

## Dividing Polynomials by Monomials

*For Algebra 1, the only form of polynomial division you are required to do, is dividing a polynomial by a monomial (many terms divided by a single term).*

**To divide a polynomial by a monomial, split up the division between all terms in the polynomial.**

Let's practice and it will make more sense!

Examples:

$$1) \frac{5x^2y - 6xy^2 + 15xy - 30}{3xy}$$

Split up the division so each term becomes a fraction with the term of the polynomial in the numerator and the monomial it is being divided by in the denominator.

$$\frac{5x^2y}{3xy} - \frac{6xy^2}{3xy} + \frac{15xy}{3xy} - \frac{30}{3xy}$$

Divide each term separately before putting the 4 terms back together.

$$\frac{5x^2y}{3xy} = \frac{5x}{3}$$

$$\frac{-6xy^2}{3xy} = -2y$$

$$\frac{15xy}{3xy} = 5$$

$$\frac{-30}{3xy} = \frac{-10}{xy}$$

Combine the 4 terms together to get the quotient.

$$\frac{5x}{3} - 2y + 5 - \frac{10}{xy}$$

$$2) \frac{5x^2 - 20x + 65}{5x}$$

First split up the division between the 3 terms in the polynomial.

$$\frac{5x^2}{5x} - \frac{20x}{5} + \frac{65}{5x}$$

Divide each term separately (only divide numbers by numbers and LIKE variables by LIKE variables, keeping in mind where they are in each fraction).

$$x - 4 + \frac{13}{x}$$

That is all you need to do for dividing polynomials by monomials. This is really not a hard topic!

## Tips for Solving Problems:

1. Remember to first SPLIT up the division to each term in the polynomial (for example, if you have  $(3x + 5)$  being divided by  $5x$ , you would split the division to each of the 2 terms, giving you  $3x/5x$  and  $5/5x$ ).
2. Remember exponent rules when doing the division for each term and also do not forget that numbers can only be divided by numbers and variables can only be divided by the SAME variables. If you cannot do either of these, the fraction is already simplified.
3. This topic is not hard. I promise! You have to just practice and these problems will become very easy for you. Use the problems in the quiz to make sure you understand this topic.