

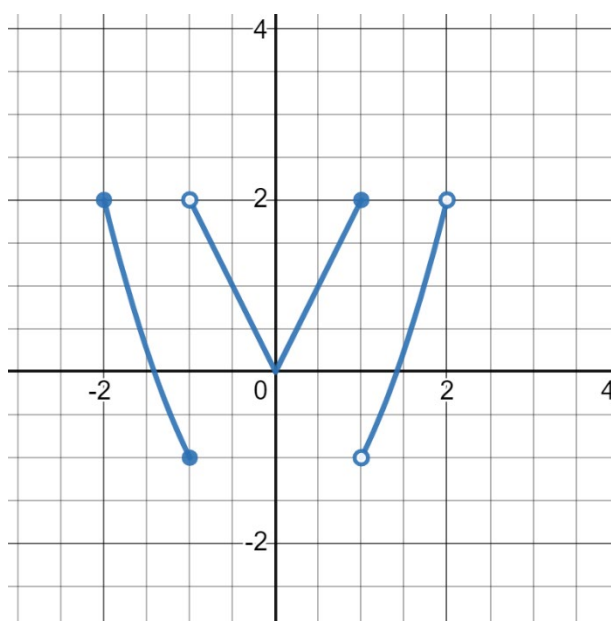
# Math 1151 Workshop 0: Refresh and Tips

## Mathematics and Statistics Learning Center

([mslc.osu.edu/tutoring](http://mslc.osu.edu/tutoring))

Problem 1: Try on your own, write down any questions, then look for answers

Consider the following graph of a function  $f$ :



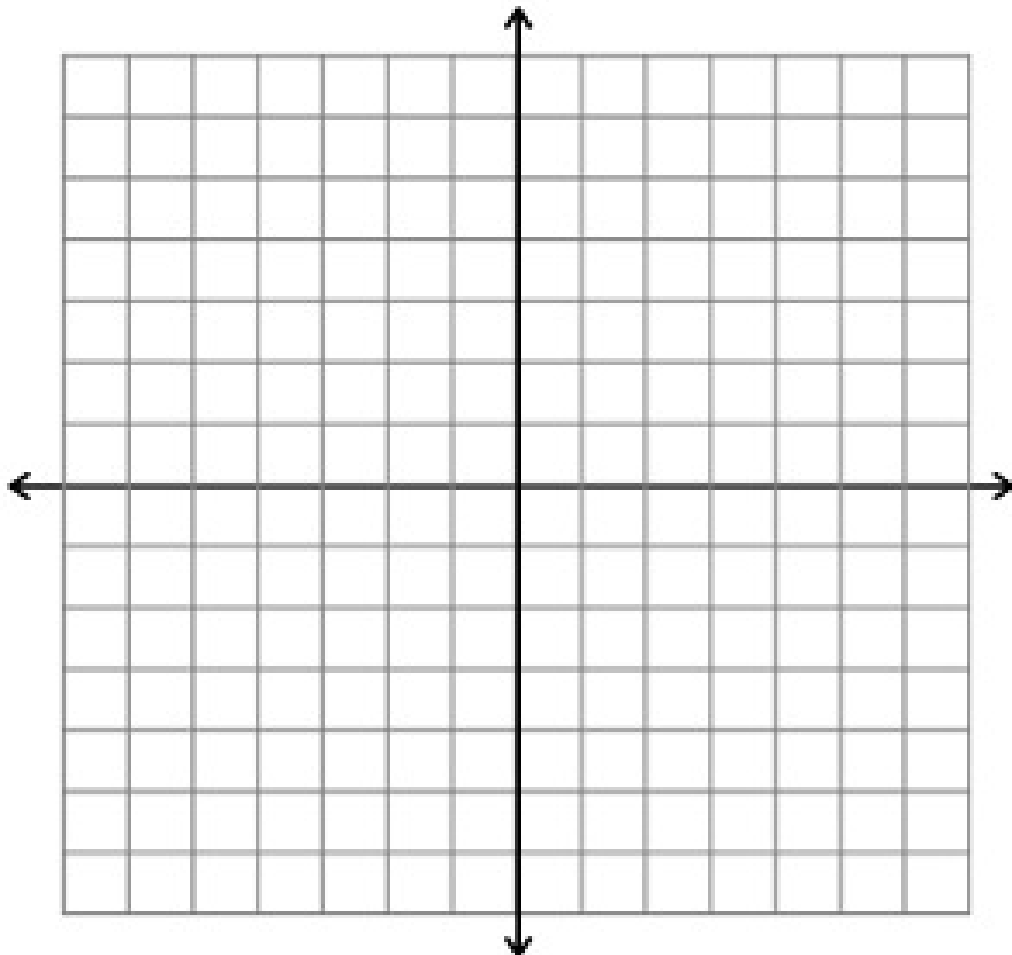
- What is the domain of the function  $f$ ?
- What is the range of the function  $f$ ?
- What is the  $y$ -intercept of the graph?
- What is  $f(-1)$ ?
- Solve the equation  $f(x) = 2$ .
- Is the function  $f$  odd, even, or neither?
- List the intervals where  $f$  is increasing.
- List the intervals where  $f$  is decreasing.

- i) Is the function  $f$  invertible?
- j) Give an interval where  $f$  is one-to-one.

Problem 2: Reflect on the problem after finishing: why did I ask it?

Draw a graph below of a function  $f$  with the following properties.

- a) The domain of  $f$  is  $[-4,3)$ .
- b) The range of  $f$  is  $[-3,3)$ .
- c) The  $y$ -intercept of the graph of  $f$  is  $(0,0)$ .
- d)  $f(-1) = 2$
- e)  $f$  is increasing on the interval  $(-3, -2)$ .
- f)  $f$  is decreasing on the interval  $(0,1)$ .
- g)  $f$  is one-to-one on the interval  $(2,3)$ .



Problem 3: Use previous parts of the problem to help

Determine the domain of the function  $f$ . Recall that an expression is undefined if its denominator is 0, it has a negative underneath an even root, or the argument of a logarithm is non-positive.

a)  $f(x) = \frac{x}{x+2}$

b)  $f(x) = \sqrt{1-x}$

c)  $f(x) = \log(7x)$

d)  $f(x) = \frac{2}{x^2-4}$

e)  $f(x) = \frac{\sqrt{1-x}}{x+2}$

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

g)  $f(x) = \frac{1}{\log(7x)}$

Problem 4: Use Desmos to find the answers and then work in groups to justify your answers without graphing

Evaluate the following:

a)  $\ln(e^{-5})$

b)  $e^{\ln(-5)}$

c)  $\sqrt{4^2}$

d)  $\sqrt{(-4)^2}$

Are any of the results surprising? Can you explain them? Explanation is a key skill we want you to learn in Calc 1.

Problem 5: Explain what you found to a partner and come to an agreement

Recall the following logarithm rules:

1.  $\log_b(xy) = \log_b(x) + \log_b(y)$
2.  $\log_b(x/y) = \log_b(x) - \log_b(y)$
3.  $\log_b(x^p) = p \log_b(x)$

Combine the following logarithms into one logarithm with coefficient 1.

$$\log(x) - \frac{1}{2}\log(y) + 3\log(z)$$

Expand the following logarithm as much as possible. Try to have the inputs to the logarithms be as simple as possible.

$$\log\left(\frac{x^2\sqrt{y}}{z^3}\right)$$