MATH 0310

Graphing Calculator Supplement: Radical Expressions
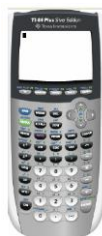
Objective: Using the $\sqrt{}, \sqrt[3]{}, \sqrt[x]{}$ features to verify the simplification of a radical expression, when appropriate.

Our goal is to use the TI-83 / TI-84 to help us verify the simplification of a radical expression. First let's learn where the keys and menus are to find square roots, cube roots, and nth roots.

Square Root

Press $\boxed{\text{2nd}}\boxed{x^2}$ to obtain the square-root function. **For TI-83 and the older TI-84**, make certain that everything under the radical is enclosed in parentheses. The calculator will automatically give you the first parenthesis. **For the newer TI-84** parentheses are not used. Instead when you insert the radicand, the radical symbol stretches across the entire radicand. To exit the radical, press the right arrow key.

For example: Evaluate $\sqrt{35+1}-7$

For TI-83 and older TI-84, the key strokes will be

$\boxed{\text{2nd}}\boxed{x^2}\boxed{3}\boxed{5}\boxed{+}\boxed{1}\boxed{)}\boxed{-}\boxed{7}\boxed{\text{ENTER}}$

For the newer TI-84, the key strokes will be

$\boxed{\text{2nd}}\boxed{x^2}\boxed{3}\boxed{5}\boxed{+}\boxed{1}\boxed{\blacktriangleright}\boxed{-}\boxed{7}$
Answer: -1

Cube Root

The cube root is found by first pressing the $\boxed{\text{MATH}}$ key and then pressing $\boxed{4}$.

Radical with Index > 3

The calculator does not have a specific function for radical terms with an index larger than 3. So you will use the x-th root function in these cases. This root can be found by pressing $\boxed{\text{MATH}}$ and then $\boxed{5}$.

Example: Evaluate $\sqrt[5]{31+1}$

Note **for TI-83 and the older TI-84**, the x-th root command does not provide an opening parenthesis like the other radical functions, so make certain to enter the parentheses yourself.

Note you must first enter the index first on the home screen and then select the x-th root command.

⑤ MATH ⑤ ⦇ ③ ① + ① ⦈ ENTER

For the newer TI-84, the key strokes will be as follows

⑤ MATH ⑤ ③ ① + ① ENTER

Answer: 2

You Try:

Simplify the following:

1. $\sqrt[4]{256}$

2. $\sqrt[5]{-32}$

3. $\sqrt[3]{-216}$

Answer:

1.   4

2.   -2

3.   -6

What if we needed to simplify $-\sqrt[4]{256}$? In this case you would need to enter the negative sign, (-) , and then insert ⦇ before pressing ④ **(index)** followed by MATH ⑤ . You would then need to enter the radicand, 256, and press ENTER . Thus this answer is -4.