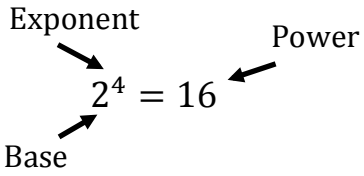
Reviewing Exponents

Exponential Notation:

Also known as powers.
Tells you how many times to multiply a base by itself.

Ex:



$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$

$\therefore a^n = \underbrace{a \cdot a \cdot a \cdot \ldots \cdot a}_{\text{n times}}$ where $n \geq 1$

Negative Exponents:

The sign of the exponent changes when you find the reciprocal (flip a fraction) of the base.

Ex:

$2^{-3} = \frac{1}{2^3}$ or $\left(\frac{4}{5}\right)^{-1} = \frac{5}{4}$

Try it:

1) $5^{-2} =$

$\frac{1}{5^2} =$

$\frac{1}{25}$

2) $\left(\frac{2}{3}\right)^{-2} =$

$\left(\frac{3}{2}\right)^{2} =$

$\left(\frac{3}{2}\right)\left(\frac{3}{2}\right) =$

$\frac{9}{4}$

HW: P. 26 #1, 3, 4 (DOSO for all)

Review of the Rules

Rule	Conditions	Example
1) $a^1 = a$	None	$5^1 = 5$
2) $a^0 = 1$	$a \neq 0$	$5^0 = 1$
3) $a^m \cdot a^n = a^{m+n}$	$a \neq 0$	$2^3 \cdot 2^4 = 2^{3+4} = 2^7$
4) $\frac{a^m}{a^n} = a^{m-n}$	$a \neq 0$	$\frac{3^5}{3^2} = 3^{5-2} = 3^3$
5) $(ab)^m = a^m b^m$	$a \neq 0, b \neq 0$	$(2 \cdot 3)^5 = 2^5 \cdot 3^5$
6) $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$	$a \neq 0, b \neq 0$	$\left(\frac{10}{5}\right)^2 = \frac{10^2}{5^2}$
7) $(a^m)^n = a^{m \cdot n}$	$a \neq 0$	$(2^3)^4 = 2^{3 \cdot 4} = 2^{12}$
8) $a^{-m} = \frac{1}{a^m}$	$a \neq 0, m \geq 0$	$5^{-2} = \frac{1}{5^2} = \frac{1}{25}$
9) $a^{\frac{1}{n}} = \sqrt[n]{a}$	$a \geq 0$	$8^{\frac{1}{3}} = \sqrt[3]{8} = 2$

*We will look at the last rule more tomorrow.

HW: P. 26 #1, 3, 4 (DOSO for all)