

Review Lessons 2.1-2.4 Worksheet

Name: LEY

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: $\{0, 1, 2, 3, 4\}$

range: $\{3, 1, 2, 4\}$

function?: Yes

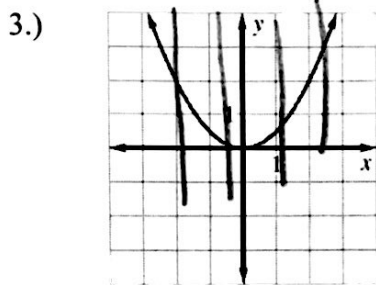
2.) $(-2, -3), (-1, -1), (0, 1), (0, 3), (1, 5)$

domain: $\{-2, -1, 0, 1\}$

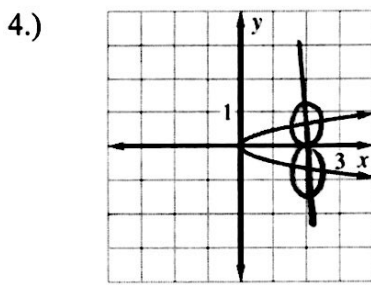
range: $\{-3, -1, 1, 3, 5\}$

function?: NO

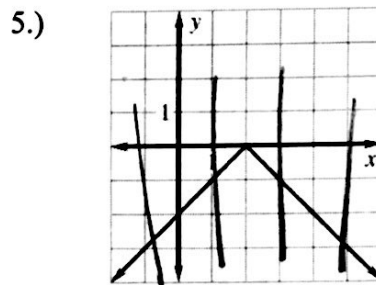
Use the vertical line test to determine whether the relation is a function.



function? Yes



function? NO



function? Yes

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

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

$f(1) = 3 - 3(1)$
 $= 3 - 3$
 $= 0$

linear? Yes

$f(1) = 0$

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

$f(-4) = |-4 + 2|$
 $= |-2|$
 $= 2$

linear? NO

$f(-4) = 2$

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

$f(6) = \frac{2}{6-2}$
 $= \frac{2}{4}$
 $= \frac{1}{2}$

linear? NO

$f(6) = \frac{1}{2}$

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

$f(9) = \frac{2}{3}(9) - 5$
 $= 6 - 5$
 $= 1$

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

$m = \frac{2 - (-1)}{-3 - 6}$
 $= \frac{3}{-9}$
 $= -\frac{1}{3}$

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

line: falls

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

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

$m = \text{undefined}$

line: vertical

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

$m = \frac{-5 - (-9)}{0 - (-2)}$
 $= \frac{4}{2}$
 $= 2$

$m = 2$

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: $m = \frac{2 - (-7)}{5 - 1} = \frac{9}{4}$

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

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: $m = \frac{-4 - (-5)}{-5 - (-1)} = \frac{-4 - (-5)}{-5 - (-1)} = \frac{1}{-4} = -\frac{1}{4}$

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.

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

$\frac{914 - 358}{2001 - 1981} = \frac{556}{20} = \boxed{\$27.8/\text{year}}$

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

$\$914 + \$27.8(15) = \boxed{\$1331}$

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

$2x + y = 2$
 $-2x \quad -2x$
 $y = -2x + 2$

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

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

$+3x \quad +4$
 $2y = 3x + 4$
 $y = \frac{3}{2}x + 2$

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

Find the x- and y-intercepts of the line with the given equation. Write the intercepts as ordered pairs.

19.) $y = 4x - 1$

$0 = 4x - 1$ y-int.
 $1 = 4x$
 $x = \frac{1}{4}$

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

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

$2x - 3(0) = -6$ $2(0) - 3y = -6$
 $2x = -6$ $-3y = -6$
 $x = -3$ $y = 2$

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

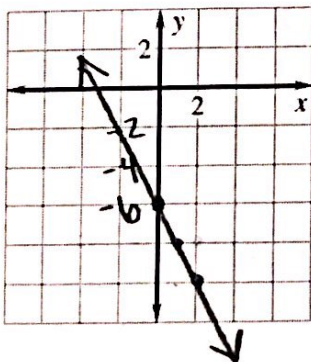
21.) $4x - 2y = 1$

$4x - 2(0) = 1$ $4(0) - 2y = 1$
 $4x = 1$ $-2y = 1$
 $x = \frac{1}{4}$ $y = -\frac{1}{2}$

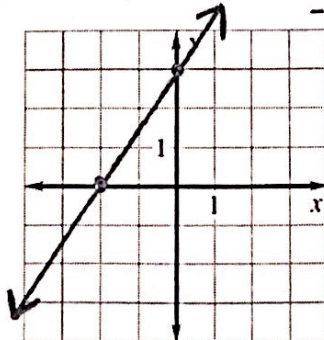
x-int: $(\frac{1}{4}, 0)$ y-int: $(0, -\frac{1}{2})$

Graph the equation using any method. **Watch the scales on the graphs**

22.) $y = -2x - 6$

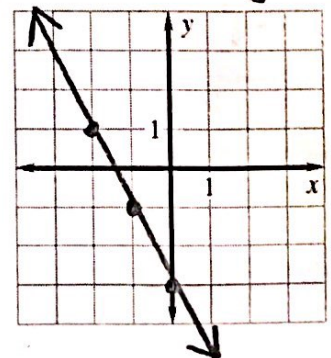


23.) $12x - 8y = -24$



$12x - 8y = -24$
 $-8y = -12x - 24$
 $y = \frac{3}{2}x + 3$

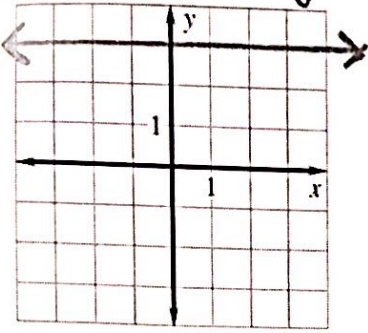
24.) $2x + y = -3$



$2x + y = -3$
 $y = -2x - 3$

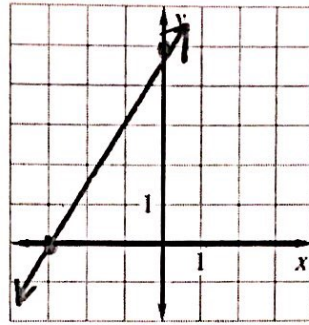
$$5.) 6y - 18 = 0$$

$$\begin{aligned} 6y - 18 &= 0 \\ 6y &= 18 \\ y &= 3 \end{aligned}$$



$$26.) -5x + 3y - 15 = 0$$

$$\begin{aligned} \text{x-int: } -5x + 3(0) - 15 &= 0 \\ -5x - 15 &= 0 \\ -5x &= 15 \end{aligned}$$

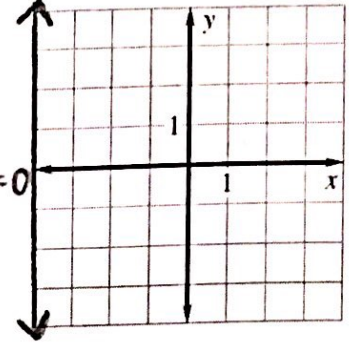


$$\begin{aligned} x &= -3 \\ (-3, 0) \end{aligned}$$

$$\begin{aligned} \text{y-int: } -5(0) + 3y - 15 &= 0 \\ 3y - 15 &= 0 \\ 3y &= 15 \\ y &= 5 \\ (0, 5) \end{aligned}$$

$$27.) 2x = -8$$

$$\begin{aligned} 2x &= -8 \\ x &= -4 \end{aligned}$$



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. $1x + 2y = 48$

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

$$\begin{aligned} x + 2(19) &= 48 \\ x + 38 &= 48 \end{aligned}$$

$$x = \boxed{10 \text{ hot dogs}}$$

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

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

$$\begin{aligned} y - 1 &= -3(x - \frac{2}{3}) \\ y - 1 &= -3x + 2 \end{aligned}$$

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

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

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

$$\begin{aligned} y - (-4) &= -\frac{1}{2}(x - (-1)) \\ y + 4 &= -\frac{1}{2}(x + 1) \\ y + 4 &= -\frac{1}{2}x - \frac{1}{2} \end{aligned}$$

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

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

↳ horizontal line

$$y = \boxed{4}$$

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

$$\begin{aligned} m &= \frac{8 - 2}{2 - 5} \\ &= \frac{6}{-3} \\ &= -2 \end{aligned}$$

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

$$y - 2 = -2x + 10$$

$$y = \boxed{-2x + 12}$$

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

$$y = -3x + 6$$

$$m = -3$$

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

$$y - 7 = -3x + 9$$

$$y = \boxed{-3x + 16}$$

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

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

$$m = \frac{0 - (-3)}{7 - (-8)}$$

$$= \frac{3}{15}$$

$$= \frac{1}{5}$$

$$y - 0 = \frac{1}{5}(x - 7)$$

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

$$5 \left(\frac{1}{5}x - y = \frac{7}{5} \right)$$

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

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

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

$$y = -5x + 3$$

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

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.

$$y = 0.99x + 10$$

$x = \#$ of movies

$y = \text{cost}$

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

$$y = 0.99(42) + 10$$

$$y = \boxed{\$51.58}$$

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. $(0, 0.13)$ $(40, 0.49)$

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.

$$m = \frac{0.49 - 0.13}{40 - 0} = \frac{0.36}{40} = 0.009$$

$$\boxed{p = 0.009t + 0.13}$$

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

$$t = 45$$

$$p = 0.009(45) + 0.13$$

$$p = \boxed{\$0.54}$$