NAME _____

**Module 1** Getting Ready for Algebra
**Lesson 4** Simplifying Expressions with Exponents and Roots

guided notes

## Lesson Objectives

- Simplify expressions of the form $b^n$, where $n$ is a whole number and $b$ is a rational number.
- Simplify square roots and cube roots.

An exponential expression takes the form $b^n$.

The expression $b^2$ can be read as ***b to the second power*** or ***b squared***.

The expression $b^3$ can be read as ***b to the third power*** or ***b cubed***.

In this expression, $b$ is the ***base*** and $n$ is the ***exponent***.

To simplify $b^n$, use ***b*** as a factor ***n*** times.

The ***expanded*** form of $3^4$ is $3 \cdot 3 \cdot 3 \cdot 3$.

For any real number $b$, except $b = 0$, $b^0 =$ ***1***.

**1** Simplify: $4^2$

***16***

**2** Simplify: $8^0$

***1***

**3** Simplify: $3^1$

***3***

**4** Simplify: $\left(\frac{1}{4}\right)^3$

$\frac{1}{64}$

(negative)$^{\text{even}}$ = ***positive***

(negative)$^{\text{odd}}$ = ***negative***

**5** Determine the sign of $(-1)^{14}$, then simplify.

- The sign will be ***positive***.
- $(-1)^{14}$ = ***1***

**6** Determine the sign of $\left(-\frac{1}{3}\right)^3$, then simplify.

- The sign will be **negative**.
- $\left(-\frac{1}{3}\right)^3 =$ **$-\frac{1}{27}$**

The $\sqrt{\ }$ symbol is called a **radical** sign.

The $\sqrt{\ }$ symbol indicates the principle, or nonnegative, square root.

The symbol $\sqrt[3]{\ }$ indicates the **cube** root.

**7** Simplify: $\sqrt{100} =$

**10**

**8** Simplify: $\sqrt[3]{27} =$

**3**

**9** Simplify: $\sqrt[3]{-216} =$

**–6**