

Sunday, October 14, 2018
5:23 PM

KEY

Precalculus

1.4A: Relations & Functions

Obj: To det. if a relation is a function; to apply function notation

Hwk:

- 1.4A #1 – 9 odd, 10 – 13 all, 17, 29, 33; **check answers!!**
- **Summer Assignment – due tomorrow**
- **SA/Prerequisite Skills Performance Assessment tomorrow**

Do Now:

- ① Have out “Even Circled Problems” (stapled, name on top)
- ② Complete “Interval notation” half sheet (both sides)

PRECALCULUS

Section 1.4: FUNCTIONS (day 1) – DO NOW

PRECALCULUS

Section 1.4 day 1 – DO NOW cont.

Examples:

	Inequality	Graph	Interval notation
1.	$x \leq 3$		$(-\infty, 3]$
2.	$x > 2$		$(2, \infty)$
3.	$-2 \leq x < 3$		$[-2, 3)$
4.	$x < -1$ or $x \geq 2$		$(-\infty, -1) \cup [2, \infty)$

Fill in the missing inequality, graph, or interval notation for each question below.

	Inequality	Graph	Interval notation
1.	$x \leq -5$		$(-\infty, -5]$
2.	$-3 < x < 5$		$(-3, 5)$
3.	$-1 \leq x < 1$		$[-1, 1)$
4.	$x > 4$ or $x \leq -2$		$(-2, -1] \cup (4, \infty)$

Calculus is the study of things that change; real-life things that change are modeled by **functions**. In order to prepare you for studying calculus, we have **precalculus** – basically the study of many different types of functions (for example, polynomial, exponential, logarithmic, and trigonometric functions) and other related (necessary) topics.

Relation: a set of ordered pairs, sometimes related by a rule

Ex. 1) $\{(1, -2), (2, 1)\}$

Ex. 2) $y = 2x$

Function: a relation where, for every input value there corresponds exactly one output value.

Domain (D): set of inputs

Range (R): set of outputs

Characteristics:

- Each element in D must be matched with one and only one element in R .

NOTE: • if an element in D does NOT have a partner, then it is NOT a function

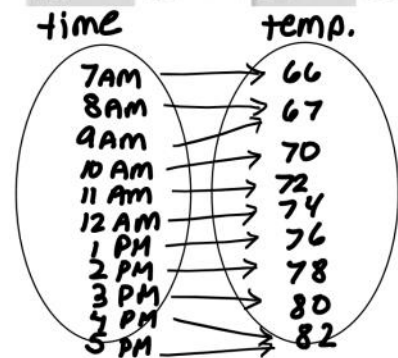
• if an element in D has TWO OR MORE partners, then it is NOT a function

- Some elements in R might not be paired with an element in D .

Ex.3)



How can we set this up as a function?



This is TEMPERATURE at a given TIME – *we can't have 2 dif. temps at the same time BUT we can have 2 dif. times with the same temp!

Ways to represent functions:

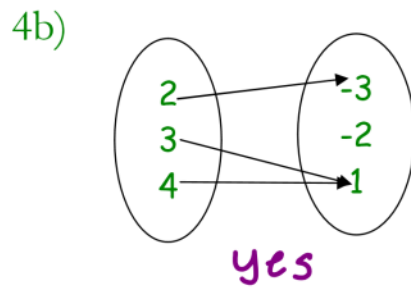
1. verbally: student ID # and grade
student ID # and phone #

yes

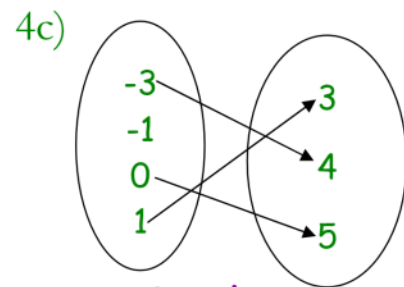
2. numerically:

Ex. 4a) $\{(1, -2), (1, 2)\}$

* NO, 1 has 2 outputs

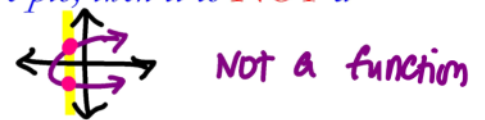


Functions? If no, JUSTIFY!



3. **graphically:** ordered pairs (x, y) plotted on a coordinate plane.

* if a vertical line can be drawn thru 2 or more pts, then it is **NOT** a function! ← vertical line test



4. **algebraically** – as an equation in two variables

Ex. 5) Det. if y is a function of f.

(i.e. solve for y then see if the result is a function)

a. $x^2 + y = 1$

$y = x^2 + 1$

yes 1 answer

b. $-x + y^2 = 1$

$\sqrt{y^2} = \sqrt{x+1}$

$|y| = \sqrt{x+1}$

$y = \pm \sqrt{x+1}$

2 answers
NO.

c. $x^2 + y^2 = 8$

$\sqrt{y^2} = \sqrt{-x^2+8}$

$|y| = \sqrt{-x^2+8}$

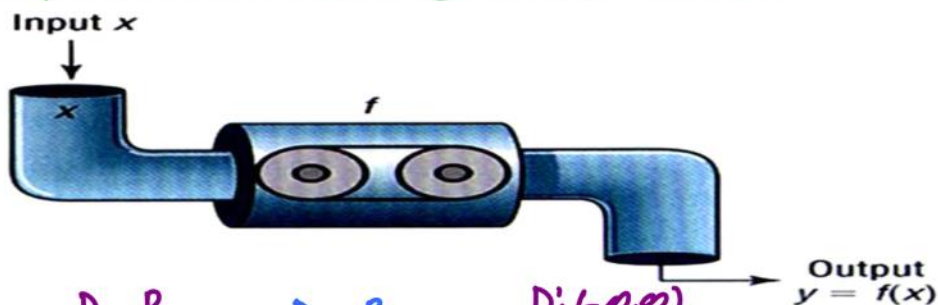
$y = \pm \sqrt{-x^2+8}$

NO

Function Notation: $y = f(x)$

- f is the **name** of the function
- y is the **dependent** variable
- x is the **independent** variable
- f(x) is the **value** of the function at x
 - Where have you seen y as dep. var. & x as ind. var.?
 - f is the name of the function, NOT another variable.

Ex. 6) Determine which of the following represent functions.
Identify the Domain and Range of each function.

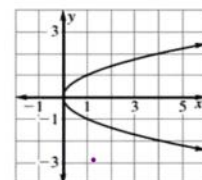
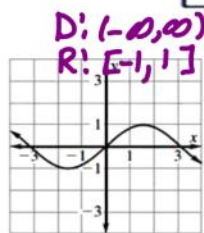


Input, x	Output, y
1	1
16	2
256	4
0	0
16	-2

yes

Input, x	Output, y
1	7
2	9
4	13
0	3
10	25

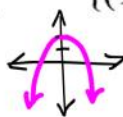
yes



D: $[0, \infty)$
R: $(-\infty, \infty)$

$y^2 = \sqrt{x}$
 $|y| = \sqrt{x}$
 $y = \pm \sqrt{x}$
NO.

$y = -x^2 + 2$
yes
D: $(-\infty, \infty)$
R: $(-\infty, 2]$



$\{(1, 5), (2, 6), (-1, -5), (-2, -6)\}$

yes
D: $\{1, 2, -1, -2\}$
R: $\{5, 6, -5, -6\}$

If time:

Ex. 7) Determine for each if y is a function of x:

a. $x^2 + y - 9 = 7$

$y = -x^2 + 16$
yes ↷

b. $-x^2 + y + x = -2$

$y = x^2 - x - 2$
yes ↷

c. $2x + 3y = 15$

$3y = -2x + 15$
 $y = -\frac{2}{3}x + 5$
yes ↗

d. $x^2 + y^2 = 16$

$\sqrt{y^2} = \sqrt{-x^2 + 16}$
 $|y| = \sqrt{-x^2 + 16}$
 $y = \pm \sqrt{-x^2 + 16}$
↑
2 outputs
NO.

○

e. $y^2 - 12x = 1$

$\sqrt{y^2} = \sqrt{12x + 1}$
 $|y| = \sqrt{12x + 1}$
 $y = \pm \sqrt{12x + 1}$
↑
2 answers for each "y"
NO