



# Ch 8.1

## Zero & Negative Exponents



# Zero Exponents

- For every non-zero #  $a$ ,  $a^0 = 1$
- A zero exponent turns the base into 1.

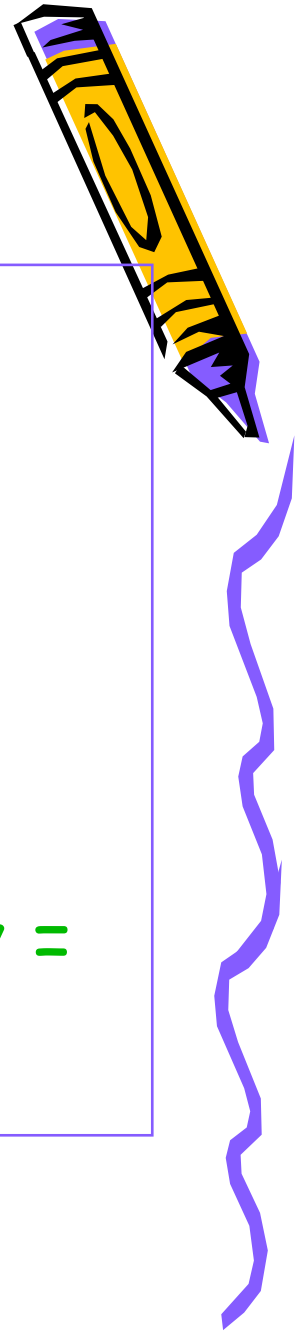
Examples:

$$2^0 = 1$$

$$5^0 x^2 y = x^2 y$$

$$(1/3)^0 = 1$$

$$6x^0 y = 6y$$



# Negative Exponents

"Move it & Lose it"

- For every non-zero #  $a$ ,  $a^{-n} = \frac{1}{a^n}$
- A negative exponent will move the 'location' of the base up or down and the exponent turns positive.

Examples:

$$1. \quad x^{-3} = \frac{1}{x^3}$$

$$2. \quad (-4)^{-1} = \frac{1}{(-4)^1} = \frac{-1}{4}$$

$$3. \quad \frac{3x^{-2}}{y} = \frac{3}{x^2y}$$

$$4. \quad \frac{yz^{-5}}{7^{-2}} = \frac{49y}{z^5}$$

\*An expression is in simplest form

written only with positive exponents.



# Try some

1.  $(-22.5)^0$

2.  $13x^0y$

3.  $4^{-2}$

4.  $3ab^{-2}$

5.  $6^2x^{-3}y^0$



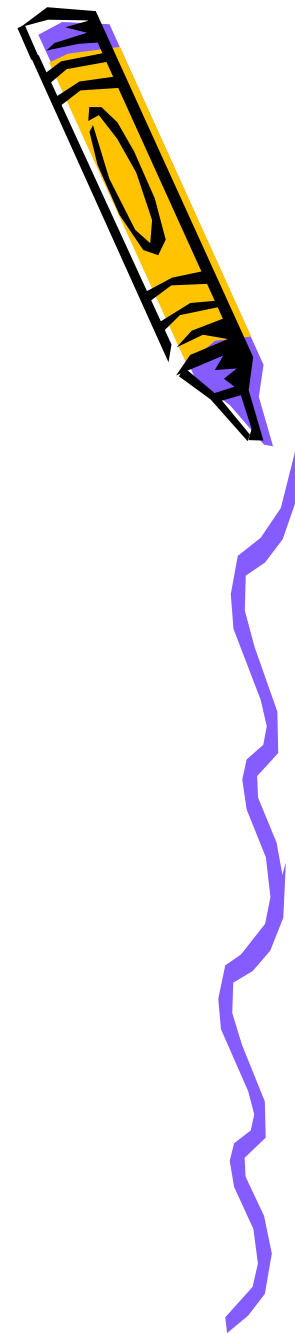
# Evaluating Exponential Expressions

- To evaluate:
  1. Rewrite with positive exponents
  2. Substitute & simplify

Example: Let  $x = 3$  &  $y = -2$   $z = 4$

$$1. \quad 4x^2y^{-3} = \frac{4x^2}{y^3} = \frac{4(3)^2}{(-2)^3} = \frac{36}{-8} = -4.5$$

$$2. \quad \frac{1y^{-2}z^0}{4^{-2}} = \frac{4^2}{y^2} = \frac{16}{(-2)^2} = \frac{16}{4} = 4$$



# Try Some

Let  $n = -2$ ,  $m = 3$  &  $w = 5$

1.  $\frac{n^{-1}}{w^2}$

2.  $\frac{w^0}{n^{-4}}$

3.  $\frac{2^n w}{m}$

