

Section 5.5: DIVIDING POLYNOMIALS

When you are done with your homework you should be able to...

- π Use the quotient rule for exponents
- π Use the zero-exponent rule for exponents
- π Use the quotients-to-power rule
- π Divide monomials
- π Check polynomial division
- π Divide a polynomial by a monomial

WARM-UP:

1. Find the missing exponent, designated by the question mark, in the final step:

$$\frac{x^8}{x^3} = \frac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x \cdot x \cdot x}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} = x^?$$

2. Simplify:

$$\frac{(2a^3)^5}{(b^4)^5}$$

THE QUOTIENT RULE FOR EXPONENTS

When dividing _____ expressions with the _____ nonzero base, _____ the exponent in the _____ from the _____ in the _____. Use this _____ as the _____ of the _____ base.

Example 1: Simplify each expression.

a. $\frac{2^5}{2^3}$

b. $\frac{x^{10}}{x^8}$

THE ZERO-EXPONENT RULE

If _____ is any _____ number other than _____,

Example 2: Simplify each expression.

a. $(4^2)^0$

b. $-7x^0$

THE QUOTIENTS-TO-POWERS RULE FOR EXPONENTS

If _____ and _____ are real numbers and _____ is nonzero, then

When a _____ is _____ to a _____, _____
the _____ to the _____ and _____ by the
_____ raised to the _____.

Example 3: Simplify each expression.

a. $\left(\frac{x}{3}\right)^5$

b. $\left(\frac{4x^3}{5y}\right)^2$

DIVIDING MONOMIALS

To _____, _____ the
_____ and then divide the _____.

Use the _____ rule for _____ to divide the _____.

Example 4: Divide.

a. $\frac{16x^4}{2x^4}$

b. $\frac{6x^2y^5}{21xy^3}$

c. $\frac{35r^8}{14r^7}$

DIVIDING A POLYNOMIAL THAT IS NOT A MONOMIAL BY A MONOMIAL

To _____ by a _____, _____ each
_____ of the _____ by the _____.

Example 5: Find the quotient.

a. $(24x^6 - 12x^4 + 8x^3) \div (4x^3)$

b. $\frac{459x^{10}y^9 + 18x^5y^3 - 9x^4y}{-9x^3y}$