

FUNCTIONS AND RELATIONS

**Chapter 4
Section 8**

RELATIONS AND FUNCTIONS

○ **Relation:** A set of ordered pairs

- Example $\{(5,2), (3,8) (-7,3), (5,4), (-4,8), (10, 6)\}$

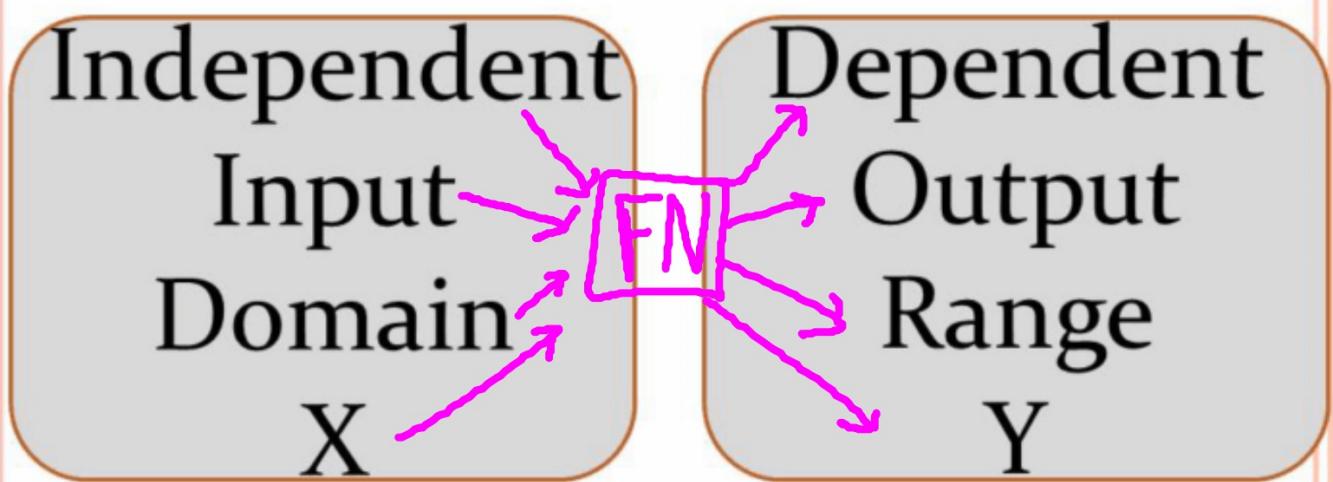
○ **Function:** A relation that has
only one output for each input

- Example $\{(2,3), (3,2), (4,2), (5,21), (-2,7)\}$

↗ No x is repeated



FUNCTIONS



A FUNCTION MUST HAVE **ONLY ONE** OUTPUT FOR EACH INPUT

x	y
Input	Output
4	7
5	5
6	6
7	4

Input	Output
4	7
5	7
6	6
7	6

Input	Output
4	7
4	5
6	6
7	4

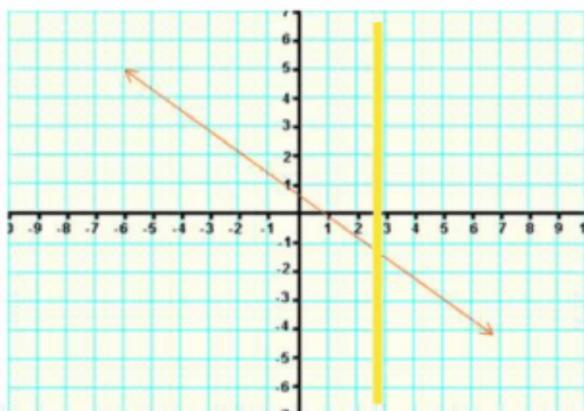
FUNCTION! FUNCTION!

**NOT A
FUNCTION**

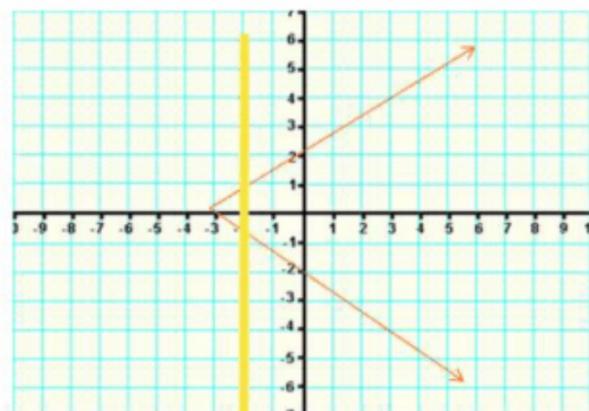


VERTICAL LINE TEST FOR FUNCTIONS

- A relation is a function if and only if no vertical line intersects the graph of the relation at more than one point



Function!



Not a Function!

FUNCTION NOTATION

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

$f(x)$ is read as the value of f at x

So, if asked to find $f(3)$, you simply just find what $f(x)$ is equal to when $x=3$



EXAMPLES:

o 1. $f(x) = -x + 10$
find $f(-3)$

$$f(x) = -x + 10$$

$$f(-3) = -(-3) + 10$$
$$= 3 + 10$$

$$f(-3) = 13$$

o 2. $f(x) = 2x - 3$
find $f(3)$

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

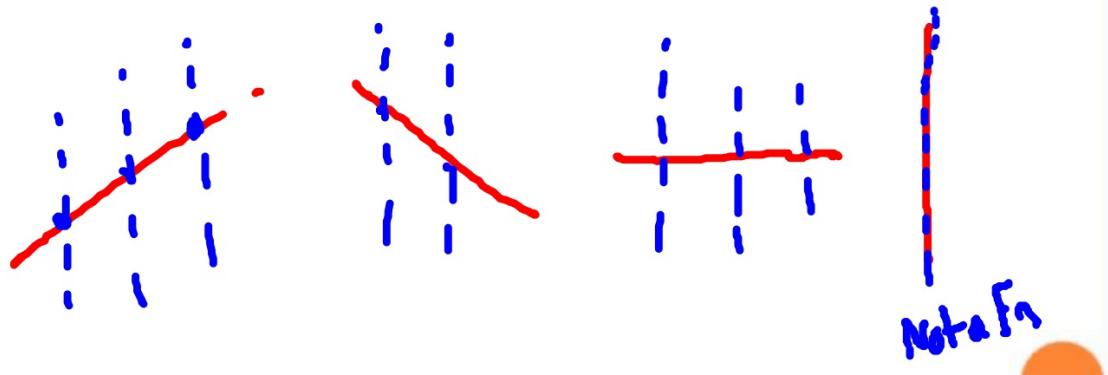
$$f(3) = 2(3) - 3$$
$$= 6 - 3$$

$$f(3) = 3$$



CLASS WORK

○ Page 259 #1-13



FUNCTIONS

- Write one variable as a function of the other variable
- “y” is a function of “x” $3x + 2 = y$
- When given 2 variables:

SOLVE FOR “Y”



EXAMPLES

$$1. \cancel{-2x} + \boxed{y} = 10$$
$$y = -2x + 10$$

$$2. \cancel{-6x} - \boxed{y} = 11$$
$$\frac{-1}{-1} y = \frac{-6x + 11}{-1}$$
$$y = 6x - 11$$

EXAMPLES

$$3. \quad 4x = 2y - 8$$
$$\begin{array}{r} +8 \\ \hline \end{array} \quad \begin{array}{r} +8 \\ \hline \end{array}$$

$$\frac{4}{2}x + \frac{8}{2} = \frac{2}{2}y$$

$$2x + 4 = y$$

$$4. \quad 10x = 6y + 14$$
$$\begin{array}{r} -14 \\ \hline \end{array} \quad \begin{array}{r} -14 \\ \hline \end{array}$$

$$\frac{10}{6}x - \frac{14}{6} = \frac{6}{6}y$$

$$\frac{5}{3}x - \frac{7}{3} = y$$



EXAMPLES

$$5. \quad 4x - 3 = 10y - 8$$

~~+8~~ ~~+8~~

$$\frac{4x+5}{10} = \frac{10y}{10}$$

$$\frac{2}{5}x + \frac{1}{2} = y$$

$$6. \quad \frac{y}{6} - 4 = 3x$$

~~+4~~ ~~+4~~

$$\frac{y}{6} = 3x + 4$$

$$y = 18x + 24$$

EXAMPLES

$$7. \frac{1}{4}y + 7 = 2x$$
$$\frac{1}{4}y = 2x - 7$$
$$y = 8x - 28$$

CLASSWORK

- Pg 177 # 9, 10



HOMEWORK

- Pg 177 # 15-22, ~~10-20~~
- Pg 259 # 14-22



