Warm-up

ONLY WRITE WORK AND ANSWERS

solution set of $\sqrt{x-1} \geq 5$ is the set of all real numbers x such that:

a. $x > 4$
b. $x > 6$
c. $x > 24$
d. $x > 25$
e. $x > 26$

at is the expanded form of $(5x-2)^2$?

a. $25x^2 + 4$
b. $25x^2 - 20x + 4$
c. $25x^2 + 10x + 4$
d. $5x^2 - 4$
e. $25x + 4$

Unit 1: Properties of Functions

Friday, 1/27/17 1.1 Functions and Domain

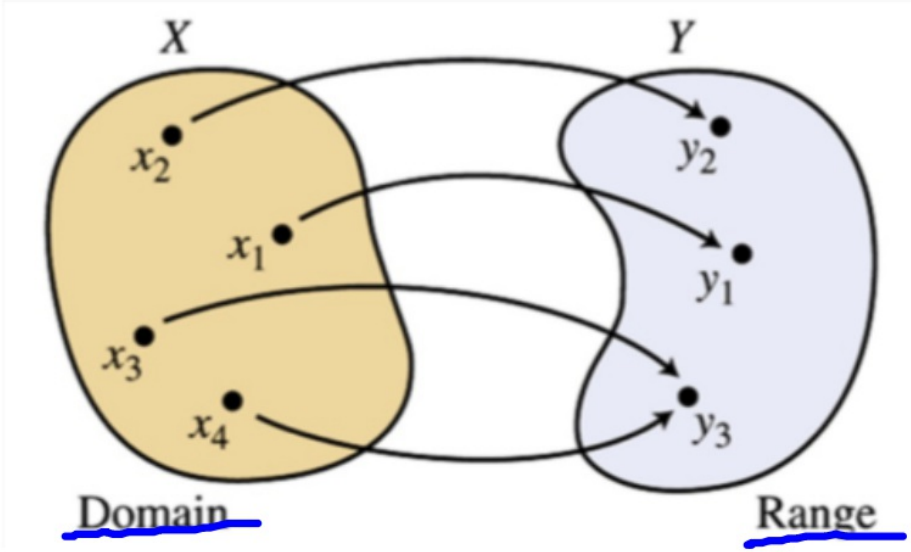
I can:

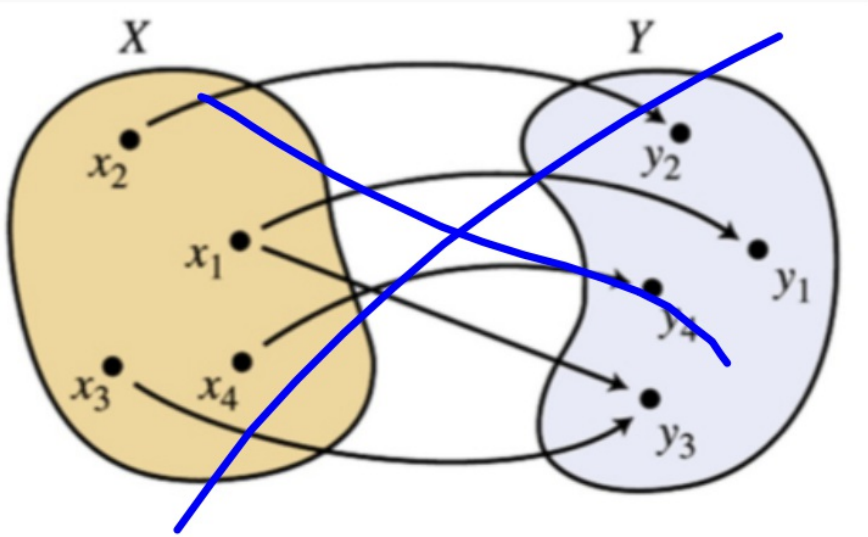
1. Determine whether a relation between two variables represents a function.
2. Write the domain of functions using interval notation.

Why?

Many natural phenomena can be modeled by functions, such as the force of water against the side of a dam or the path of a baseball through the air.

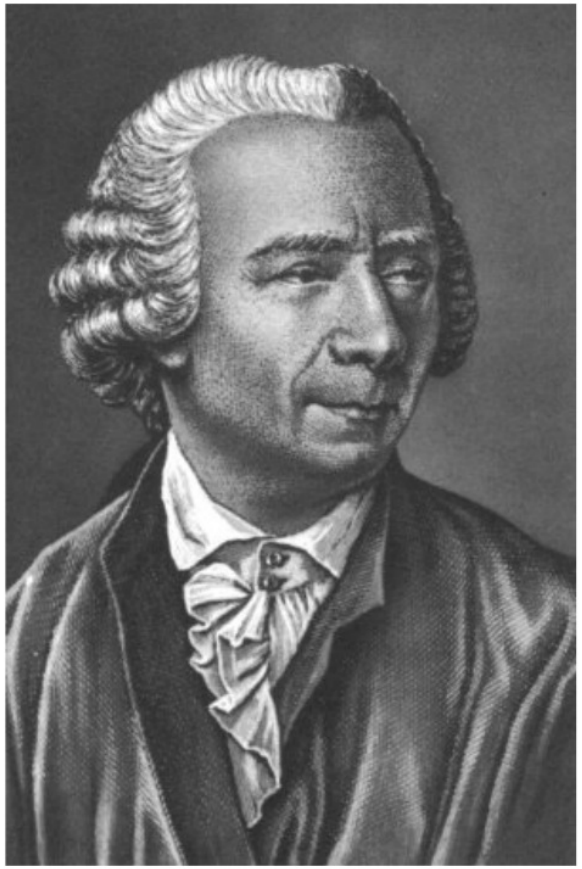
A function: a relation where each input is assigned a single unique output



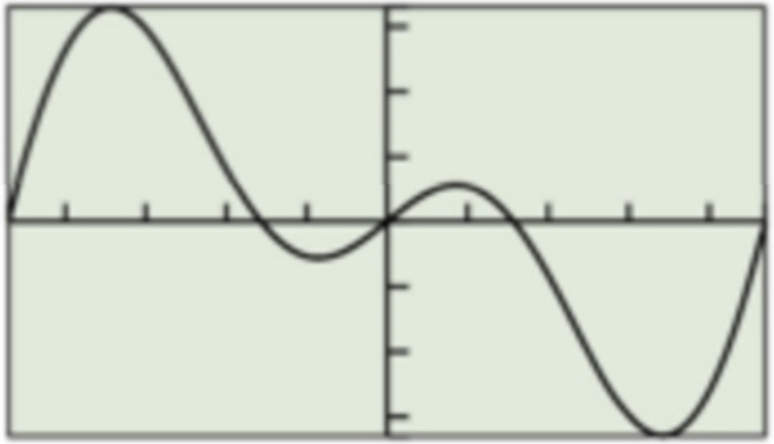


Who?

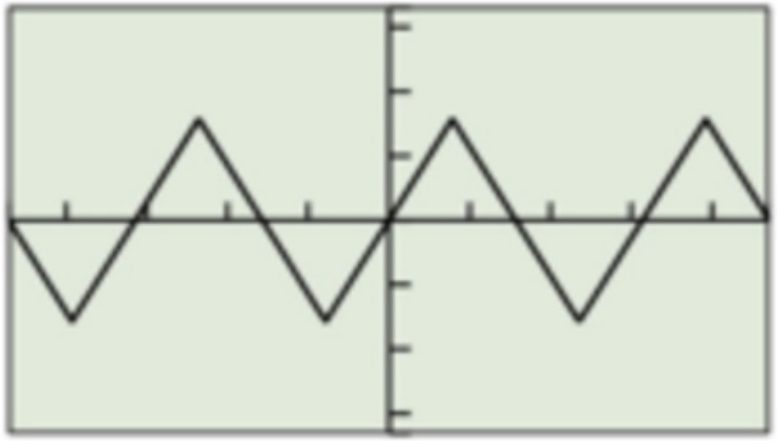
Leonhard Euler (1707-1783), a Swiss mathematician is considered to have been the most prolific and productive mathematician in history. One of his greatest influences on math was his use of symbols, or notation. The function notation $y = f(x)$ was introduced by Euler.



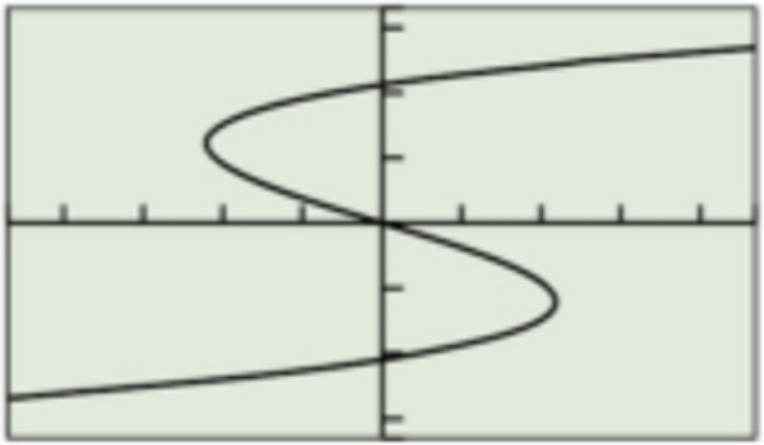
A graph (set of points (x,y)) in the xy-plane defines y as a function of x if and only if no vertical line intersects the graph in more than one point.



Function or not?



Function or not?



Function or not?

Ex 1: Determine whether each equation represents a function or not. Justify your answer.

a. $x^2 + y = 1$

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

Domain of a function: the set of all values of the independent variable (x) for which the function is defined.

General Rules for Domain:

1. Domain excludes x-values that result in division by 0

2. Domain excludes x-values that result in even roots (square root, 4th root, 6th root, etc.) of negative numbers

Ex 2: Determine the domain of each.

a. f: {(-3,0), (-1,4), (0,2), (2,2), (4,-1)}

b. $g(x) = -3x^2 + 4x + 5$

c. $h(x) = \frac{1}{x+5}$

d. Volume of a sphere: $V = \frac{4}{3}\pi r^3$

e. $k(x) = \sqrt{4-3x}$

Ex 3: Using interval notation, determine the domain of

$$f(x) = \frac{\sqrt{x+1}}{x-3}$$

Ex 4: Using interval notation, determine the domain of

$$y = \frac{x+3}{\sqrt{x+2}}$$

Think Tank 1.1

Hint Zone

Volume of a right ciruclar cylinder:

$\frac{h}{r} = 4$

a. $V(r) = \pi r^2 h$

Write V as a function of r.

$= \pi r^2(4r)$

$= 4\pi r^3$

b. $V(h) = \pi\left(\frac{h}{4}\right)^2 h$

Write V as a function of h.

$= \frac{\pi h^3}{16}$

1.1 Exit Ticket

HW p. 102 #1-16

16. A number q has a remainder of 5 when divided by 6. What is the remainder when $3q$ is divided by 6?

F. 0
G. 1
H. 3
J. 4
K. 15

Here's How to Crack It

In this case, the unknown is very explicitly stated, so we can go ahead and think of a number that fits the bill. First and foremost, we must choose a number that satisfies the restrictions imposed by the question. When we divide q by 6, we must have 5 left over. Could we make $q = 12$? Definitely not, because it would divide evenly and leave 0 as the remainder. We could, however, make q equal to 17; if we divided $\frac{17}{6}$, we would be able to divide evenly only twice (giving us 12). What's the remainder? 17 – 12 would leave us with 5, so we know our numbers work.

Let's move to the second step in the problem: What would the remainder be if $3q$ were divided by 6? In our scenario, $3q$ would equal 51. How many times can we divide 6 into 51? Only 8 times, because $6 \times 8 = 48$. How much is left over before we get to 51? Only 3. Thus, our answer is (H).