Name: _____

MATH 1010 LAB ACTIVITY: EXPONENTS AND RADICALS

Part 1: Exponent Rules

Let's begin by practicing with exponent rules. Here are the Definitions and Properties of Exponents from your textbook for reference:

Definitions and Properties of Exponents

The following summary assumes that no denominators are 0 and that 0^0 is not considered, and is true for any integers m and n.

1 as an exponent:	$a^1 = a$
0 as an exponent:	$a^0 = 1$
Negative exponents:	$a^{-n} = \frac{1}{a^n}$
	$\frac{a^{-n}}{b^{-m}} = \frac{b^m}{a^n}$
	$\left(\frac{a}{b}\right)^{-n} = \left(\frac{b}{a}\right)^n$
The Product Rule:	$a^m \cdot a^n = a^{m+n}$
The Quotient Rule:	$\frac{a^m}{a^n} = a^{m-n}$
The Power Rule:	$(a^m)^n = a^{mn}$
Raising a product to a power:	$(ab)^n = a^n b^n$
Raising a quotient to a power:	$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

1. Fill-in the following versions for rational exponents:

   Negative exponents: $a^{-\frac{m}{n}} = \frac{1}{\_\_\_\_}$

   The Product Rule: $a^{\frac{m}{n}} \cdot a^{\frac{p}{q}} =$ _____

   The Power Rule: $\left(a^{\frac{m}{n}}\right)^{\frac{p}{q}} =$ _____

   Raising a product to a power: $(ab)^{\frac{m}{n}} =$ _____

Simplify. Assume that all variables represent nonzero integers.

2. $x^4(3x)^2 =$ _____

3. $x^6x^0 =$ _____

4. $\frac{3^{-4}}{3^7} =$ _____ (leave in exponential form)

5. $\frac{x^{-5}y^9}{x^{-2}y^7} =$ _____

6. $\frac{24x^{10}}{8x^8} =$ _____

7. $x^{\frac{1}{5}}x^{\frac{4}{5}} =$ _____

8. $\dfrac{y^{\frac{9}{10}}}{y^{\frac{2}{5}}} =$ _____

9. Here's a challenging one!
$\left(\dfrac{-4x^4y^{-2}}{5x^{-1}y^4}\right)^{-4} =$ _____

Part 2: Graphing Radical Functions

Domains and Radical Functions

Recall that only nonnegative numbers have square roots that are real numbers.

1. Find the domain of f if $f(x)=\sqrt{5-x}$ by solving the inequality $5-x\geq 0$

2. Now find the domain of $f(x)=\sqrt{2x-5}$

3. Find the domain of $f(x)=\sqrt[3]{x-1}$ (Hint: see page 433 in your textbook.)

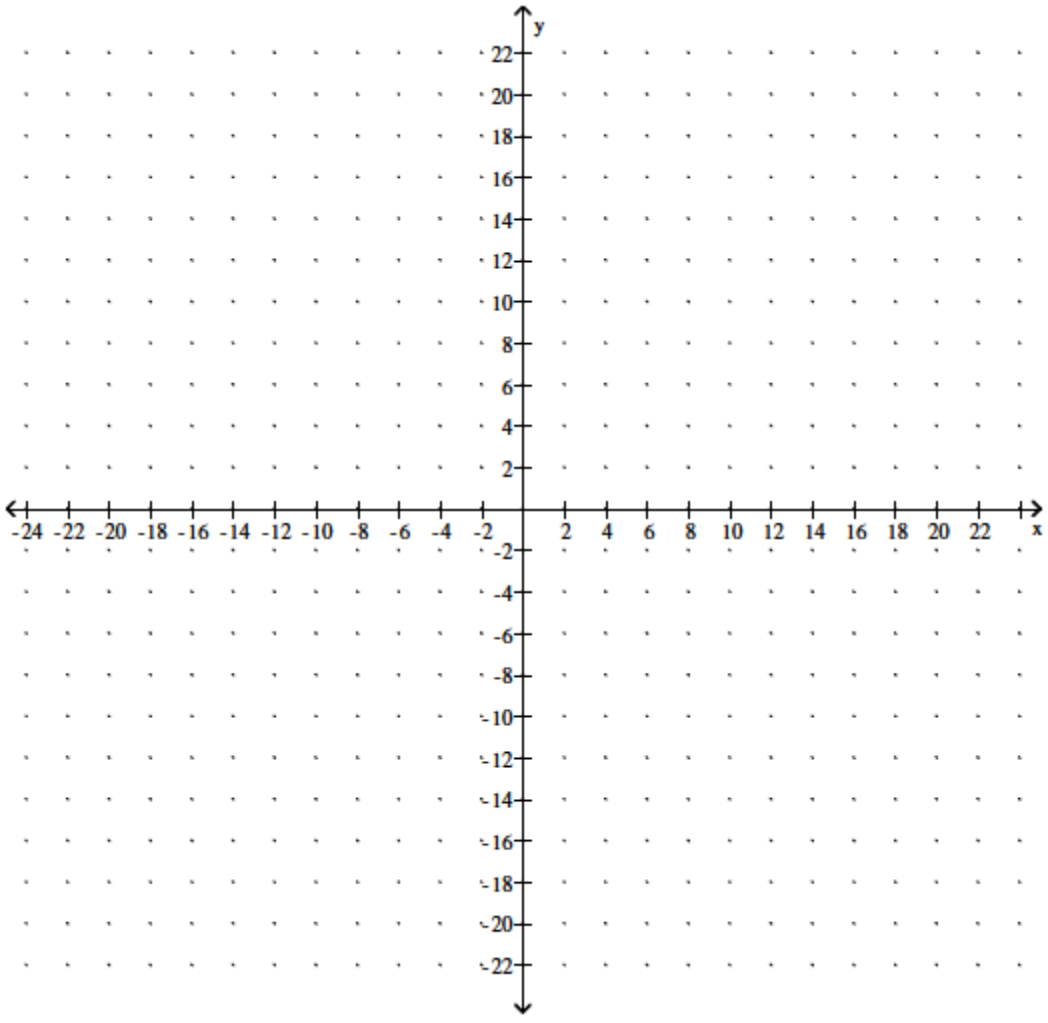
Graphing the Square Root Function

Given the function $f(x)=\sqrt{x}$

1. State the domain of the function: _____
2. List at least **five** exact (x, y) ordered pairs that lie on the graph of this function. Think about the domain as you choose your *x* values! Fill in the following chart:

x	y	(x, y)
0	$\sqrt{0}=0$	$(0,0)$
1		
4		
9	$\sqrt{9}=3$	$(9,3)$
16		

3. Plot your points to graph the function.



4. Compare your graph to the graph of another student. Are they the same? Discuss the graph with your lab buddy and be sure you agree.

Graphing the Cube Root Function

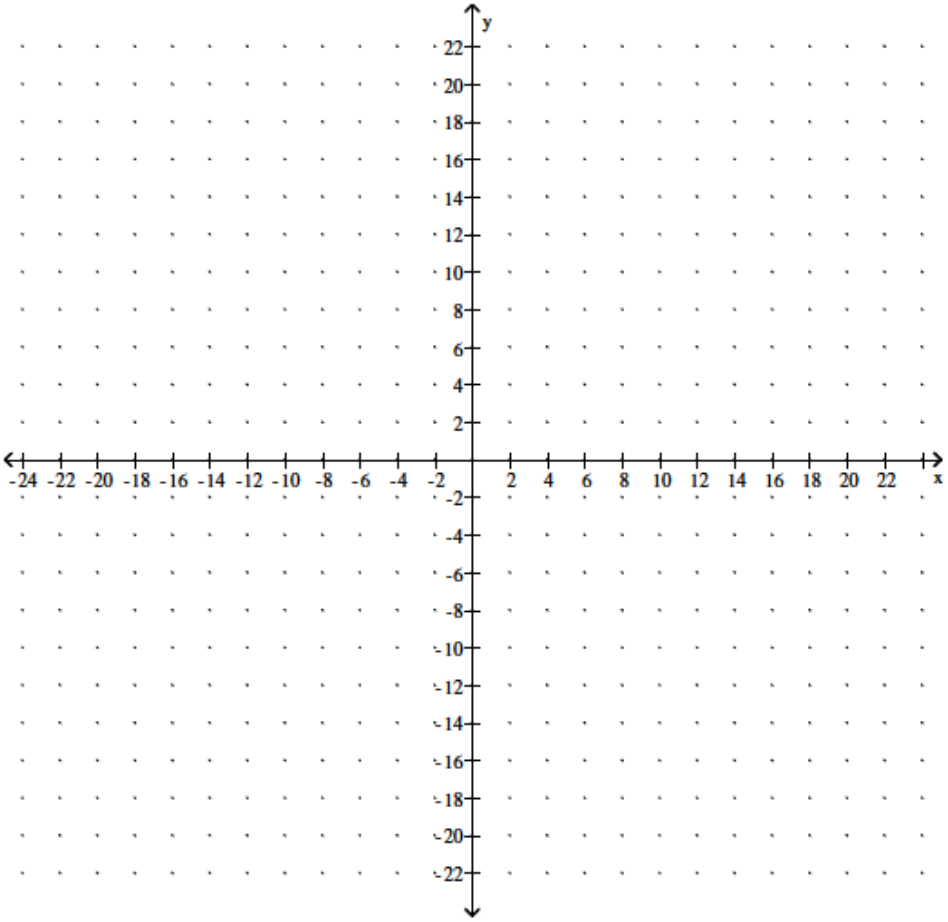
Given the function $f(x) = \sqrt[3]{x}$

1. State the domain of the function:

2. List at least **five** exact (x, y) ordered pairs that lie on the graph. Think about the domain as you choose your x values!

x	y	(x, y)

3. Plot your points to graph the function.



4. Compare your graph to the graph of another student. Are they the same? Did you use the same points? Discuss the graph with your lab buddy and be sure you agree.