Chapter 8 Calendar **Name:** _____

Day	Date	Assignment (Due the next class meeting)
Wednesday Thursday	2/16/22 2/17/22	**8 Day 1 Notes: Compositions** HW: 8 Day 1 Worksheet
Friday Tuesday	2/18/22 2/22/22	**8 Day 2 Notes: Inverses of Linear and Quadratic Functions** HW: 8 Day 2 Worksheet
Wednesday Thursday	2/23/22 2/24/22	**8 Day 3 Notes: Simplifying Radicals** HW: 8 Day 3 Worksheet
Friday Monday	2/25/22 2/28/22	**8 Day 4 Notes: Solving Radical Equations** HW: 8 Day 4 Worksheet
Tuesday Wednesday	3/1/22 3/2/22	**8 Day 5 Notes: Graphing Square and Cube Root Functions** HW: 8 Day 5 Worksheet
Thursday Friday	3/3/22 3/4/22	**Review Chapter 8** HW: Practice Test
Monday Tuesday	3/7/22 3/8/22	**Chapter 8 Extra Review** HW: Extra Review
Wednesday Thursday	3/9/22 3/10/22	**Ch 8 Test**

- Be prepared for daily quizzes.
- Every student is expected to do every assignment for the entire unit.
- Try www.khanacademy.org or www.mathguy.us if you need help outside of school hours.
- Students who complete 100% of the assignments for the semester will receive a 2% bonus.

8 Day 1 Notes: Composition of Functions

Work with a partner to perform the indicated operations given $f(x) = 2x^2 - x + 11$, $g(x) = 7x - 9, and\ h(x) = -x^2 + 6$.

a) $f(x) + h(x)$

c) $g(x) - f(x)$

b) $g(x) \bullet h(x)$

Functional Notation:

$f(x)$ = rule

What does the word "composition" mean?

Use the following worked-out examples as a model to help you with the following examples:

Example: Find $f(3)$ if $f(x) = 8x - 1$.

$= 8(3) - 1$

$= 24 - 1$

so $f(3) = 23$

Try the following problems with a partner:

1) Find $g(-2)$ if $g(x) = -7x + 9$.

2) Find $h(5)$ if $h(x) = -2x^2 + 23$.

3) Find $d(-8)$ if $d(x) = \frac{3}{4}x + 6$.

Example: Solve for x if $f(x) = 5x - 3$ and $f(x) = 17$.

$17 = 5x - 3$

$20 = 5x$

so $4 = x$

Try the following problems with a partner:

1) Solve for x if $g(x) = 2x + 9$ and $g(x) = -33$

2) Solve for x if $h(x) = -2x - 3$ and $h(x) = 6$

3) Solve for x if $d(x) = x^2 + 7$ and $d(x) = 32$

More examples: If $f(x) = 6x + 18$, $g(x) = 9x - 1$, and $h(x) = -3x + 7$, then find the following compositions.

Example 4: Find $f(g(x))$.

Example 5: Find $g(f(x))$.

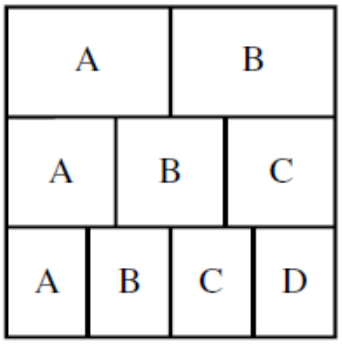
Example 6: Find $h(g(x))$.

Example 7: Find $h(h(x))$.

Example 8: Find $f(g(-6))$.

Your notes on composition of functions:

Example 9: The square below is divided into 3 rows of equal area. In the top row, the region labeled A has the same area as the region labeled B. In the middle row, the 3 regions have equal areas. In the bottom row, the 4 regions have equal areas. What fraction of the square's area is in a region labeled A?



8 Day 2 Notes: Inverses of Linear and Quadratic Functions

What do you think the word "inverse" means in math? Hint: What is the inverse of adding? What is the inverse of dividing?

Exploration: Complete the following input/output tables for the given linear functions. What do you notice?

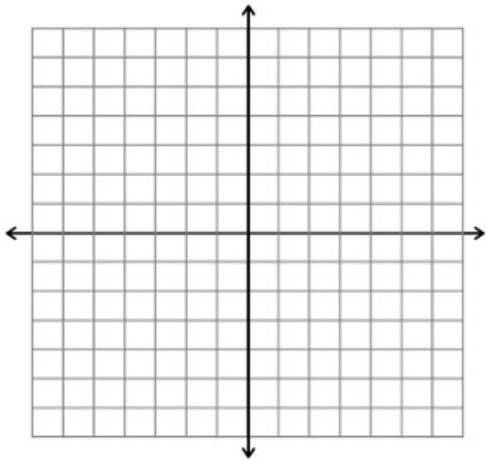
Function A: $f(x) = 3x - 6$

x	$f(x)$
3	
2	
1	
0	

Function B: $g(x) = \frac{1}{3}x + 2$

x	$g(x)$
3	
0	
-3	
-6	

Now graph each function on the coordinate system below. Then draw the line $y = x$. What do you notice?

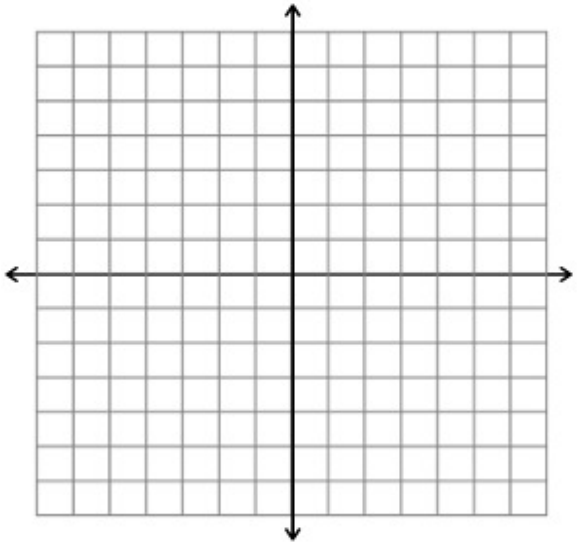


Now find $f(g(x))$ and $g(f(x))$. What do you notice?

Properties of Inverse Functions:

Example 1: Graph the following lines on the same coordinate plane. Are they inverse functions? How do you know?

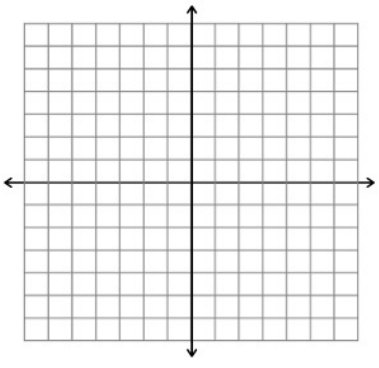
$y = 2x + 4$ and $y = -\frac{1}{2}x - 4$



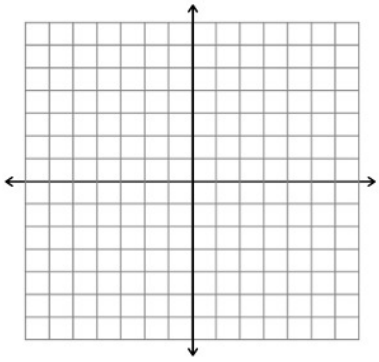
How to find the inverse (y^{-1}) of a function:

Examples: Find the inverse of each linear function. Then graph both functions on the same coordinate plane.

2) $y = 4x - 4$

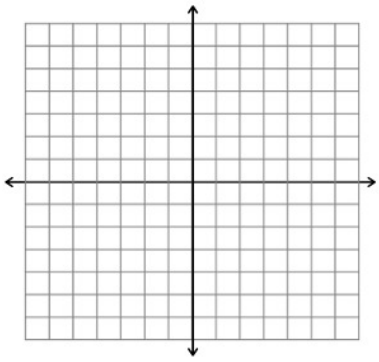


3) $g(x) = \frac{2}{3}x - 4$



4) Are the following functions inverses? Explain your reasoning.
$h(x) = 6x - 1$ and $k(x) = 6x + 1$

Now, graph the function $h(x) = x^2$

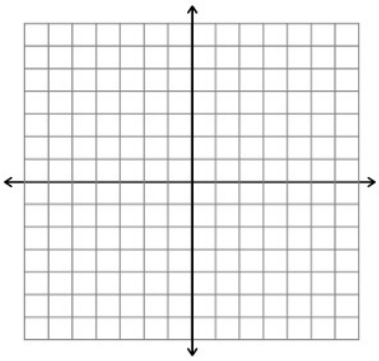


Switch the input and output values from the graph above and graph the new ordered pairs on the same grid. What did you just graph?

This new graph is not a function. How can you limit the domain of $h(x)$ so that the inverse is also a function?

The inverse of a quadratic function is a _____ _____ function.

Example 6) Find the inverse of $f(x) = 4x^2$ if $x \geq 0$. Then graph both functions on the same grid.



Example 7) Find the inverse of $y = x^2 - 8$ if $x \geq 0$.

Example 8) Determine if $f(x) = x^2 + 3$ and $g(x) = \sqrt{x - 3}$ are inverses if $x \geq 0$. Explain.

Example 9) Write a function.

Now, find its inverse.

Finally, is the inverse a function? Explain your reasoning.

8 Day 3 Notes: Simplifying Radicals

Work with a partner to simplify $\sqrt{200}$.

Now simplify $\sqrt{27x^7y^2}$

What do you think $\sqrt[3]{\ }$ means? What about $\sqrt[4]{\ }$?

n^{th} root: index of a radical:

Another way to write a radical is with a rational exponent.

$\sqrt[n]{x^1} = x^{\frac{1}{n}}$ so we can write $\sqrt{64}$ as or $8^{\frac{1}{3}}$ as

Examples: Simplify.

1) $50^{\frac{1}{2}}$

2) $(-20x^2y)^{\frac{1}{2}}$

3) $\sqrt[3]{27a^3b^7}$

4) $(-32xy^8z^{10})^{\frac{1}{3}}$

5) $\sqrt[4]{625x^{48}y^{36}z^{72}}$

6) $2\sqrt[3]{-64a^5}$

7) $-3\sqrt[4]{162e^{12x}}$

You try these!

a) $\sqrt[3]{256x^4y^6}$

b) $\sqrt[5]{-32a^{20}b^{17}c^9}$

c) $\sqrt[3]{-16a^{13}}$

d) $2(32x^7y^9)^{\frac{1}{2}}$

e) Create a radical that could be simplified to $2e^{3x}\sqrt[3]{2e^{2x}}$

Adding and Subtracting with Radicals

With a partner to simplify $\sqrt{6} + 3\sqrt{6}$. Check your answer with a calculator.

We can add or subtract radicals as long as they have the same radicand.

Examples: Simplify.

8) $3\sqrt{8} - 4\sqrt{2}$

9) $10\sqrt[3]{y} - 6\sqrt[3]{y}$

10) $\sqrt[4]{48} - \sqrt[4]{3}$

11) $7\sqrt[3]{2a^5} - a\sqrt[3]{16a^2}$

You try these!

a) $3\sqrt[3]{8} + \sqrt[3]{108} - 2\sqrt[3]{32}$

b) $7x^5y^{\frac{1}{2}} + 13y^{\frac{1}{2}}x^5$

12) As part of a probability experiment, Elliot is to answer 4 multiple-choice questions. For each question, there are 3 possible answers, only 1 of which is correct. If Elliot randomly and independently answers each question, what is the probability that he will answer 4 questions correctly?

8 Day 4 Notes: Solving Radical Equations

Examples: Solve the following equations. Check for extraneous solutions.

Step 1:

Step 2:

Step 3:

Work with a partner to solve the following equations for *x*:

1) $\sqrt{3x+2} = 3$

2) $\sqrt{x+6} = \sqrt{2x-3}$

Examples: Solve the following equations. Check for extraneous solutions.

3) $\sqrt[3]{12x} = 6$

4) $2\sqrt{6x-7} + 14 = 4$

5) $x - 2 = \sqrt{x+10}$

Check example 5 by graphing it in your graphing calculator. Graph $f(x) = x - 2$ and $g(x) = \sqrt{x + 10}$ on the same screen. What do you notice?

You try! Solve the following equations. Check for extraneous solutions.

a) $\sqrt[3]{x - 4} + 3 = -1$

b) $\sqrt{x - 3} + 5 = x$

8 Day 5 Notes: Graphs of Square and Cube Root Functions

Use a table of values to graph the parent radical function: $y = \sqrt{x}$

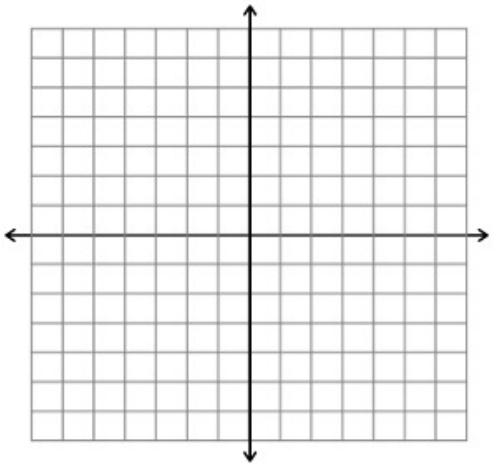
Identify the following key features:

Endpoint:

Domain:

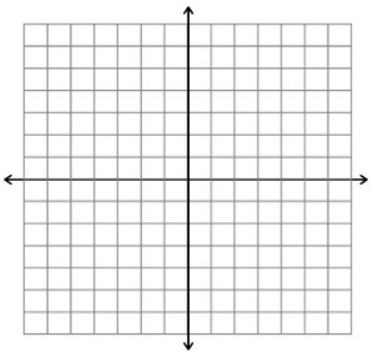
Range:

End Behavior:



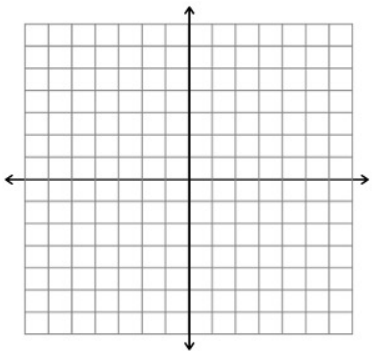
Examples: For each radical function $y = a\sqrt{x-h}+k$, describe the transformation from the parent function $y=\sqrt{x}$, identify the domain and range, sketch the graph, and identify the end behavior.

1) $y = 2\sqrt{x}$



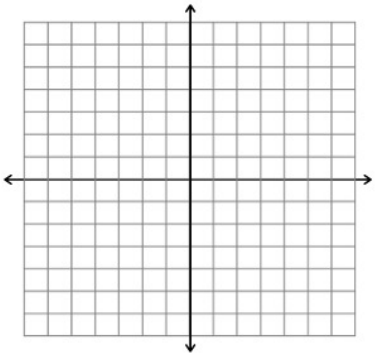
Domain:
Range:
End Behavior:

2) $y = \sqrt{x-2}$



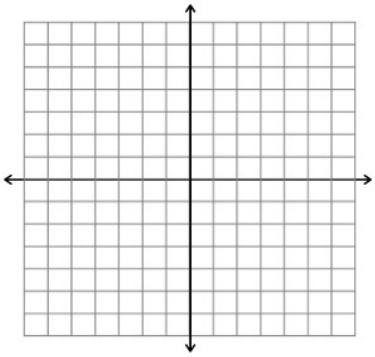
Domain:
Range:
End Behavior:

3) $y = -\sqrt{x}+3$



Domain:
Range:
End Behavior:

4) $y = \frac{1}{5}\sqrt{x+3}-4$



Domain:
Range:
End Behavior:

Use a table of values to graph the parent cube root function: $y=\sqrt[3]{x}$

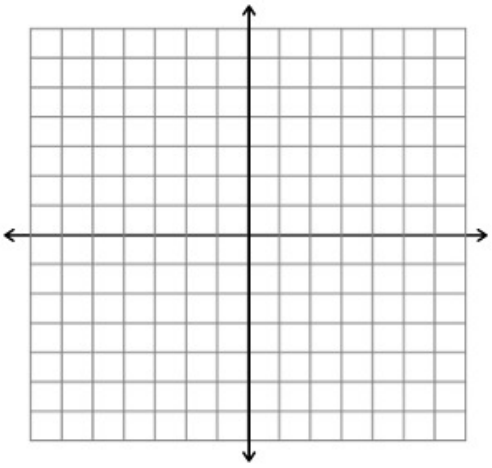
Identify the following key features:

"Center"

Domain:

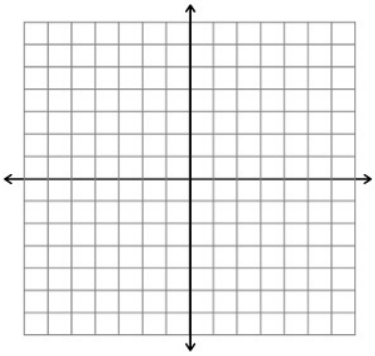
Range:

End Behavior:



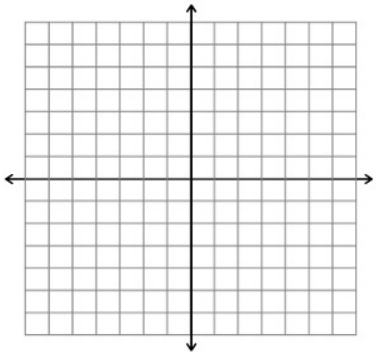
Examples: For each radical function $y = a\sqrt[3]{x-h}+k$, describe the transformation from the parent function $y = \sqrt[3]{x}$, identify the domain and range, sketch the graph, and identify the end behavior.

5) $y = \sqrt[3]{x+2}-3$



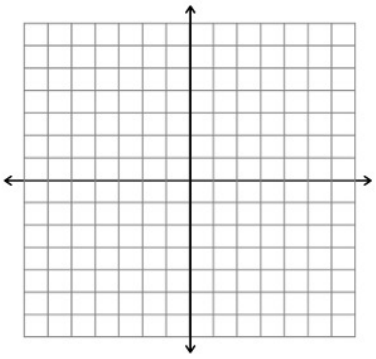
Domain:
Range:
End Behavior:

6) $y = 2\sqrt[3]{x}+4$



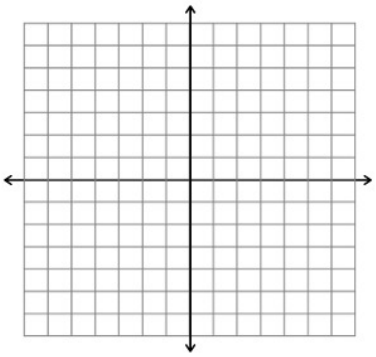
Domain:
Range:
End Behavior:

7) $y = -\sqrt[3]{x+5}$



Domain:
Range:
End Behavior:

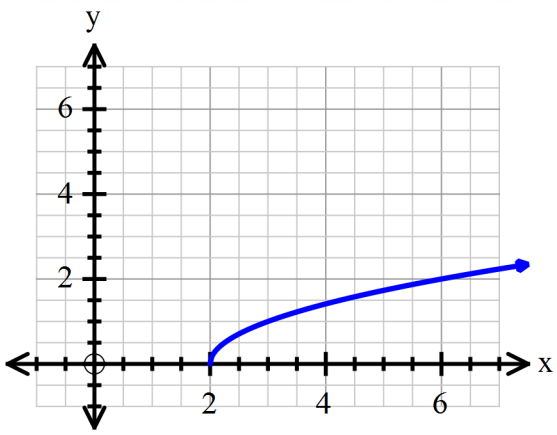
8) $y = 2 + \frac{1}{2}\sqrt[3]{x-3}$



Domain:
Range:
End Behavior:

Example 9) Translate the graph of $y = \sqrt{x}$ so that it has a range of $y \geq 3$.

Example 10) Which of the following statements about the graph of f(x) is correct?



A.) $\boldsymbol{f(x)}$ is increasing over the interval $(-\infty, \infty)$.

B.) $\boldsymbol{f(x)}$ is increasing over the interval $[2, \infty)$.

C.) $\boldsymbol{f(x)}$ is decreasing over the interval $(-\infty, \infty)$.

D.) $\boldsymbol{f(x)}$ is decreasing over the interval $[2, \infty)$.