Elftmann Student Success Center

The Math Center

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Simplifying binomials

If we are asked to simplify the following binomials

(5 + 2) (3 + 4) this is simple if we follow **PERMDAS** to help us simplify.

(5 + 2) (3 + 4) = (7) (7) = 49 using **PERMDAS**

However, there is a longer method used in algebra when we cannot simplify further in the parentheses. We will **use the distribution method and do the multiplication first.**

(5+ 2) (3 + 4)

- **take the first term**, **5**, in the first binomial
  - **multiply it through each term in the second binomial**
- **take the second term**, **2**, in the first binomial
  - **multiply it through each term in the second binomial.**

(5 + 2) (3 + 4) = **5**(3 + 4) + **2**(3 + 4)

= 15 + 20 + 6 + 8

= 49 **using the longer method, we still get the same answer**

Let's look at why we need another method to help us simplify binomial expressions.

Simplify (x + 3) (x + 7) ; We can see that we cannot simplify further inside the parentheses, so we must use the longer method to allow us to multiply binomials.

Ex. **(x + 3)** (x + 7) = **x**(x + 7) +**3**(x + 7)

$= x^2 + 7x + 3x + 21$ now add like terms

$= x^2 + 10x + 21$ ***notice how each and every term is distributed (multiplied) through.**

Simplify the following

Ex. (a + 5) (a – 3) = **a**(a – 3) +**5**(a – 3)

$= a^2 - 3a + 5a - 15$ add like terms

$= a^2 + 2a - 15$ **the simplified form**

Ex. $(x - 4)^2 = (x - 4)(x - 4)$

= **x**(x - 4) **- 4**(x - 4)

$= x^2 - 4x - 4x + 16$

$= x^2 - 8x + 16$ **simplified form**

Remember: pay attention to the signs of the terms as you are multiplying. This is where mistakes can happen. Take your time and understand the logic. **PERMDAS** guides you.