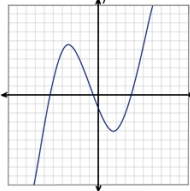
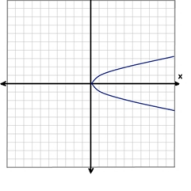


Section 10.2 - Linear Functions

Name: _____ Class: _____

Video Notes

Information about Functions

| Definition of a Function | | Vertical Line Test | |
|---|--|--|--|
| A relation in which each input has only one output. | | A relation is a function if there are no vertical lines that intersect the graph at more than one point. | |
| Example 1 $\{(2,5), (-3,7), (1,5)\}$ | Example 2 $\{(-5,1), (4,8), (4,-2)\}$ | Example 1  | Example 2  |

Information about Linear Functions

| Format of a linear function: | Slope: | Y-intercept: |
|------------------------------|--|---|
| $y = mx + b$ | Slope is represented by <i>m</i> and is a rate (unit per unit) $m = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$ | Y-intercept is represented by <i>b</i> and indicates the initial value (when $x = 0$). |

Examples of Linear Functions

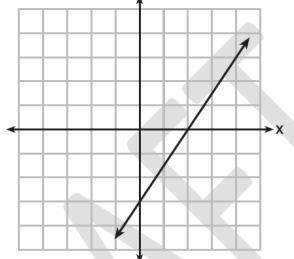
| Example 1 | Example 2 | Example 3 |
|--|--|---|
| You join a gym that charges \$50 to join and \$25 per month. | You join a gym that charges \$25 per month. You know you pay \$100 after 2 months. | You go to a gym that charges \$100 after 2 months and \$200 after 6 months. |

Comparing Functions

Three different linear functions below are represented in three different ways as shown.

(I)

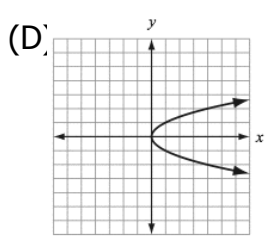
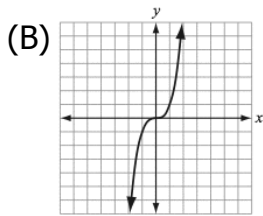
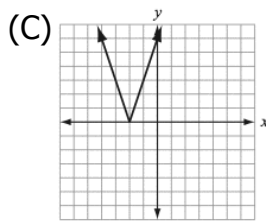
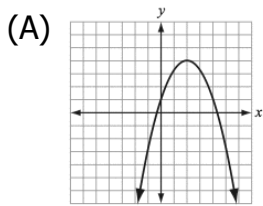
| x | f(x) |
|----|------|
| -3 | -9 |
| 3 | 3 |
| 6 | 9 |

 (II)  (III) $2y + 3 = 3x$ (IV) y is 4 less than a number.

a.) Which function has the greatest rate of change? **Justify your answer.**

b.) Does any pair of functions have the same rate of change? **Justify your answer.**

2.) Which graph does not represent a function?



3.) Which equation does not represent a linear function of x ?

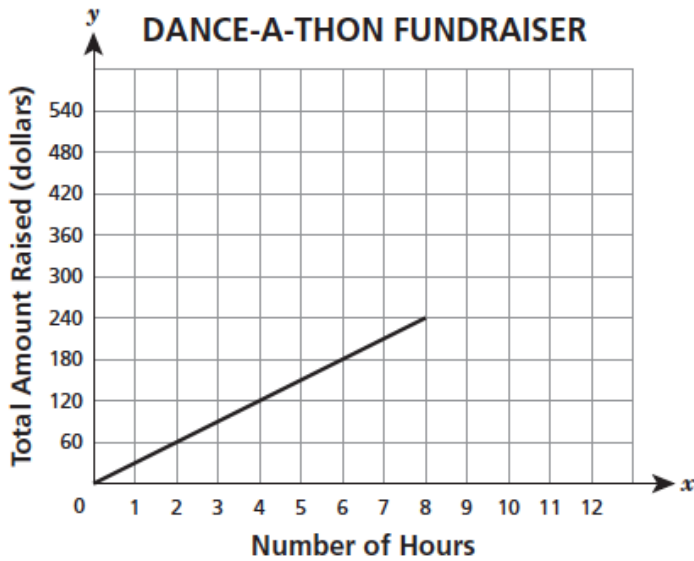
(A) $y = -\frac{3}{4}x$

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

(B) $y = \frac{x}{2}$

(D) $y = 3x^2 - 2$

- 4.) Students organized a 12-hour “dance-a-thon” as a fundraiser for their summer camp. The graph below represents the amount of money they raised during the first 8 hours.



- a.) What was the amount of money raised **per hour** during the first 8 hours? Show your work or explain how you determined your answer.

- b.) During the next 4 hours of the dance-a-thon, the students raised money at twice the hourly rate of the first 8 hours.

On the coordinate plane, complete the graph for the next 4 hours to represent the total amount of money raised at the dance-a-thon.

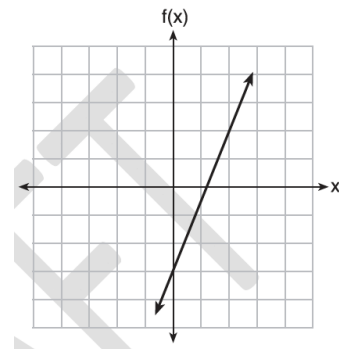
- c.) Explain below, in complete sentences, how you knew where to draw the graph.

- 5.) Of the four linear functions represented below, which has the greatest rate of change?

(A) A number, y , is two less than twice a number, x . (C) $3y - 4x = 3$

(B)

| x | $h(x)$ |
|-----|--------|
| -6 | -10 |
| -3 | -3 |
| 3 | 11 |



- 6.) Which equation represents a linear function?

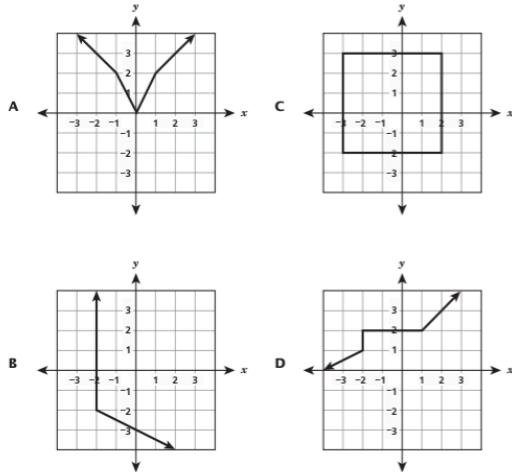
(A) $y = \frac{4}{x} + 1$

(C) $y = \sqrt[3]{x+1}$

(B) $y = x^2 + 2$

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

11.) Which graph represents a function?



12.) Which list of ordered pairs represents a function?

- (A) $(-1, -1), (0, -2), (2, -2), (3, 1)$
- (B) $(-1, -3), (-1, 3), (-2, -6), (-2, 6)$
- (C) $(-3, 4), (-1, -5), (-1, 1), (2, 0)$
- (D) $(-4, -2), (-2, -2), (3, 1), (3, 4)$

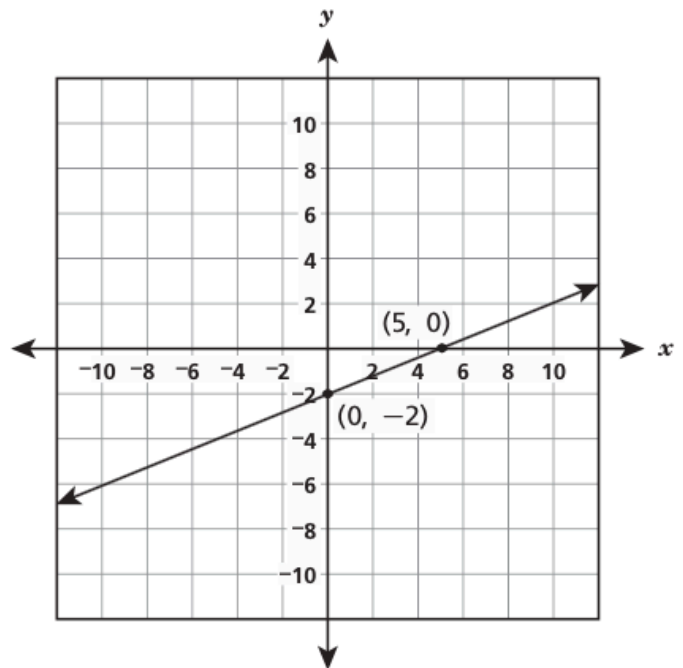
13.) Does the equation $y = \frac{3}{x}$ represent a linear function? Explain how you got your answer.

14.) The cost of renting a kayak is represented by the equation $y = 8x + 5$, where x represents the number of hours. What does the slope of the equation represent?

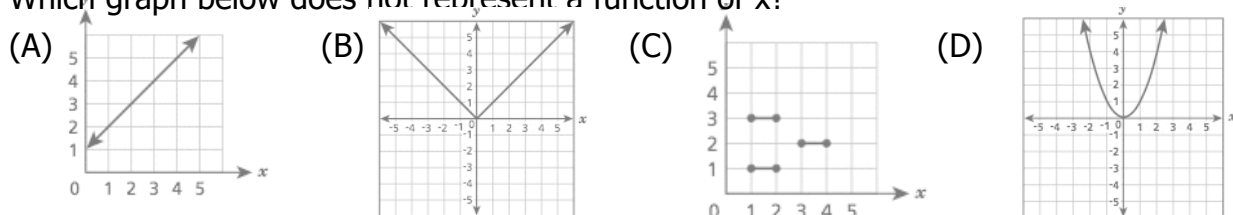
- (A) the total cost for the rental
- (B) the cost of renting a kayak for 5 hours
- (C) the cost of renting a kayak for 8 hours
- (D) the cost increase for each hour of rental

15.) Which equation represents the line shown on the coordinate grid below?

- (A) $y = \frac{2}{5}x - 2$
- (B) $y = \frac{2}{5}x + 5$
- (C) $y = -\frac{2}{5}x - 2$
- (D) $y = -\frac{2}{5}x + 5$



16.) Which graph below does not represent a function of x ?

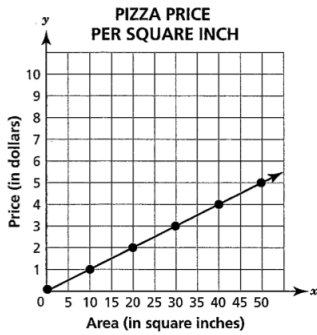


17.) A graph is shown. Which situation is represented by the graph?

- (A) It costs \$2 per hour to rent a bike for 10 hours.
- (B) It costs \$60 to rent a boat for 8 hours.
- (C) It costs \$5 per hour to rent ice skates.
- (D) It costs \$40 to rent a snowboard.

18.) The price of a cheese pizza with no toppings is based on the area of the pizza. If P represents the price of the pizza, in dollars, and A represents the area of the pizza, in square inches, which function represents the lowest price per square inch?

(A)



(C)

| Area | Price |
|----------------------|---------|
| 50 in. ² | \$4.00 |
| 100 in. ² | \$8.00 |
| 150 in. ² | \$12.00 |
| 200 in. ² | \$16.00 |

(B) $P = \$0.16A$

(D) A cheese pizza with no toppings costs \$0.13 per square inch

19.) Jeffrey and Fumi walk at different speeds. Fumi’s walking speed can be represented by the equation $y = 85x$, where x is the time in minutes and y is the distance in meters. The distance Jeffrey walked over time is shown in the graph.

Which statement is true?

- (A) Jeffrey walks 5 meters per minute faster than F
- (B) Jeffrey walks 10 meters per minute faster than
- (C) Jeffrey walks 5 meters per minute slower than F
- (D) Jeffrey walks 10 meters per minute slower than

