U2 – Dividing Polynomials

Name _____

Since $\frac{18}{3} = 6$, then 3 and 6 are "factors" of 18.

Dividing by Monomials (1 term in the denominator): "Butterfly" to divide each term in the numerator by the monomial:

Ex. a) $\frac{3a^2b + 6a^2b^2 + 18ab}{3ab} = a + 2ab + 6$

b) $\frac{12x^2y + 3x}{3x} = 4xy + 1$

Dividing by Binomials (2 terms in the denominator) – Use **Polynomial Long Division** - like "Long Division" in 4th Grade!

Let's remember how to do long division:

$$7\overline{)1190} = 170$$

-7, 49, -49, 00, -0, 0

$$2\overline{)915} = 457 + \frac{1}{2}$$

-8, 11, -10, 15, -14, 1

$$9\overline{)4976} = 552 + \frac{8}{9}$$

-45, 47, -45, 26, -18, 8

Example 1: Divide: $\frac{x^2 + 2x - 30}{x - 5}$

$x \cdot x = x^2$

$x \cdot 7 = 7x$

$$x - 5\overline{)x^2 + 2x - 30} = x + 7 + \frac{5}{x-5}$$

$-x^2 \mp 5x$

$7x - 30$

$-7x \mp 35$

5

You Try!

a) $\frac{7p^3+67p^2-22p+79}{P+10}$

$p \cdot 7p^2 = 7p^3$

$p \cdot -3p = -3p^2$

$p \cdot 8 = 8p$

$7p^2 - 3p + 8 - \frac{1}{p+10}$

$p+10 \overline{)\,7p^3+67p^2-22p+79}$

$-7p^3+70p^2$

$-3p^2-22p$

$-3p^2+30p$

$8p+79$

$8p+80$

-1

b) $\frac{4m^2+10m-3}{m+3}$

$m \cdot 4m = 4m^2$

$m \cdot -2 = -2m$

$4m - 2 + \frac{3}{m+3}$

$m+3 \overline{)\,4m^2+10m-3}$

$-4m^2+12m$

$-2m-3$

$-2m+6$

3

c) $\frac{5p^3-26p^2+20p+7}{5p-1}$

$5p \cdot p^2 = 5p^3$

$5p \cdot -5p = -25p^2$

$5p \cdot 3 = 15p$

$p^2 - 5p + 3 + \frac{10}{5p-1}$

$5p-1 \overline{)\,5p^3-26p^2+20p+7}$

$-5p^3+1p^2$

$-25p^2+20p$

$-25p^2+5p$

$15p+7$

$-15p+3$

10

d) $\frac{9b^2+9b-10}{3b-2}$

$3b \cdot 3b = 9b^2$

$3b \cdot 5 = 15b$

$3b+5$

$3b-2 \overline{)\,9b^2+9b-10}$

$-9b^2+6b$

$15b-10$

$-15b+10$

0

Is 3b-2 a factor of $9b^2+9b-10$? yes

How do you know? no remainder