Review Lessons 2.1-2.4 Worksheet

Name: **Key**

Identify the domain and range of the given relation. Then tell whether the relation is a function.

1.) $(0,3), (1,1), (2,2), (3,4), (4,2)$

domain: $x = 0, 1, 2, 3, 4$

range: $y = 3, 1, 2, 4$

function?: **yes**

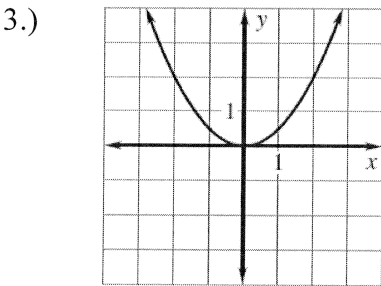2.) $(-2,-3), (-1,-1), (0,1), (0,3), (1,5)$
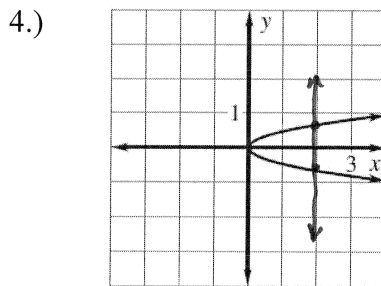
domain: $x = -2, -1, 0, 1$

range: $y = -3, -1, 1, 3, 5$
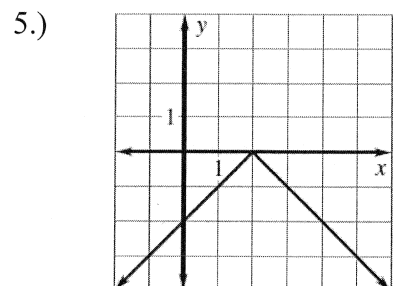
function?: **no. Input 0 has two different outputs.**

Use the vertical line test to determine whether the relation is a function.

3.)

function? **yes**

4.)

function? **no**

5.)

function? **yes**

Tell whether the function is linear. Then evaluate the function for the given value of x.

6.) $f(x) = 3 - 3x$; $f(1)$ $f(1) = 3 - 3(1)$

linear? **yes** $f(1) = 0$

7.) $f(x) = |x + 2|$; $f(-4)$ $f(-4) = |-4 + 2|$

linear? **no** $f(-4) = 2$

8.) $f(x) = \frac{2}{x-2}$; $f(6)$ $f(6) = \frac{2}{6-2}$

linear? **no** $f(6) = \frac{1}{2}$

9.) $f(x) = \frac{2}{3}x - 5$; $f(9)$ $f(9) = \frac{2}{3}(9) - 5$

linear? **yes** $f(9) = 1$

Find the slope of the line passing through the given points. Tell whether the line *rises, falls, is horizontal*, or *is vertical*.

10.) $(-3, 2), (6, -1)$

$m = \frac{2 + \text{+}1}{-3 + 6} = \frac{3}{-9} = -\frac{1}{3}$

$m = -\frac{1}{3}$

line: **falls**

11.) $(3, 1), (3, -2)$

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

$m = $ **undefined**

line: **is vertical**

12.) $(0, -5), (-2, -9)$

$m = \frac{-9 + \text{+}5}{-2 - 0} = \frac{-4}{-2} = 2$

$m = 2$

line: **rises**

Tell whether the lines are *parallel*, *perpendicular*, or *neither*. You must have work to back up your answer.

13.) Line 1: through $(5, 2), (1, -7)$
      Line 2: through $(-1, 3), (9, -1)$

Line 1
$$m = \frac{-7-2}{1-5} = \frac{-9}{-4} = \frac{9}{4}$$

Line 2
$$m = \frac{-1-3}{9--1} = \frac{-4}{10} = \frac{-2}{5}$$

lines are: *neither*

14.) Line 1: through $(7, 3), (8, 7)$
      Line 2: through $(-5, -4), (-1, -5)$

Line 1
$$m = \frac{7-3}{8-7} = \frac{4}{1} = 4$$

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

lines are: *perpendicular*

15.) In 1981, the annual household cost of telephone service was \$358. By the year 2001, the household cost of telephone service had increased to \$914.

$(1981, 358)$ $(2001, 914)$

a.) What is the average rate of increase in telephone service cost?

$$m = \frac{914-358}{2001-1981} = \boxed{\$27.80} \text{ (per year)}$$

b.) Predict what the annual household cost of telephone service would be in 2016.

$$27.80(15) + 914 = \boxed{\$1331}$$

Find the slope and *y*-intercept of the line. Write the *y*-intercepts as ordered pairs.

16.) $y = -13x$

$m = -13$ y-int: $(0, 0)$

17.) $2x + y - 2 = 0$

$2x + y = 2$

$y = -2x + 2$

$m = -2$ y-int: $(0, 2)$

18.) $-3x + 2y - 4 = 0$

$-3x + 2y = 4$

$2y = 3x + 4$

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

$m = \frac{3}{2}$ y-int: $(0, 2)$

Find the *x*- and *y*-intercepts of the line with the given equation. Write the intercepts as ordered pairs.
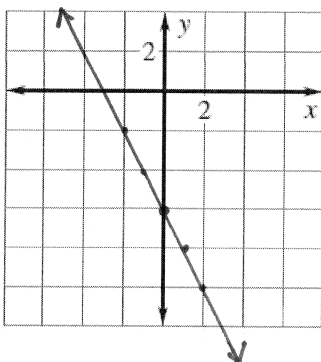
19.) $y = 4x - 1$

$-4x + y = -1$

20.) $2x - 3y = -6$

21.) $4x - 2y = 1$

x-int: $\left(\frac{1}{4}, 0\right)$ y-int: $(0, -1)$

x-int: $(-3, 0)$ y-int: $(0, 2)$

x-int: $\left(\frac{1}{4}, 0\right)$ y-int: $\left(0, -\frac{1}{2}\right)$
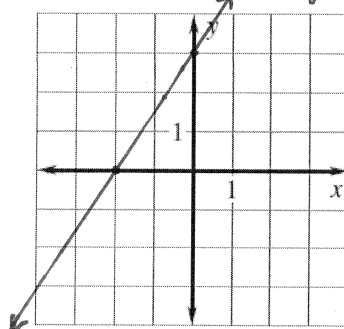
Graph the equation using any method. **Watch the scales on the graphs**
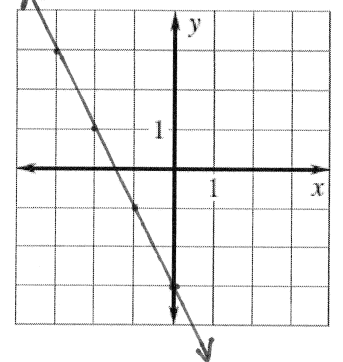
22.) $y = -2x - 6$
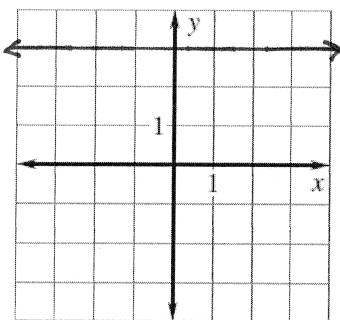

23.) $12x - 8y = -24$

x-int: $(-2, 0)$
y-int: $(0, 3)$
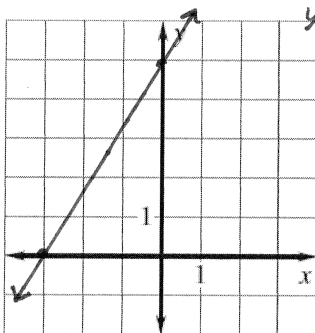

24.) $2x + y = -3$

$y = -2x - 3$

25.) $6y - 18 = 0$ $6y = 18$ $y = 3$

26.) $-5x + 3y - 15 = 0$ $-5x + 3y = 15$ x-int: $(-3, 0)$ y-int: $(0, 5)$

27.) $2x = -8$ $x = -4$
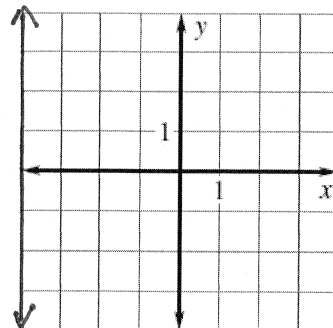
28.) The caterer for your class picnic charges \$1 for each hot dog and \$2 for each hamburger. You have \$48 dollars that you must spend on food.

a.) Write a model that shows the different combinations of hot dogs and hamburgers that you could purchase. h = # of hot dogs purchased

b = # of hamburgers purchased

$$h + 2b = 48$$

b.) If you buy 19 hamburgers, how many hot dogs could you purchase?

$h + 2(19) = 48$ $h = 10$ 10 hot dogs

Write an equation, in <u>slope-intercept</u> form, that passes through the given point and satisfies the given criteria, or that passes through the given points.

29.) $\left(\frac{2}{3}, 1\right), m = -3$

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

$y - 1 = -3x + 2$

$$y = -3x + 3$$

30.) $(-1, -4)$; perpendicular to $y = 2x + 5$

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

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

$$y = -\frac{1}{2}x - \frac{9}{2}$$

31.) $(12, 4), m = 0$

$y - 4 = 0(x - 12)$

$y - 4 = 0$

$$y = 4$$

32.) $(2, 8), (5, 2)$

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

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

$y - 2 = -2x + 10$

$$y = -2x + 12$$

33.) $(3, 7)$; parallel to $3x + y = 6$

$y = -3x + 6$

$m = -3$

$y - 7 = -3(x - 3)$

$y - 7 = -3x + 9$

$$y = -3x + 16$$

Write an equation, in <u>standard</u> form, that passes through the given point and satisfies the given criteria, or that passes through the given points.

34.) $(-8, -3), (7, 0)$

$m = \dfrac{-3-0}{-8+7} = \dfrac{-3}{-15} \; \boxed{\dfrac{1}{5}}$

$y + 3 = \dfrac{1}{5}(x + 8)$

$y + 3 = \dfrac{1}{5}x + \dfrac{8}{5}$

$y = \dfrac{1}{5}x - \dfrac{7}{5}$

$\left(-\dfrac{1}{5}x + y = -\dfrac{7}{5}\right)^{\cdot 5}$

$\boxed{-x + 5y = -7}$

35.) $\left(\dfrac{3}{5}, 0\right), m = -5$

$y - 0 = -5\left(x - \dfrac{3}{5}\right)$

$y = -5x + 3$

$\boxed{5x + y = 3}$

36.) Netflix has changed its cost model for its movie service. There will now be a $10 annual fee plus a cost of $0.99 per movie watched.

   a.) Write an equation that models the total amount of money that you will spend watching movies on Netflix this year, assuming you have a Netflix subscription.

   $x = $ # of movies purchased

   $y = $ total cost

   $\boxed{y = .99x + 10}$

   b.) How much will it cost you to watch 42 movies?

   $y = .99(42) + 10$

   $\boxed{y = \$51.58}$

37.) The price for U.S. postage stamps has increased over the years. Since 1975, the price has increased from $0.13 to $0.49 in 2015 at a rate that is approximately linear. $(1975, .13)\;(2015, .49)$

   a.) Write a linear model for the price of stamps during this time period. Let p represent the price and t represent the number of years since 1975.

   $m = \dfrac{.49 - .13}{2015 - 1975} = \dfrac{.36}{40} = .009/\text{year}$ $\boxed{p = .009t + .13}$

   b.) What would you expect the price of a stamp to be in 2020?

   $2020 - 1975 = 45 \text{ yrs}$

   $p = .009(45) + .13$

   $p = .535$

   $\boxed{\text{about } \$0.54 \text{ for a stamp in } 2020}$