Exponents (Multiplication and Division)

Big Ideas: *Exponents show repeated multiplication.
             *The BASE is the number being multiplied repeatedly
             *The exponent is the number of times the base is multiplied

$$\text{Base}^{\text{exponent}}$$

$4^3 = 4 \cdot 4 \cdot 4 = $

64

$(-2)^3 = (-2)(-2)(-2) = $

-8

$6^{-2} = \dfrac{1}{6^2} = \dfrac{1}{6 \cdot 6} = $

$$\dfrac{1}{36}$$

Multiply (same base)

$3^2 \cdot 3^3 = (3 \cdot 3)(3 \cdot 3 \cdot 3) = \mathbf{3^5}$

$2^4 \cdot 2^2 = (2 \cdot 2 \cdot 2 \cdot 2)(2 \cdot 2)$

$$\mathbf{2^6}$$

$(-5)^2(-5)^3 = (-5 \cdot -5)(-5 \cdot -5 \cdot -5)$

$$\mathbf{-5^5}$$

<u>Pattern Found</u>

× **Add Exponents** when multiplying with same base

Divide (same base)

$\dfrac{5^8}{5^2} = \dfrac{5 \cdot 5 \cdot 5 \cdot \cancel{5} \cdot \cancel{5} \cdot 5 \cdot 5 \cdot 5}{\cancel{5} \cdot \cancel{5}}$

$$\mathbf{5^6}$$

$\dfrac{4^6}{4^3} = \dfrac{4 \cdot 4 \cdot 4 \cdot \cancel{4} \cdot \cancel{4} \cdot \cancel{4}}{\cancel{4} \cdot \cancel{4} \cdot \cancel{4}}$

$$\mathbf{4^3}$$

$\dfrac{3^6}{3^8} = \dfrac{\cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3}}{\cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot \cancel{3} \cdot 3 \cdot 3} = $

$$\dfrac{1}{3^2} \text{ OR } \mathbf{3^{-2}}$$

<u>Pattern Found</u>

× **Subtract Exponents** when divide with same base