Name _____ Date _____

Essential Question What are some of the characteristics of the graph of a cube root function?
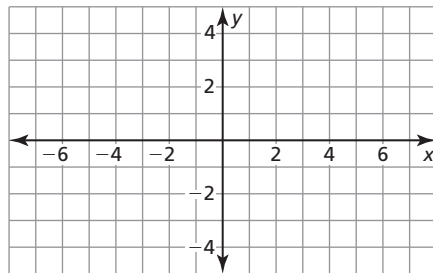
1 EXPLORATION: Graphing Cube Root Functions

Work with a partner.

- Make a table of values for each function. Use positive and negative values of x.

- Use the table to sketch the graph of each function.

- Describe the domain of each function.

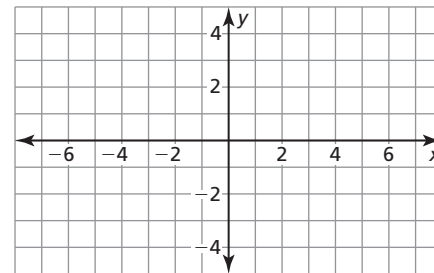- Describe the range of each function.

a. $y = \sqrt[3]{x}$

x					
y					

x					
y					

b. $y = \sqrt[3]{x + 3}$

x					
y					

x					
y					

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2 **EXPLORATION:** Writing Cube Root Functions

Work with a partner. Write a cube root function, $y = f(x)$, that has the given values. Then use the function to complete the table.

a.

x	f(x)
–4	0
–3	
–2	
–1	$\sqrt[3]{3}$
0	

x	f(x)
1	
2	
3	
4	2
5	

b.

x	f(x)
–4	1
–3	
–2	
–1	$1 + \sqrt[3]{3}$
0	

x	f(x)
1	
2	
3	
4	3
5	

Communicate Your Answer

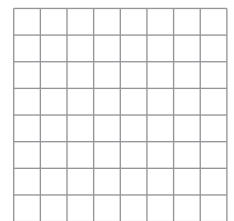**3.** What are some of the characteristics of the graph of a cube root function?
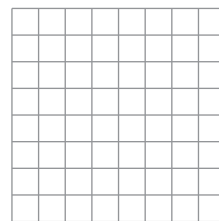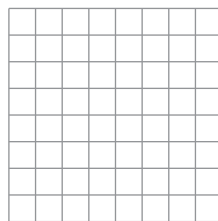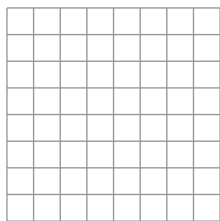
4. Graph each function. Then compare the graph to the graph of $f(x) = \sqrt[3]{x}$.

a. $g(x) = \sqrt[3]{x-1}$ **b.** $g(x) = \sqrt[3]{x} - 1$ **c.** $g(x) = 2\sqrt[3]{x}$ **d.** $g(x) = -2\sqrt[3]{x}$

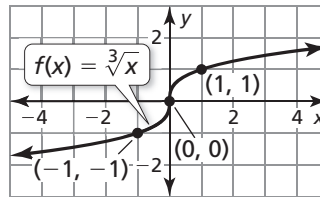# 10.2 Notetaking with Vocabulary
For use after Lesson 10.2

In your own words, write the meaning of each vocabulary term.

cube root function

Core Concepts

Cube Root Functions

A **cube root function** is a radical function with an index of 3. The parent function for the family of cube root functions is $f(x) = \sqrt[3]{x}$. The domain and range of f are all real numbers.
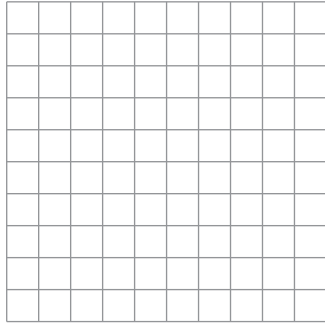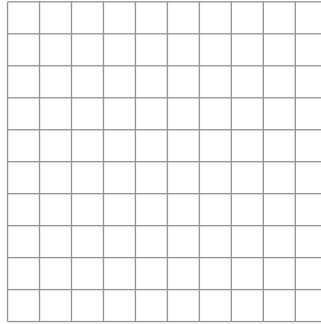

$f(x) = \sqrt[3]{x}$

(1, 1)

(0, 0)

(−1, −1)

Notes:

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Extra Practice

In Exercises 1–6, graph the function. Compare the graph to the graph of
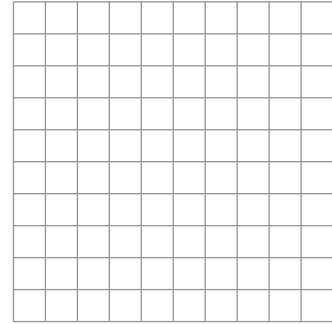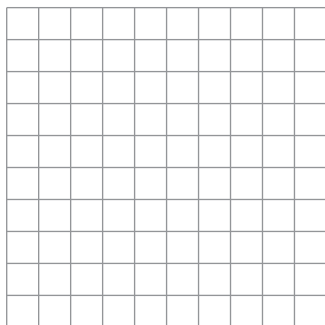$f(x) = \sqrt[3]{x}.$

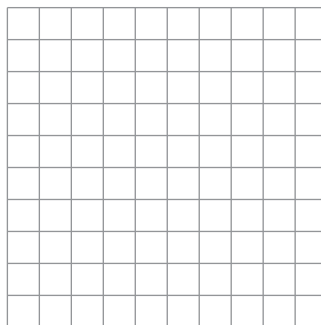**1.** $h(x) = \sqrt[3]{x - 3}$
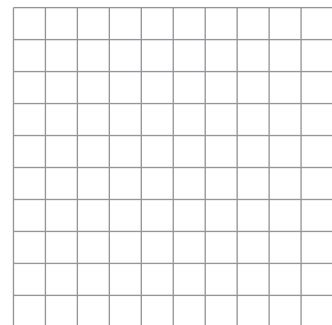
2. $g(x) = \sqrt[3]{x} + 2$

3. $j(x) = 4\sqrt[3]{x}$

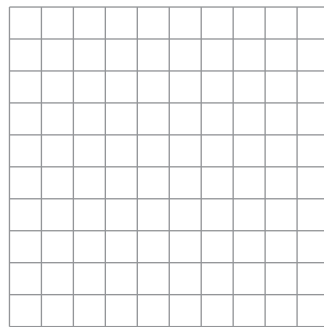**4.** $r(x) = -\sqrt[3]{x - 3}$

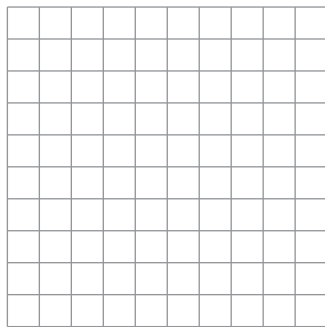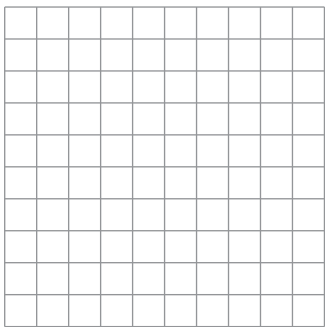**5.** $s(x) = 2\sqrt[3]{x} - 1$
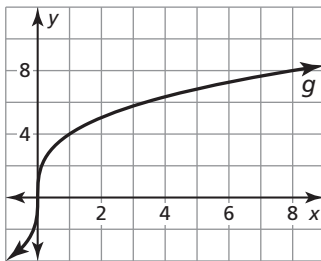
6. $t(x) = \sqrt[3]{-6x} - 2$

10.2 **Notetaking with Vocabulary** (continued)

In Exercises 7–9, describe the transformations from the graph of $f(x) = \sqrt[3]{x}$ to
the graph of the given function. Then graph the given function.

7. $p(x) = \sqrt[3]{x - 1} + 1$ **8.** $q(x) = -4\sqrt[3]{x + 2} + 3$ **9.** $r(x) = \dfrac{1}{2}\sqrt[3]{x + 1} + 4$

10. The graph of cube root function g is shown. Compare the average rate of change of g to
the average rate of change of $h(x) = 2\sqrt[3]{x}$ over the interval $x = 0$ to $x = 8$.

11. The edge length s of a regular tetrahedron is approximately given by $s = \sqrt[3]{8.49V}$,
where V is the volume of the tetrahedron. Use a graphing calculator to graph the
function. Estimate the volume of a regular tetrahedron with an edge length of
24 inches.