Notes for 2.2 Functions (pp. 197 – 209)

Name:
Date:
Instructor:

Topics: Relations, Functions, Domain, Range, Evaluation, Increasing, Decreasing and Constant Functions

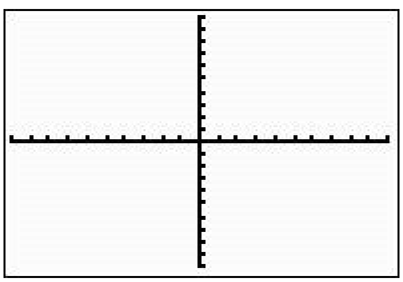
I. Relations and Functions (pp.197 – 199)

A ______________is a _____ of ordered pairs.
A _____________ is a relation in which, for each value of the _________ component of the ordered pairs, there is ___________ _________ value of the second component.
*There are no repeated x values.

Ex. Given a set of ordered pairs, decide whether each relation defines a function.
a. { (2, 4), (0, 2), (2, 5) }

b. { (-3, 1), (4, 1), (-2, 7) }

Ex. Given a graph, decide whether the relation defines a function.



Sketch the graph in the video.
Name the two points that are highlighted as the reason that the graph does not represent a function:
_____________ and _______________

The result above indicates that to be a graph of a function, the graph must pass the ________________ __________ _________, which states that if a ______________ line intersects a graph in at most ________ point, then the graph is that of a function.

Given an equation, decide whether the relation is a function or not. *Choose values that demonstrate there is more than one value that results from the number you chose.
Ex. $x = y^6$

Ex. $y = 2x - 6$

II. Domain and Range of a Function (pp. 199 – 204)

The values that x can have is called the _______________. Sometimes this is called the “input value”.
The values that y can have is called the _______________. Sometimes this is called the “output value.”

Ex. State the domain and the range for the functions below. Write the answer using interval notation.

a. $y = 2x - 6$

Domain:

Range:

b. $x = y^6$

Domain:

Range:

III. Notation for Functions (pp. 204 – 207)

Functions are written in a more formal style using ***f(x)*** and is read "*f* of *x*". This is *not* multiplication, but is a more concise way of writing an equation with the particular characteristic of no repeated x coordinates. When you *evaluate a function*, you're being asked to substitute the value from the domain (the x coordinate) and find the value of the range that results (the y coordinate). *Pay attention to the instructions… that's where the functions are defined, to be used throughout the parts of the problem.

Ex. Let $f(x) = -3x + 4$ and $g(x) = -x^2 + 4x + 1$. Find:

a. $g(-2)$

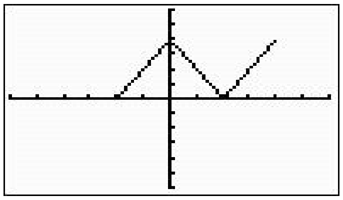
b. $f(2m - 3)$

Ex. An equation that defines *y* as a function of *x* is given. Solve for *y* in terms of *x* and replace *y* with the function notation. Find $f(3)$.
*The "replacement of *y* with the function notation" will dress the equation up a bit… makes it more formal.

$$4x - 3y = 8$$

When the *x* value is 3, then the *y* value is _______.

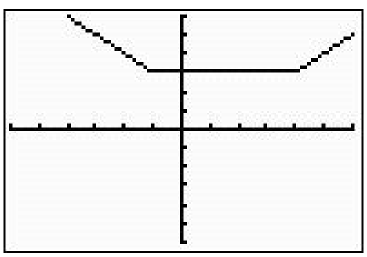
Ex. Given a graph, evaluate a function at



$f(-2)$ = ______, $f(0)$ = ______, $f(1)$ = ______, $f(4)$ = ______

IV. Increasing, Decreasing and Constant Regions of a Function (pp.207 – 209)
* Answers about increasing, decreasing and constant are always stated from the *x* (domain) point of view.
* An **increasing** interval of the domain is where the graph *rises* or goes *uphill.*
* A **decreasing** interval of the domain is where the graph *falls* or goes *downhill.*
* A **constant** interval of the domain is where the graph *stays the same*.
* This part of analysis works just like a rollercoaster… uphill, downhill, and flat.

Ex. Given a graph, determine the intervals in which the function is increasing, decreasing and constant.



Increasing:

Decreasing:

Constant:

*Not every graph will have all three types.
*Use [and] of interval notation to include the value at each endpoint (except, of course, for the infinities)

Assignment:
pp. 209 – 213 #1 – 21 odd, 23 – 39 eoo, 41 – 61 odd, 65 – 79 odd