Math 9 *Name:*_____

2.5 – Exponent Laws II

Date: _____

Warm Up: Evaluate: a. $3^4 \times 3^5 =$ **b.** $\frac{5^6}{5^2} =$ **c.** $2^3 \times 3^2 =$

Investigate: Power of a Power

Power	As Repeated Multiplication	As a Product of Factors	As a Single Power
$\left(2^3\right)^4$			
$\left(3^2\right)^4$			
$\left[\left(-4\right)^2\right]^3$			
$\left[\left(-5\right)^2\right]^3$			

Conclusion: To raise a POWER to another POWER, we _____ the powers

➔ $\left(b^x\right)^y =$

Example 1: Write each expression as a single power, then evaluate:

a) $\left(4^2\right)^3$ b) $-\left(2^4\right)^2$ c) $\left[\left(-3\right)^2\right]^3$ d) $\left[-2^3\right]^2$

Investigate: Power of a Product

Power	As Repeated Multiplication	As a Product of Factors	As a Product of Powers
$(2 \times 5)^3$			
$(3 \times 8)^2$			
$(-5 \times 6)^3$			
$(3 \times 2 \times 4)^2$			

➔ $(a \times b)^n =$

Example 2: Write each expression as a product of powers, then evaluate:

a) $(5 \times 3)^2$

b) $(3 \times 2)^5$

c) $[5 \times (-2)]^4$

d) $(7 \times 8)^0$

Investigate: Power of a Quotient

Power	As Repeated Multiplication	As a Quotient of Factors	As a Quotient of Powers
$\left(\frac{2}{5}\right)^3$			
$\left(\frac{3}{4}\right)^2$			
$\left(\frac{1}{6}\right)^4$			
$\left(-\frac{2}{3}\right)^2$			

➔ $(a \div b)^n = \left(\frac{a}{b}\right)^n =$

Example 3: Write each expression as a quotient of powers, then evaluate:

a) $\left(\frac{8}{3}\right)^2$

b) $\left(\frac{19}{-3}\right)^4$

c) $(144 \div 6)^3$

Example 4: Simplify, then evaluate each expression:

a) $\left(2^2 \times 2^3\right)^2$

b) $\left[(-2)^2 \times -2\right]^5 + (-2)^{12} \div \left[(-2)^5\right]^2$

c) $\left(4^6\right)^5 \div \left(4^8\right)^3$

d) $\left[3^2 \times (-2)^2\right]^2 + \left(5^2\right)^3 + \left[(-4)^5 \div (-4)^2\right]^3 + \left[(-5)^4\right]^0$