

Basic Operations with Polynomials



This sheet is designed as a review aid. If you have not previously studied this concept or after reviewing the contents you still don't pass you should enroll in the appropriate math class.

A polynomial is a series of terms that are to be added to or subtracted from each other in an equation. An example of a trinomial (a polynomial with three terms) would be $6x^2 - 5x - 6$.

For the ATC apprenticeship math test you will work with factors to create polynomials.

Example:

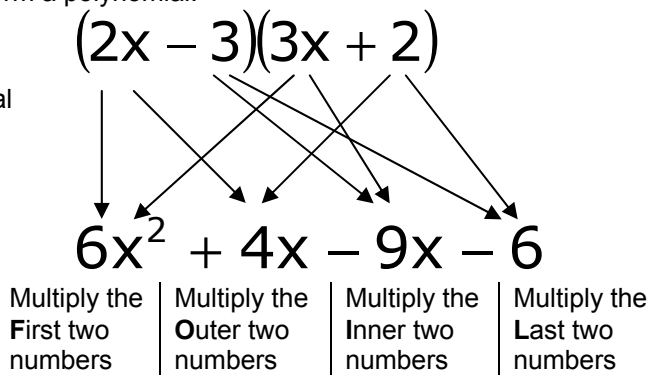
Creating a polynomial from a problem where each factor is given:

Which of the following expressions represents the **product** of **3 less than twice x** and **2 more than the quantity 3 times x**?

1. The word "product" indicates that you will be multiplying.
 - a. 3 less than twice x is written $2x - 3$ (this is the first factor in this problem)
 - b. 2 more than 3 times x is written $3x + 2$ (this is the second factor in the problem)
2. Factors are multiplied together to form a polynomial.

The equation is written:

3. Convert the problem to a polynomial by multiplying each term in the first parentheses with each term in the second parentheses:



This is called the **FOIL** Method because it designates the order in which to multiply the numbers (First, Outer, Inner, Last).

4. Combine like terms (this is the answer): $6x^2 - 5x - 6$

The following Samples are similar to problems you may see on the test:

1. Jake had a goal of practicing his saxophone x minutes a day. The first day he practiced 5 minutes less than his goal. The second day he practiced 2 times his goal plus 15 minutes. On day three he practiced 10 minutes more than his goal. On day four he practiced 10 minutes less than 3 times his goal. On day five, he practiced 5 minutes over his goal. In terms of his goal, how many minutes did Jake practice in the five days?

Write the time practiced each day with a plus mark between each:

$$\begin{array}{cccccc} (x - 5) + (2x + 15) + (x + 10) + (3x - 1) + (x + 5) \\ \text{Day 1} & \text{Day 2} & \text{Day 3} & \text{Day 4} & \text{Day 5} \end{array}$$

Drop the parentheses and combine like terms by adding them together:

$$8x + 15 \quad \text{Answer (this is a binomial)}$$

2.
$$\frac{\frac{6x}{2}}{2x + y}$$

a. Invert the denominator and multiply: $\left(\frac{6x}{1}\right)\left(\frac{2x + y}{2}\right)$

b. Factor out the 2 in the denominator: $3x(2x + y)$
(Multiply both sets by 2)

c. Multiply: $3x(2x + y) = 6x^2 + 3xy$ Answer (this is a binomial)

3.
$$\frac{2}{3}(4x - 5)(6)$$

a. Multiply the terms in the parentheses: $\frac{2}{3}(24x - 30)$

b. Multiply the term in the parentheses by 2 then divide by 3:

$$\frac{2}{3}(24x - 30) = \left(\frac{2}{3}\right)\left(\frac{24x - 30}{1}\right) = \frac{48x - 60}{3} = 16x - 20 \quad \text{Answer}$$