Name: ______________________ Date: ____________

# CUBE ROOTS
## COMMON CORE ALGEBRA I

Just like square roots undo the squaring process, **cube roots**, undo the **process of cubing a number**. The cube root's technical definition along with its symbolism is given below.

| CUBE ROOTS |
|---|
| If $x^3 = a$ then $\sqrt[3]{a}$ is a solution to this equation. Or… $\sqrt[3]{a}$ is any number that when cubed gives $a$. |

***Exercise* #1:** It is good to know some basic cube roots of smaller numbers. Find each of the following and justify by using a multiplication statement.

(a) $\sqrt[3]{8}$ (b) $\sqrt[3]{1}$ (c) $\sqrt[3]{27}$

(d) $\sqrt[3]{0}$ (e) $\sqrt[3]{-1}$ (f) $\sqrt[3]{-8}$

One of the most striking differences between **square roots** and **cube roots** is that you can find the **cube root of negative real numbers**. For square roots, that will have to wait until you learn about non-real numbers in Algebra II.

***Exercise* #2:** Using your calculator, use a guess and check scheme to find the following cube roots. Justify using a multiplication statement.

(a) $\sqrt[3]{343}$ (b) $\sqrt[3]{-2744}$ (c) $\sqrt[3]{12,167}$

Most calculators have a cube root option, although it may be harder to find than the square root button.

***Exercise* #3:** Find each of the following cube roots to the nearest *tenth* by using your calculator's cube root option/button.

(a) $\sqrt[3]{100}$ (b) $\sqrt[3]{-364}$ (c) $\sqrt[3]{982}$

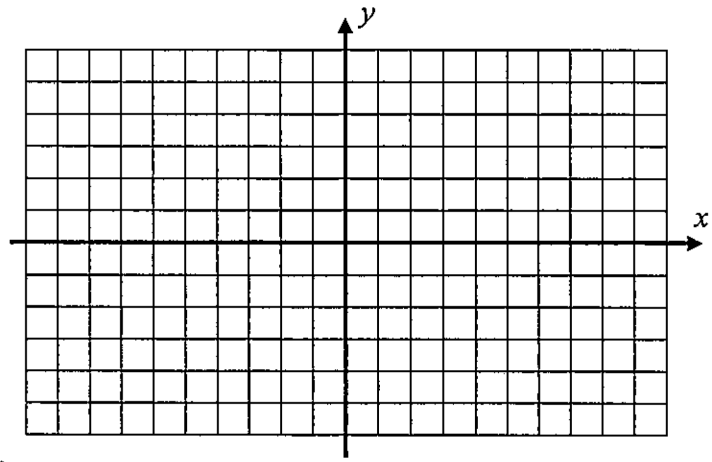
The cube root also gives rise to the **cube root function**. Like the square root function, its basic graph is relatively easy to construct.

***Exercise* #4:** Consider the basic cubic function $y=\sqrt[3]{x}$.

(a) Fill out the table of values below without the use of your calculator.

| $x$ | $-8$ | $-1$ | $0$ | $1$ | $8$ |
|---|---|---|---|---|---|
| $y$ | | | | | |

(b) Plot its graph on the grid provided below.




(c) Using your calculator, produce a graph to verify what you found in part (b).

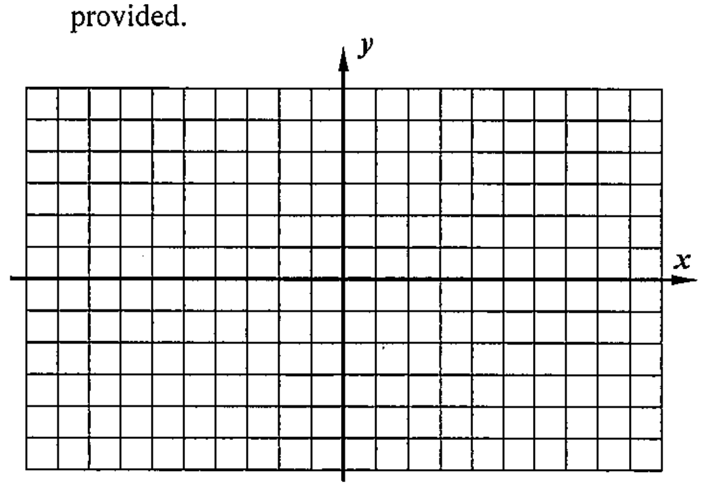
Just like with all other functions, cube root graphs can be **transformed** in a variety of ways. Let's see if our **shifting pattern** continues to hold with cube roots.

***Exercise* #5:** Consider the function $f(x)=\sqrt[3]{x+2}-4$.

(a) Use your calculator to create a table of values that can be plotted. Show your table below.

| $x$ | | | | | |
|---|---|---|---|---|---|
| $y$ | | | | | |

(b) Create a graph of this function on the axes provided.




(c) Describe how the graph you drew in Exercise #4 was shifted to produce this graph?