

# MA 109: August 23

Function Notation – Evaluating Functions

## Start of Class

### Instructor Information

Name:

Email:

Office Hours:

## Warm-up Questions

## Notes

What is a function?

a machine that turns inputs into outputs

$$\begin{array}{c} \text{name} \swarrow \quad \downarrow \text{input} \\ f(x) = y \\ \swarrow \quad \downarrow \quad \searrow \text{output} \\ \text{"f of x"} \end{array}$$

Example: Suppose  $f(x) = x + 4$ . What is  $f(-3)$ ?

$x$  is a placeholder for the input  
input is  $-3$

Strategy: replace all the  $x$ 's with  $-3$

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

$$f(-3) = -3 + 4 = 1$$

answer:  $\boxed{1}$

Constant functions are functions that...

always give the same output

Example: Suppose  $f(x) = 42$ . What is  $f(-1)$ ?

↑  
no x's in formula, so nowhere to put the -1, so the input doesn't matter

Answer:  $f(-1) = 42$

Inputs can be anything!

Example: Suppose  $f(x) = 3x^2 - 7$ . What is  $f(a+1)$ ?

↑  
input is  $(a+1)$

strategy: replace all x's with  $a+1$

$$f(x) = 3x^2 - 7$$

$$f(a+1) = 3(a+1)^2 - 7$$

answer:  $3(a+1)^2 - 7$

→ do not simplify unless told to do so

Note: don't forget the parentheses!

$3(a+1)^2 - 7$  is NOT the same as  $3a+1^2 - 7$

Piecewise Functions are functions that...

use different formulas, depending on the input

$$p(x) = \begin{cases} 5 - x & x > 2 \\ \pi & 0 \leq x \leq 2 \\ x^2 + 1 & x < 0 \end{cases}$$

how to know which formula to use, START HERE

Example: Suppose  $p(x)$  is given as above. What is  $p(0)$ ?

First, figure out which formula to use. See which inequality is true for  $x=0$ :

$$\begin{aligned} 0 &> 2 && \text{no} \\ 0 &\leq 0 \leq 2 && \text{yes!} \\ 0 &< 0 && \text{no} \end{aligned}$$

so, plug 0 into the second formula. It is a constant, so

answer:  $p(0) = \pi$

## End of Class

Write a summary of what you learned today:

What questions do you have about the material from today?

What do you need to do between now and the next class meeting?