Unit 4 Review

Friday, June 9, 2023 1:13 PM

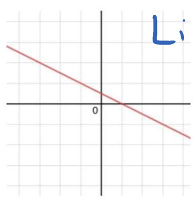
Unit 4 – Final Exam Review
Relations and Functions

1) Linear Relation

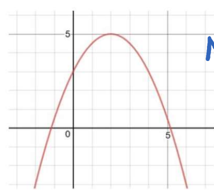
- A linear relation is composed of one or two variables with **singular exponents**.
  - Example: $y = 3x + 2$ $5x + 2y - 11 = 0$
    $y = 3$ $x = 2$
- In a linear relation, the variables (dependent and independent) change by **constant variation.**
  Y X
  - Example:

	x	*y*	
	2	8	
+1	3	11	+3
+1	4	14	+3
+1	5	17	+3

- A **linear** relation is a relation whose graphical representation has the shape of a line.
  - Example:



Linear

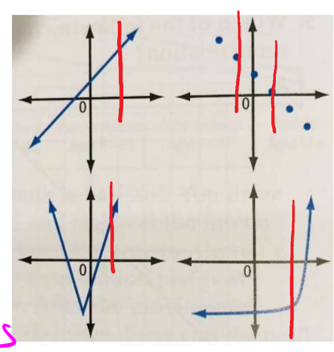


Not Liner

- A function is a particular relation that associates each element of the first set (independent variable) to one and only one element of the second set (dependent variable).
  - Example: these relations are also functions

all different x-values

x	*y*
5	10
6	-15
7	20
8	10



{ (-2, -5) , (0, 4) , (2, 13) , (4 , 22)}

all different x-values

- Vertical Line Test If a vertical line passes through the graph only once then the relation is A FUNCTION

2) Function Notation

F**unction notation** is a way of expressing the function stating the independent variable.

Example 1 : Write each equation in function notation.

a) $y = 2x - 3$

$f(x) = 2x - 3$

b) $y = n^2 + 5$

$f(n) = n^2 + 5$

Example 2 : Determine the value of the function when the value of the independent variable is given.

$f(x) = -4x + 7$; find $f(3)$.

independent variable $= x$

$x = 3$

$f(3) = -4(3) + 7$

$f(3) = -12 + 7$

$f(3) = -5$

Example 3: Determine the value of the independent variable when the value of the function is given.

$f(x) = -2 + 9x$; find the value of x when $f(x) = -10$.

Find x given the dependent

y

$-10 = -2 + 9x$

$+2 \qquad +2$

$-8 = 9x$

$\frac{-8}{9} = \frac{9x}{9}$

$-8/9 = x$

3) Domain and Range

Domain is the set of all possible values for the independent variable. Domain = x-values

Range is the set of all possible values for the dependent variable Range = y-values

There are different ways to express the domain and image of a relation:

- Brackets (discrete data) (set of points or ordered pairs)
- Set Notation $\geq$ $\leq$ $>$ $<$
- Interval Notation [,] (,)

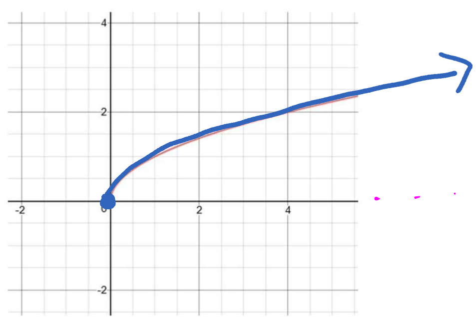
a) **Ordered Pairs** : { (-3, 4) , (5, -6) , (-2, 7) , (5, 3) , (6, -3) } Discrete data

Domain: $\{-3, -2, 5, 6\}$

Range: $\{-6, -3, 3, 4, 7\}$

b) **Set Notation and Interval Notation**

(i)

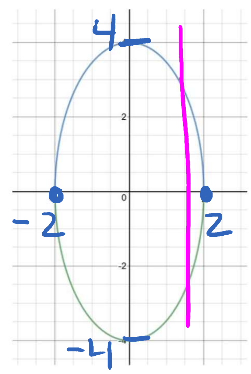


Domain: $x \geq 0$ $[0, \infty)$

Range: $y \geq 0$ $[0, \infty)$

Function: Yes No

(ii)



Domain: $-2 \leq x \leq 2$ $[-2, 2]$

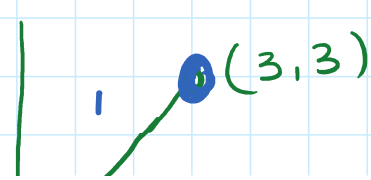
Range: $-4 \leq y \leq 4$ $[-4, 4]$

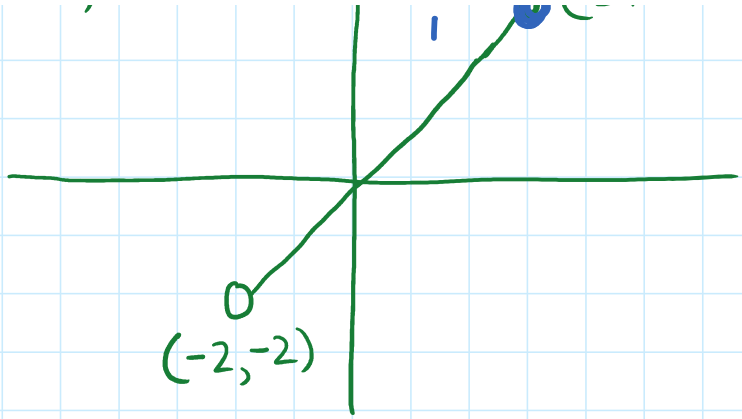
Function: Yes No

4) Rate of change

- Rate of change = slope = $\dfrac{\text{dependent (change)}}{\text{independent (change)}} = \dfrac{\text{change in y}}{\text{change in x}}$

iii)





domain $-2 < x \leq 3$ $(-2, 3]$

Range $-2 < y \leq 3$ $(-2, 3]$