Lesson 4-6

Example 1 Multiply Powers

Find $4^5 \cdot 4^2$.

$4^5 \cdot 4^2 = 4^{5+2}$ The common base is 4.

$= 4^7$ Add the exponents.

Check: $4^5 \cdot 4^2 = (4 \cdot 4 \cdot 4 \cdot 4 \cdot 4)(4 \cdot 4)$

$= 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4 \cdot 4$ or 4^7

Example 2 Multiply Monomials

Find each product.

a. $m^3 \cdot m^8$

$m^3 \cdot m^8 = m^{3+8}$ The common base is m.

$= m^{11}$ Add the exponents.

b. $(3x^4)(-5x^3)$

$(3x^4)(-5x^3) = (3 \cdot -4)(x^4 \cdot x^3)$ Use the Commutative and Associative Properties.

$= (-12)(x^{4+3})$ The common base is x.

$= -12x^7$ Add the exponents.

Example 3 Divide Powers

Find each quotient.

a. $\frac{7^6}{7^4}$

$\frac{7^8}{7^4} = 7^{8-4}$ The common base is 7.

$= 7^4$ Subtract the exponents.

b. $\frac{y^5}{y^2}$

$\frac{y^5}{y^2} = y^{5-2}$ The common base is y.

$= y^3$ Subtract the exponents.

Example 4 Divide Powers to a Solve Problem

PENNIES The students at Green Middle School collected 10^4 pennies and the students at East Middle School collected 10^6 pennies. Find how many times more pennies were collected by East Middle School than by Green Middle School.

Write a division expression to compare the amounts.

$\frac{10^6}{10^4} = 10^{6-4}$ Subtract the exponents.

$= 10^2$ or 100 Simplify.

So, East Middle School collected 100 times more pennies than Green Middle School.