligned} &= -(4)(4)(4)(4) \\ &= -256 \end{aligned}$$

11. Simplify $-(x + 3y)$

$$= -x - 3y$$

12. Simplify $-4(2x + 3)$

$$= -8x - 12$$

13. Simplify $5 - (x + 4)$

$$\begin{aligned} &= 5 - x - 4 \\ &= 1 - x \end{aligned}$$

14. Simplify $\frac{1}{4}(8x+16)$

$$= \frac{1}{4}\left(\frac{8x}{1}\right) + \frac{1}{4}\left(\frac{16}{1}\right)$$

$$= \left(\frac{8x}{4}\right) + \left(\frac{16}{4}\right)$$

$$= 2x + 4$$

15. Simplify $\frac{-2}{5}(10x-30)$

$$= \frac{-2}{5}(10x) + \frac{-2}{5}(-30)$$

$$= \frac{-2}{5}\left(\frac{10x}{1}\right) + \frac{-2}{5}\left(\frac{-30}{1}\right)$$

$$= \left(\frac{-20x}{5}\right) + \left(\frac{60}{5}\right)$$

$$= -4x + 12$$

16. Simplify $-2(3x-1)+2x-8$

$$= -2(3x) + (-2)(-1) + 2x - 8$$

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

$$= -4x - 6$$

Name the sets of numbers to which each belongs:

17. $\frac{1}{2}$

Rational
Real

18. 42

Natural
Whole
Integers
Rational
Real

19. -13

Integers
Rational
Real

20. Write from least to greatest: $\frac{1}{3}, \frac{-2}{3}, \frac{3}{8}, -1$

..... = $-1, \frac{-2}{3}, \frac{1}{3}, \frac{3}{8}$

Name the property shown by each equation:

21. $7+5=5+7$

Commutative Prop/Addition

22. $2 \cdot (3 \cdot 5) = (2 \cdot 3) \cdot 5$

Associative Prop/Multiplication

23. $7+0=7$

Identity Prop/Addition

Tell in which quadrant or on which axis each point would be found:

24. $(-3, 0)$

x-axis

25. $(-5, -3)$

III

26. $(3, -2)$

IV

Solve each equation:

27. $\frac{2}{3}x = 40$

$$\left(\frac{3}{2}\right)\frac{2}{3}x = \frac{40}{1}\left(\frac{3}{2}\right)$$

$$x = (20)(3)$$

$$x = 60$$

28. $x + \frac{2}{5} = \frac{-2}{3}$

$$x + \frac{2}{5} = \frac{-2}{3} = \frac{-10}{15}$$

$$-\frac{2}{5} = -\frac{2}{5} = \frac{-6}{15}$$

$$x = \frac{-16}{15}$$

29. $4b+5=-2b-13$

$$-5 = -5$$

$$4b = -2b - 18$$

$$+2b = +2b$$

$$6b = -18$$

$$\frac{6b}{6} = \frac{-18}{6}$$

$$x = -3$$

$$30. 4 = \frac{x-5}{3}$$

$$\frac{x-5}{3} = 4$$

$$\left(\frac{3}{1}\right) \frac{(x-5)}{(3)} = \frac{(4)}{(1)} \left(\frac{3}{1}\right)$$

$$x-5=12$$

$$+5=+5$$

$$x=17$$

$$31. 7 = \frac{p}{-2} - 5$$

$$7 = \frac{p}{-2} - 5$$

$$\frac{p}{-2} - 5 = 7$$

$$+5=+5$$

$$\frac{p}{-2} = 12$$

$$\left(\frac{-2}{1}\right) \frac{p}{-2} = \frac{12}{1} \left(\frac{-2}{1}\right)$$

$$p = -24$$

$$32. 3x+4=2(x+1)-4(x+2)$$

$$3x+4=2x+2-4x-8$$

$$3x+4=-2x-6$$

$$-4=-4$$

$$3x=-2x-10$$

$$+2x=+2x$$

$$5x=-10$$

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

$$x=-2$$

33. The sum of two consecutive integers is 35. Write and solve an equation to find the values of the integers.

$$1st + 2nd = 35$$

$$2x = 34$$

$$x + x + 1 = 35$$

$$\frac{2x}{2} = \frac{34}{2}$$

$$1st = x$$

$$2x + 1 = 35$$

$$\{17, 18\}$$

$$2nd = x + 1$$

$$-1 = -1$$

$$x = 17$$

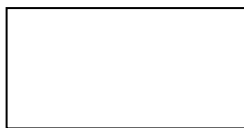
$$2x = 34$$

$$x + 1 = 18$$

34. The width of a rectangle is 2 cm less than its length. The perimeter of the rectangle is 16 cm. What are the length and width of the rectangle?

Length

Width

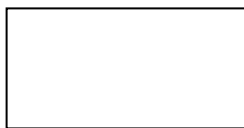


w = width

w + 2 = length

w+2

w



$$P = 2l + 2w$$

$$16 = 2(w+2) + 2(w)$$

$$16 = 2w + 4 + 2w$$

$$16 = 4w + 4$$

$$4w + 4 = 16$$

$$\underline{-4 = -4}$$

$$\underline{4w = 12}$$

$$\underline{4 \quad 4}$$

$$w = 3$$

width = 3cm and the Length = 5cm

35. Solve for y: $y - 7 = \frac{3}{4}(x - 12)$

$$y - 7 = \frac{3}{4}x - 9$$

$$+7 = +7$$

$$y = \frac{3}{4}x - 2$$

36. Solve for c: $d = 2ce$

$$\frac{2ce}{2e} = \frac{d}{2e}$$

$$e = \frac{d}{2e}$$

37. Solve for r: $2r + 4 = 6x$

$$2r + 4 = 6x$$

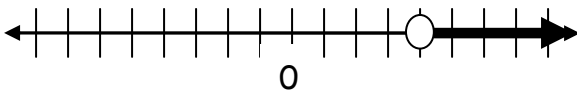
$$-4 = -4$$

$$2r = 6x - 4$$

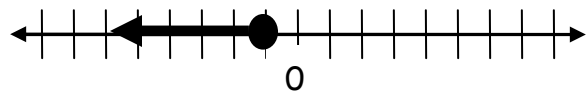
$$\frac{2r}{2} = \frac{6x}{2} - \frac{4}{2}$$

$$r = 3x - 2$$

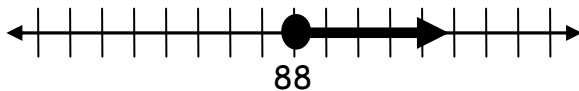
38. Graph $x > 4$



39. Graph $x \leq -1$



40. You want to get at least an 88 on the next test. Write and graph an inequality to model this situation. $t \geq 88$

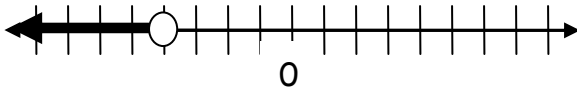


41. Solve and graph: $-2x > 8$

$$-2x > 8$$

$$\frac{-2x}{-2} > \frac{8}{-2}$$

$$x < -4$$

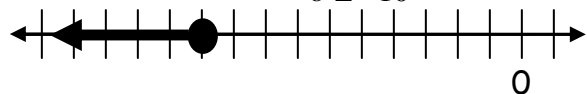


42. Solve and graph: $b + 7 \leq -3$

$$b + 7 \leq -3$$

$$-7 = -7$$

$$b \leq -10$$



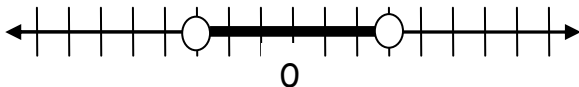
43. Solve and graph $-8 < 3x + 1 < 10$

$$-1 = -1 = -1$$

$$-9 < 3x < 9$$

$$\frac{-9}{3} < \frac{3x}{3} < \frac{9}{3}$$

$$-3 < x < 3$$



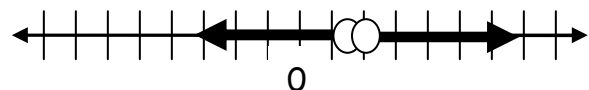
44. Solve and graph: $4x - 1 < 5$ or $-2x < -4$

$$+1 = +1 \text{ or } \frac{-2x}{-2} < \frac{-4}{-2}$$

$$4x < 6 \text{ or } x > 2$$

$$\frac{4x}{4} < \frac{6}{4}$$

$$x < \frac{3}{2} \text{ or } x > 2$$



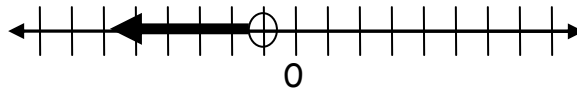
45. Solve $-6x + 12 > 18$

$$-12 = -12$$

$$-6x > 6$$

$$\frac{-6x}{-6} > \frac{6}{-6}$$

$$x < -1$$



46. An 8-ounce bottle of lotion costs \$4.50. What is the cost per ounce?

$$\frac{\$}{oz} = \frac{4.50}{8} = \$0.5625 \approx \$0.56 / oz \approx 56c / oz$$

47. A pound of coffee costs \$14.99. What is the cost per ounce?

$$\frac{\$}{lb} = \frac{14.99}{16} = \$0.9368 \approx \$0.94 / lb \approx 94c / lb$$

48. Solve $\frac{x-1}{-4} = \frac{2}{3}$

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

$$(x-1)(3) = (-4)(2)$$

$$3x - 3 = -8$$

$$+3 = +3$$

$$3x = -5$$

$$\frac{3x}{3} = \frac{-5}{3}$$

$$x = \frac{-5}{3}$$

49. Solve $\frac{3}{6} = \frac{x-3}{8}$

$$\frac{(3)}{(6)} = \frac{(x-3)}{(8)}$$

$$(3)(8) = (x-3)(6)$$

$$24 = 6x - 18$$

$$6x - 18 = 24$$

$$+18 = +18$$

$$6x = 42$$

$$\frac{6x}{6} = \frac{42}{6}$$

$$x = 7$$

50. A canary's heart beats 130 times in 12 seconds. Use a proportion to find out how many times its heart beats in 50 seconds.

$$\frac{ht\ beat}{seconds} = \frac{(130)}{(12)} = \frac{(x)}{(50)}$$

$$(12)(x) = (130)(50)$$

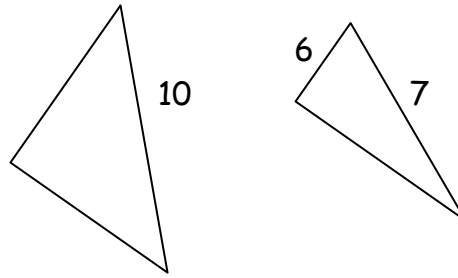
$$12x = 6500$$

$$\frac{12x}{12} = \frac{6500}{12}$$

$$x = 541.66$$

$$x \approx 542$$

51. Using the similar figures, find x .



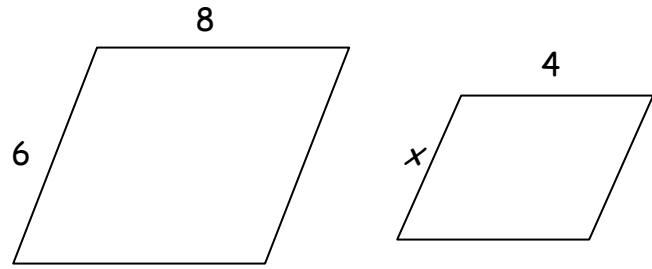
$$\frac{\text{Leg}}{\text{long}} \quad \begin{array}{l} \text{Large} \\ \text{Small} \end{array} \quad \frac{x}{10} = \frac{6}{7}$$

$$7x = 60$$

$$\frac{7x}{7} = \frac{60}{7}$$

$$x = \frac{60}{7} \approx 8.57$$

52. Using the similar figures, find x .



$$\begin{array}{l} \text{Large} \\ \text{Small} \end{array} \quad \frac{\text{top}}{\text{side}} = \frac{8}{6} = \frac{4}{x}$$

$$8x = 24$$

$$\frac{8x}{8} = \frac{24}{8}$$

$$x = 3$$

53. A blueprint scale is 1 in : 12 ft. The width of a building is 48 feet. What is the width of the building on the blueprint?

$$\frac{\text{scale}}{\text{actual}} \quad \begin{array}{l} \text{Map} \\ \text{Building} \end{array} \quad \frac{1 \text{ in}}{12 \text{ ft}} = \frac{x}{48 \text{ ft}}$$

$$12x = 48$$

$$\frac{12x}{12} = \frac{48}{12}$$

$$x = 4 \text{ in}$$

54. A map has a scale of 1 in: 25 mi. Two cities are 175 miles apart. How far apart are they on the map?

$$\frac{\text{scale}}{\text{actual}} = \frac{\text{Map}}{\text{Route}}$$

$$\frac{\text{1 in}}{25 \text{ miles}} = \frac{x}{175 \text{ miles}}$$

$$25x = 175 \text{ miles}$$

$$\frac{25x}{25} = \frac{175}{25}$$

$$x = 7 \text{ in}$$

55. 25% of what is 28?

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

$$\frac{28}{x} = \frac{25}{100}$$

$$25x = 2800$$

$$\frac{25x}{25} = \frac{2800}{25}$$

$$x = 112$$

56. 60% of what is 45?

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

$$\frac{45}{x} = \frac{60}{100}$$

$$60x = 4500$$

$$\frac{60x}{60} = \frac{4500}{60}$$

$$x = 75$$

57. What is 250% of 14?

$$\frac{\text{is}}{\text{of}} = \frac{\%}{100}$$

$$\frac{x}{14} = \frac{250}{100}$$

$$100x = 3500$$

$$\frac{100x}{100} = \frac{3500}{100}$$

$$x = 35$$

58. You spent 16% of your vacation money on food. If you spent \$48 on food, how much money did you spend on your vacation?

$$\frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

$$\frac{48}{x} = \frac{16}{100}$$

$$16x = 4800$$

$$\frac{16x}{16} = \frac{4800}{16}$$

$$x = \$300$$

59. Sarah spends 30% of her monthly income on rent. If she pays \$810 for rent each month, what is her monthly income?

$$\frac{\text{part}}{\text{whole}} = \frac{\%}{100}$$

$$\frac{810}{x} = \frac{30}{100}$$

$$30x = 81000$$

$$\frac{30x}{30} = \frac{81000}{30}$$

$$x = \$2700$$

60. In 1980, the average annual tuition charge for a four-year public university was \$840. The average annual tuition charge in 2000 was \$3356. What is the percent of change?

$$\begin{aligned} \text{Percent of change} &= \frac{\text{amount of change}}{\text{original amount}} \\ \frac{\text{amount of change}}{\text{original amount}} &= \frac{3356 - 840}{840} \\ &= \frac{2516}{840} \\ &= 2.995238 \\ &= 299.5238\% \\ &\approx 300\% \end{aligned}$$

61. The United States imported 6,909,000 barrels of oil per day in 1980. In 2000, the U.S. imported 11,459,000 barrels of oil per day. What is the percent of change?

$$\begin{aligned} \text{Percent of change} &= \frac{\text{amount of change}}{\text{original amount}} \\ \frac{\text{amount of change}}{\text{original amount}} &= \frac{11,459,000 - 6,909,000}{6,909,000} \\ &= \frac{4,550,000}{6,909,000} \\ &= 0.6585612 \\ &= 65.85612\% \\ &\approx 66\% \end{aligned}$$

62. Find the domain and range of the relation: $\{(-3, -7), (-1, -3), (0, -1), (2, 3), (4, 7)\}$

$$\text{Domain} = \{-3, -1, 0, 2, 4\}$$

$$\text{Range} = \{-7, -3, -1, 3, 7\}$$

63. Find the domain and range of the relation: $\{(-5, -4), (-4, 2), (0, 2), (1, 3), (2, 4)\}$

$$\text{Domain} = \{-5, -4, 0, 1, 2\}$$

$$\text{Range} = \{-4, 2, 3, 4\}$$

$$f(x) = 2x - 15$$

$$f(3) = 2(3) - 15$$

64. Evaluate the function for $x = 3$

$$f(3) = 6 - 15$$

$$f(3) = -9$$

$$f(x) = -x + 3$$

$$f(-4) = -(-4) + 3$$

65. Evaluate the function for $x = -4$

$$f(-4) = 4 + 3$$

$$f(-4) = 7$$

66. Find the range of the function for the given domain:

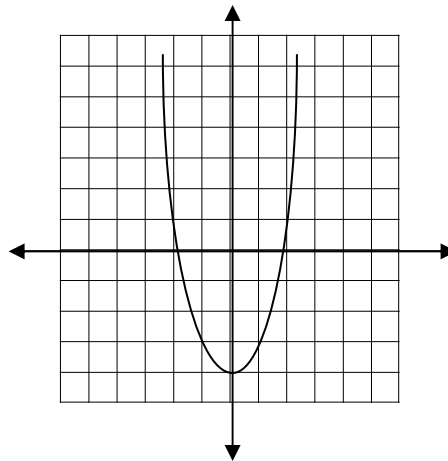
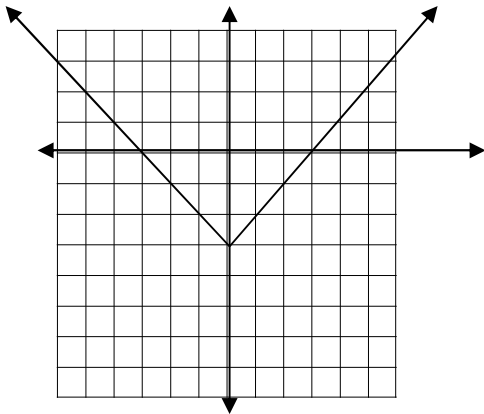
$$\text{domain } \{-2, -1, 0\} \quad f(x) = -3x + 1$$

$$\text{Range} = \{1, 4, 7\}$$

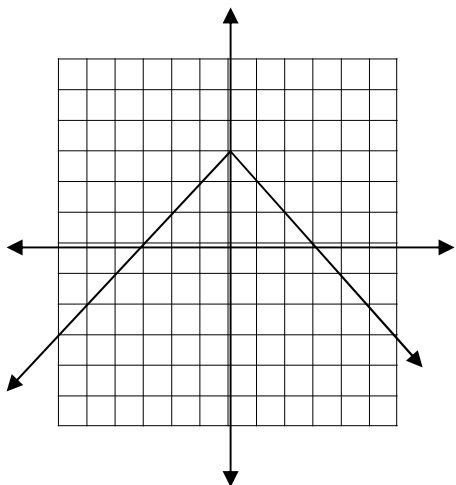
Use a table of values to graph each of the following:

67. $y = |x| - 3$

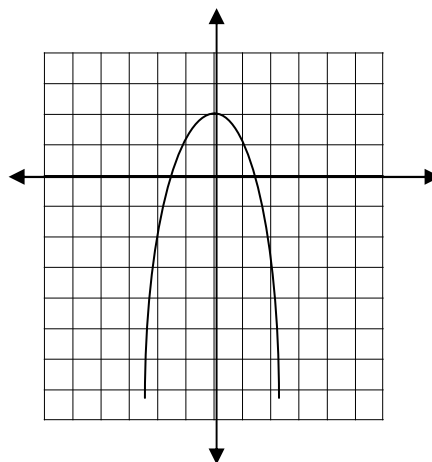
68. $y = x^2 - 4$



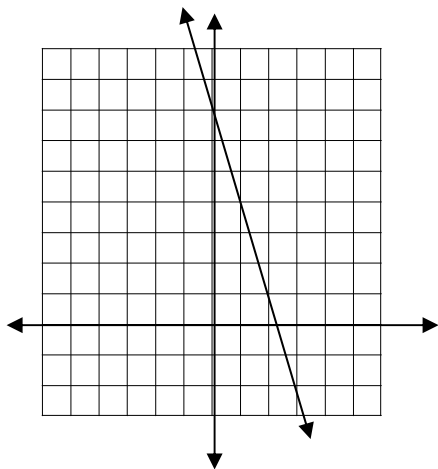
69. $y = -|x| + 3$



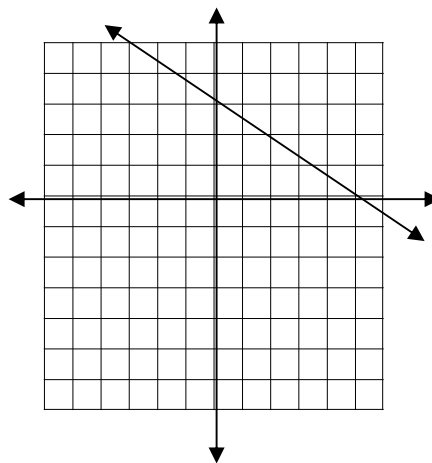
70. $f(x) = -x^2 + 2$



71. Graph $f(x) = -3x + 7$



72. Graph $f(x) = -\frac{1}{2}x + 3$



For 73 and 74, write a function rule for the table:

73.

x	y
0	0
1	3
2	6
3	9

$y = 3x$

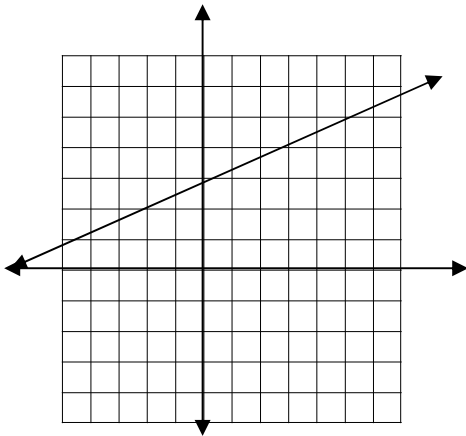
74.

x	f(x)
0	-1
1	0
2	1
3	2

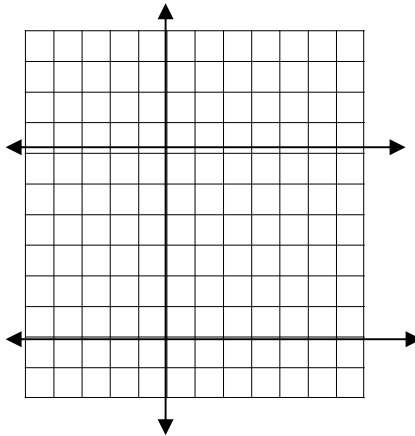
$y = x - 1$

For 75, 76, and 77, Graph using the slope and y-intercept:

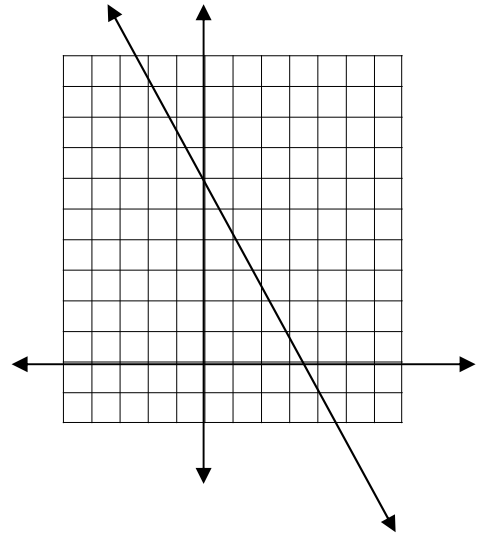
75. $y = \frac{2}{5}x + 3$



76. $y = -6$



77. $y = \frac{-7}{4}x + 6$



78. Write an equation for the line with the given slope and y-intercept.

$m = 4$ $b = 8$

$Y = 4x + 8$

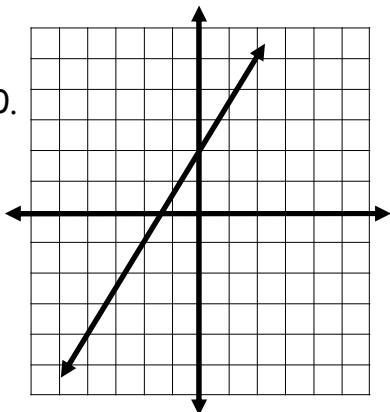
79. Write an equation for the line with the given slope and y-intercept.

$m = -1$, $b = -3$

$y = -1x - 3$ or $y = -x - 3$

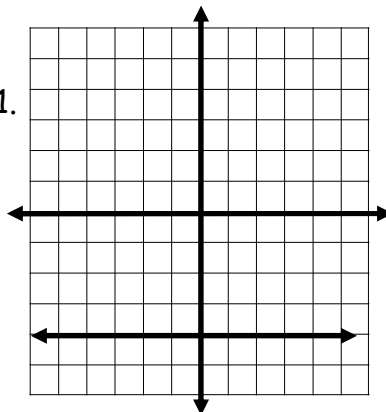
For 80, 81, and 82, write an equation for each line.

80.



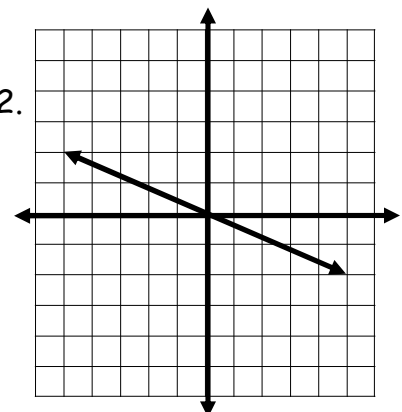
$y = \frac{3}{2}x + 2$

81.



$x = -2$

82.



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

83. Write the equation in standard form:

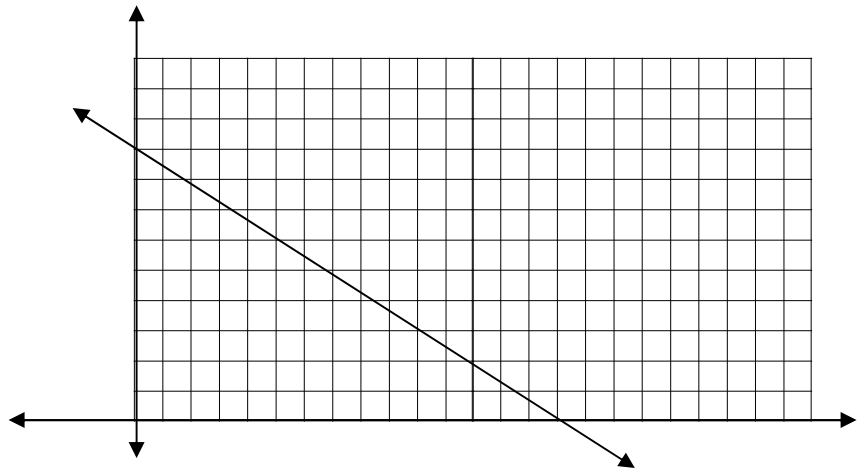
$$y = \frac{-x}{3} + \frac{2}{3}$$
$$3 \left[\frac{y}{1} = \frac{-x}{3} + \frac{2}{3} \right]$$
$$3 \left(\frac{y}{1} \right) = 3 \left(\frac{-x}{3} \right) + 3 \left(\frac{2}{3} \right)$$
$$3y = -1x + 2$$
$$+1x \quad = +1x$$
$$1x + 3y = 2$$

84. The student council is sponsoring a carnival to raise money. Tickets cost \$5 for adults and \$3 for students. The student council wants to raise \$450.

A) Write an equation to find the number of adult and student tickets they should sell.

$$x = \text{student} \quad y = \text{adults}$$
$$3x + 5y = \$450$$

B) Graph your equation using x- and y-intercepts. $(150, 0)(0, 90)$



C) Use your graph to find two different combinations of tickets they can sell to meet their goal.

150 Children's ticket and 0 Adult ticket

Or

90 Adult tickets and 0 children's Tickets

85. Write an equation in slope-intercept form for the line that goes through the points $(2, -5)$ and $(0, -7)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad (2, -5) (0, -7)$$

$$m = \frac{-7 - -5}{0 - 2}$$

$$m = \frac{-7 + 5}{-2}$$

$$m = \frac{-2}{-2}$$

$$m = 1$$

$$m = 1 (0, -7)$$

$$y = mx + b$$

$$y = x - 7$$

86. Write an equation in slope-intercept form for the line that goes through the points $(-2, -6)$ and $(8, 4)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad (-2, -6) (8, 4)$$

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

$$= \frac{4 + 6}{8 + 2}$$

$$= \frac{10}{10}$$

$$= 1$$

$$m = 1 (8, 4)$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 1(x - 8)$$

$$y - 4 = x - 8$$

$$+4 = \quad +4$$

$$y = x - 4$$

87. Write an equation for the line that is parallel to $y = 2x - 7$ and goes through $(3, 4)$.

$$m = 2 \quad (3, 4)$$

$$y - y_1 = m(x - x_1)$$

$$y - 4 = 2(x - 3)$$

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

$$+4 = \quad +4$$

$$y = 2x - 2$$

88. Write an equation for the line perpendicular to $y = \frac{1}{6}x + 1$ through $(-1, -4)$

$$m = -6 \quad (-1, -4)$$

$$y - y_1 = m(x - x_1)$$

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

$$y + 4 = -6(x + 1)$$

$$y + 4 = -6x - 6$$

$$-4 = \quad -4$$

$$y = -6x - 10$$

89. Are the lines parallel, perpendicular, or neither. Explain:

$$y = 3x - 8 \quad m = 3 \quad (0, -8)$$

$$3x - y = -1$$

$$3x - y = -1$$

$$-3x \quad = -3x$$

$$-y = -3x - 1$$

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

$$y = 3x + 1 \quad m = -3$$

the lines are parallel because their slopes are the same and their y intercepts are the same.

Simplify each of the following expressions.

90. $(-8.6)^0$

1

91. $12^{-3} \cdot 12^{10} \cdot 12^0$

12^7

92. $a^5 \cdot 3b^9 \cdot 6a$

$18a^6b^9$

93. $-4x^3 \cdot 2y^{-2} \cdot 5y^5 \cdot y^{-8}$

$-40x^3y^{-5}$ or $\frac{-40x^3}{y^5}$

94. $(4)^{-2}$

$\frac{1}{16}$

95. $(7.46)^{-5} \cdot (7.46)^6$

7.46

Re-write each number in Scientific or Standard form as appropriate.

96. 8,670,000,000

8.67×10^9

97. 9.07×10^{-2}

.0907

Simplify and Re-write each expression only using Positive exponents

98. $\frac{12}{c^{-8}d^2}$
 $\frac{12c^8}{d^2}$

99. $7x^{-8} \cdot 6x^3$
 $\frac{42}{x^5}$

100. Order 34×10^2 , 1.2×10^7 , 8.11×10^{-3} and 435 from least to greatest

1^{st} 8.11×10^{-3} , 2^{nd} 34×10^2 , 3^{rd} 435 and 4^{th} 1.2×10^7