Example 3

Evaluate $\sqrt{4}$ using a calculator.

$\sqrt{\ }$	4	Equal or Enter key

$\sqrt{4} = 2$

Example 4

Evaluate $\sqrt[3]{8}$ using a calculator.

3	$\sqrt[x]{\ }$	8	Equal or Enter key

$\sqrt[3]{8} = 2$

Just as with squaring, finding the square root of a number is a very common calculation and as such, most calculators have a special key for that purpose. However, for all other radicals, it is required that you input the value of the index.

Check Up

1. Write $\sqrt{\left(\frac{2}{5}\right)^7}$ as a power.

2. Identify the error(s) in the following solution; then, write the correct solution.

$$\left(\frac{1}{64}\right)^{-\frac{3}{2}}$$
$$= \left(\frac{\sqrt{1}}{\sqrt{64}}\right)^{-3}$$
$$= \frac{1^3}{8^3}$$
$$= \frac{3}{512}$$

3. The light intensity of a floodlight is 100% at its source. The formula for the percent intensity of a floodlight, at a distance of d metres from its source, is given by $I = 100d^{-2}$. Without using a calculator, determine the intensity of a flood light 5 m from its source.

☑ Compare your answers.

1. Write $\sqrt{\left(\frac{2}{5}\right)^7}$ as a power.

$\sqrt{\left(\frac{2}{5}\right)^7} = \left(\frac{2}{5}\right)^{\frac{7}{2}}$

2. Identify the error(s) in the following solution; then, write the correct solution.

$\left(\frac{1}{64}\right)^{-\frac{3}{2}}$
$= \left(\frac{\sqrt{1}}{\sqrt{64}}\right)^{-3}$
$= \frac{1^3}{8^3}$
$= \frac{3}{512}$

The errors are:

- $\left(\frac{\sqrt{1}}{\sqrt{64}}\right)^{-3} \neq \frac{1^3}{8^3}, \left(\frac{\sqrt{1}}{\sqrt{64}}\right)^{-3} = \frac{8^3}{1^3}$
- $1^3 \neq 3, 1^3 = 1$

Correct solution:

$\left(\frac{1}{64}\right)^{-\frac{3}{2}}$
$= \left(\frac{\sqrt{1}}{\sqrt{64}}\right)^{-3}$
$= \left(\frac{\sqrt{64}}{\sqrt{1}}\right)^{3}$
$= \frac{8^3}{1^3}$
$= 512$

3. The light intensity of a floodlight is 100% at its source. The formula for the percent intensity of a floodlight, I, at a distance of d metres from its source, is given by $I = 100d^{-2}$. Without using a calculator, determine the intensity of a flood light 5 m from its source.

$I = 100d^{-2}$

$I = 100 \cdot (5)^{-2}$

$I = 100 \cdot \left(\frac{1}{5}\right)^{2}$

$I = 100 \cdot \left(\frac{1}{25}\right)$

$I = \frac{100}{25}$

$I = 4$

The intensity of the floodlight 5 metres from its source is 4%.

Exponents lend efficiency to large numbers. Radicals allow for the representation of irrational numbers as exact values. Both exponents and radicals make math operations a little easier once they are sufficiently understood.

Exponents and Radicals Summary

The development of various mathematical skills supports continued mathematical fluency and efficiency. Consider the supporting links that can be made between prime and composite numbers, greatest common factors and least common multiples, exponents and radicals and their laws, and the Real Number System. Together, understanding these concepts makes complex problems more manageable.

Multimedia

Additional video examples pertaining to this lesson are available.