

12-6 Dividing Polynomials.....#

**Objective**

Divide a polynomial by a monomial or binomial.

Apr 27-9:47 AM

To divide a polynomial by a monomial, you can first write the division as a rational expression. Then divide each term in the polynomial by the monomial.

$$\frac{(8x^2 - x)}{4x} \div 4x$$

$$2x - \frac{1}{4}$$

$$\frac{(5x^3 - 20x^2 + 30x)}{5x^2} \div 5x^2$$

$$x - 4 + \frac{6}{x}$$

Apr 27-9:49 AM

$$\frac{(8p^3 - 4p^2 + 12p)}{-4p^2} \div (-4p^2)$$

$$-2p + 1 - \frac{3}{p}$$

Apr 27-9:49 AM

Division of a polynomial by a binomial is similar to division of whole numbers.

Dividing Polynomials			
	WORDS	NUMBERS	POLYNOMIALS
Step 1	Factor the numerator and/or denominator if possible.	$\frac{168}{3} = \frac{56 \cdot 3}{3}$	$\frac{r^2 + 3r + 2}{r + 2} = \frac{(r+2)(r+1)}{(r+2)}$
Step 2	Divide out any common factors.	$\frac{56 \cdot \cancel{3}}{\cancel{3}}$	$\frac{(r+2)(r+1)}{(r+2)}$
Step 3	Simplify.	56	r + 1

Apr 27-9:49 AM

Factor and Reduce

$$\frac{(x+5)(x-3)}{x^2 + 2x - 15} \div \frac{(b+7)(b-7)}{b^2 - 49}$$

$$\frac{x+5}{x-3} \div \frac{(b-7)}{b+7}$$

**Helpful Hint**  
Put each term of the numerator over the denominator only when the denominator is a monomial. If the denominator is a polynomial, try to factor first.

Apr 27-9:50 AM

$$\frac{(2x+1)(x-4)}{2x^2 - 7x - 4} \div \frac{(x-4)(x+3)}{x^2 - x - 12}$$

$$\frac{2x+1}{x+3}$$

Apr 29-2:41 PM

Standard Form?	$\frac{10 + 7k + k^2}{k + 2}$
Factor/Reduce	$( \quad )( \quad )$ $k^2 + 7k + 10$

Apr 27-9:50 AM

Recall how you used long division to divide whole numbers as shown at right. You can also use long division to divide polynomials. An example is shown below.

$$\begin{array}{r} 15 \\ 23 \overline{)345} \\ \underline{-23} \phantom{0} \\ 115 \\ \underline{-115} \\ 0 \end{array}$$

$(x^2 + 3x + 2) \div (x + 2)$

Divisor

 $x + 2$

$x + 1$ 

Quotient

Dividend

 $x^2 + 3x + 2$

$$\begin{array}{r} x + 1 \\ x + 2 \overline{)x^2 + 3x + 2} \\ \underline{x^2 + 2x} \phantom{0} \\ x + 2 \\ \underline{x + 2} \\ 0 \end{array}$$

May 2-9:56 AM

Divide using long division.

$(x^2 + 10x + 21) \div (x + 3)$

First we should rewrite the problem

$$\begin{array}{r} 14 \\ 3 \overline{)429} \\ \underline{-3} \phantom{0} \\ 12 \phantom{0} \\ \underline{-12} \\ 0 \end{array}$$

Draw the line, switch the signs...

$$\begin{array}{r} x + 7 \\ x + 3 \overline{)x^2 + 10x + 21} \\ \underline{-x^2 + 3x} \phantom{0} \\ 7x + 21 \\ \underline{-7x + 21} \\ 0 \end{array}$$

May 2-9:57 AM

Divide using long division.

$\frac{x^2 - 2x - 8}{x - 4}$  rewrite...

$$\begin{array}{r} x + 2 \\ x - 4 \overline{)x^2 - 2x - 8} \\ \underline{-x^2 + 4x} \phantom{0} \\ 2x - 8 \\ \underline{-2x + 8} \\ 0 \end{array}$$

Apr 29-3:48 PM

Divide using long division.

$(a^2 - 8a + 12) \div (a - 6)$

May 2-9:58 AM

Divide using long division.

$(2y^2 - 5y - 3) \div (y - 3)$

$$\begin{array}{r} 2y + 1 \\ y - 3 \overline{)2y^2 - 5y - 3} \\ \underline{-2y^2 + 6y} \phantom{0} \\ y - 3 \\ \underline{-y + 3} \\ 0 \end{array}$$

Apr 29-3:50 PM

Assignment: p. 897 #1-16

Apr 27-10:00 AM