Name _____ Date _____ Class _____

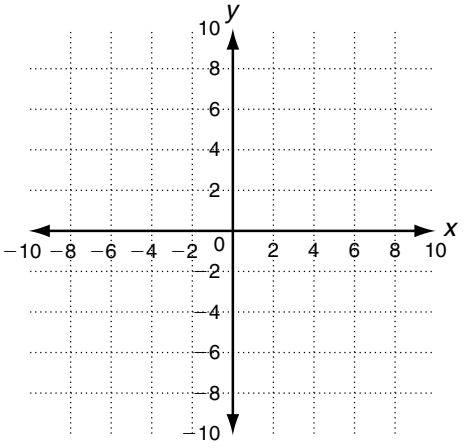
LESSON 8-7

Practice C

Radical Functions

Graph each function or inequality.

1. $g(x) = \frac{1}{2}\sqrt[3]{x} - 3$



a. Identify the domain and range.

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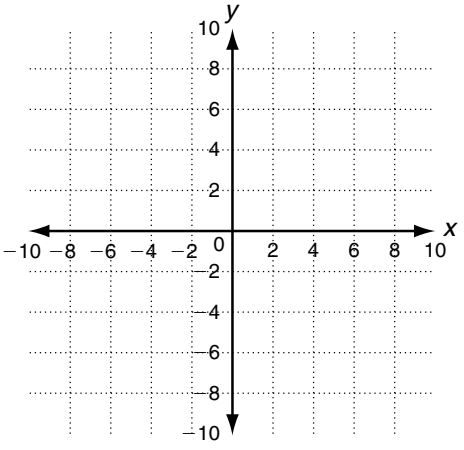
_____

2. $y \geq 4\sqrt{x + 2} - 6$



a. Describe the solution region.

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Use the description to write the square root function *g*.

3. The parent function $f(x) = \sqrt{x}$ is compressed vertically by a factor of $\frac{1}{4}$, reflected across the *x*-axis, and translated 6 units up.

_____

4. The parent function $f(x) = \sqrt{x}$ is translated 8 units left, reflected across the *y*-axis, and stretched horizontally by a factor of 3.

_____

Solve.

5. The frequency, *f*, in Hz, at which a simple pendulum rocks back and forth is given by $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$, where *g* is the strength of the gravitational field at the location of the pendulum, and *l* is the length of the pendulum.

a. Find the frequency of a pendulum whose length is 1 foot and where the gravitational field is approximately 32 ft/s^2.

_____

b. The strength of the gravitational field on the moon is about $\frac{1}{6}$ as strong as on Earth. Find the frequency of the same pendulum on the moon.

_____

LESSON 8-7

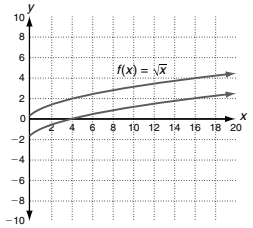
Practice A

Radical Functions

Graph each function.

1. $g(x) = \sqrt{x} - 2$

x	$g(x)$	$(x, g(x))$
0	$\sqrt{0} - 2 = -2$	$(0, -2)$
1	$\sqrt{1} - 2 = -1$	$(1, -1)$
4	$\sqrt{4} - 2 = 0$	$(4, 0)$
9	$\sqrt{9} - 2 = 1$	$(9, 1)$
16	$\sqrt{16} - 2 = 2$	$(16, 2)$



a. Describe the transformation from the parent function.

Translation 2 units down

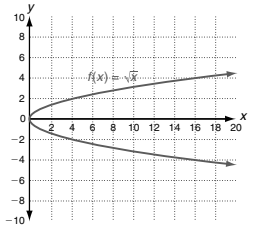
b. Identify the domain and range.

Domain: $\{x \mid x \geq 0\}$; range: $\{y \mid y \geq -2\}$

2. $g(x) = -\sqrt{x}$

a. Complete the table of values, then graph.

x	$g(x)$	$(x, g(x))$
0	$-\sqrt{0} = 0$	$(0, 0)$
1	$-\sqrt{1} = -1$	$(1, -1)$
4	$-\sqrt{4} = -2$	$(4, -2)$
9	$-\sqrt{9} = -3$	$(9, -3)$
16	$-\sqrt{16} = -4$	$(16, -4)$



b. Describe the transformation from the parent function.

Reflection across the x-axis

c. Identify the domain and range.

Domain: $\{x \mid x \geq 0\}$; range: $\{y \mid y \leq 0\}$

Solve.

3. Dale wants to horizontally stretch the function $f(x) = \sqrt{x + 5}$ by a factor of 3. He writes the function $f(x) = \sqrt{3(x + 5)}$. Is he correct? If not, what is the correct function?

No; $g(x) = \sqrt{\frac{1}{3}(x + 5)}$

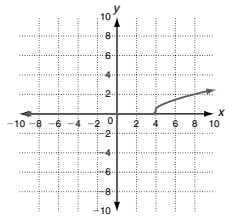
LESSON 8-7

Practice B

Radical Functions

Graph each function, and identify its domain and range.

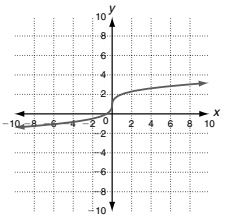
1. $f(x) = \sqrt{x - 4}$



Domain: $\{x \mid x \geq -4\}$

Range: $\{y \mid y \geq 0\}$

2. $f(x) = \sqrt[3]{x} + 1$



Domain: all real numbers

Range: all real numbers

Using the graph of $f(x) = \sqrt{x}$ as a guide, describe the transformation.

3. $g(x) = 4\sqrt{x + 8}$ — Vertical stretch by a factor of 4 and translate 8 units left

4. $g(x) = -\sqrt{3x} + 2$ — Reflection across the x-axis, horizontal compression by a factor of $\frac{1}{3}$, and translate 2 units up

Use the description to write the square root function g.

5. The parent function $f(x) = \sqrt{x}$ is reflected across the y-axis, vertically stretched by a factor of 7, and translated 3 units down. $g(x) = 7\sqrt{-x} - 3$

6. The parent function $f(x) = \sqrt{x}$ is translated 2 units right, compressed horizontally by a factor of $\frac{1}{2}$, and reflected across the x-axis. $g(x) = -\sqrt{2(x - 2)}$

Solve.

7. For a gas with density, n, measured in atoms per cubic centimeter, the average distance, d, between atoms is given by $d = \left(\frac{3}{4\pi n}\right)^{\frac{1}{3}}$. The gas in a certain region of space has a density of just 10 atoms per cubic centimeter. Find the average distance between the atoms in that region of space.

0.29 cm

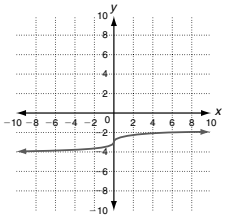
LESSON 8-7

Practice C

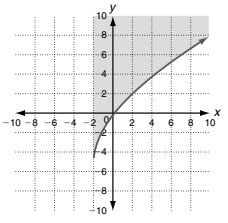
Radical Functions

Graph each function or inequality.

1. $g(x) = \frac{1}{2}\sqrt[3]{x} - 3$



2. $y \geq 4\sqrt{x + 2} - 6$



a. Identify the domain and range.

Domain: all real numbers; range: all real numbers

a. Describe the solution region.

The region above the curve including the line where $x \geq -2$

Use the description to write the square root function g.

3. The parent function $f(x) = \sqrt{x}$ is compressed vertically by a factor of $\frac{1}{4}$, reflected across the x-axis, and translated 6 units up. $g(x) = -\frac{1}{4}\sqrt{x} + 6$

4. The parent function $f(x) = \sqrt{x}$ is translated 8 units left, reflected across the y-axis, and stretched horizontally by a factor of 3. $g(x) = \sqrt{-\frac{1}{3}(x + 8)}$

Solve.

5. The frequency, f, in Hz, at which a simple pendulum rocks back and forth is given by $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$, where g is the strength of the gravitational field at the location of the pendulum, and l is the length of the pendulum.

a. Find the frequency of a pendulum whose length is 1 foot and where the gravitational field is approximately 32 ft/s^2. 0.90 Hz

b. The strength of the gravitational field on the moon is about $\frac{1}{6}$ as strong as on Earth. Find the frequency of the same pendulum on the moon. 0.37 Hz

LESSON 8-7

Reteach

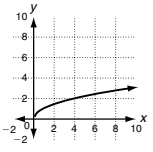
Radical Functions

The square root function, $f(x) = \sqrt{x}$, is a radical function.

The domain of $f(x) = \sqrt{x}$ is $\{x \mid x \geq 0\}$.

The range is $\{y \mid y \geq 0\}$.

Note that x and y have only nonnegative values.



You can make a table of values to graph a radical function.

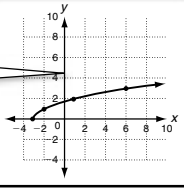
Graph: $f(x) = \sqrt{x + 3}$

x	$f(x) = \sqrt{x + 3}$	$(x, f(x))$
-3	$f(-3) = \sqrt{-3 + 3} = \sqrt{0} = 0$	$(-3, 0)$
-2	$f(-2) = \sqrt{-2 + 3} = \sqrt{1} = 1$	$(-2, 1)$
1	$f(1) = \sqrt{1 + 3} = \sqrt{4} = 2$	$(1, 2)$
6	$f(6) = \sqrt{6 + 3} = \sqrt{9} = 3$	$(6, 3)$

First choose the value of x that makes $f(x) = 0$.

First choose the value of x that make perfect squares.

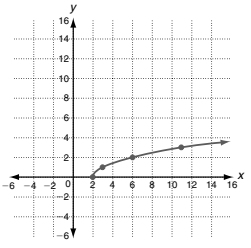
The domain is $\{x \mid x \geq -3\}$.
The range is $\{y \mid y \geq 0\}$.



Graph the function. Identify its domain and range.

1. $f(x) = \sqrt{x - 2}$

x	$f(x) = \sqrt{x - 2}$	$(x, f(x))$
2	0	(2, 0)
3	1	(3, 1)
6	2	(6, 2)
11	3	(11, 3)



Domain: $\{x \mid x \geq 2\}$

Range: $\{y \mid y \geq 0\}$