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Factoring: Difference of Squares

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When determining what type of factoring your problem will require in order to solve, always count the amount of terms of the problem. For the problem to be a difference of squares problem, it will always be two terms.

An example of a difference of squares problem would look like this: $x^2 - 36$

In order to factor this type of problem you will need to follow the following steps:

- You need to find a term that, when multiplied by itself, will equal the first term of the given problem
- You then need to repeat this process for the second term in your given problem. You need to find a term that, when multiplied by itself, will equal the last term of the given problem.

Now let us take a look at the example above. $x^2 - 36$ is made up of 2 terms. Plus and minus signs will separate each term. The first term is x^2 and the second term is $36.$

Following the steps above, I will need to find a term that when multiplied by itself will equal the first term which is x^2. That would be x because x times x would equal x^2 (Remember: when multiplying letters or variables together you need to add exponents. If a letter or variable does not have an exponent next to it, that means the exponent is a 1).

Now we need to find a term that when multiplied by itself will equal the second term which is 36. That would be 6 because 6 times 6 equals 36.

Once we find these terms we are ready to write our answer. Your answer will be written in two sets of parenthesis and there will always be opposite signs in each set of parenthesis. What that means is that inside one set or parenthesis, between the first and second terms will be a plus sign and between the first and second terms in the other set of parenthesis will be a minus sign. It does not matter if you put the plus sign or the minus sign first.

Your answer will look either like this: (+)(-) or like this: (-)(+)

Now we have to add to the parenthesis the terms we found, that when multiplied by themselves equal the first and second terms of the original problem. Remember, we said that x, when multiplied by itself, would equal the first term of the given problem. So, x will need to be added to each set of parenthesis in our answer.

Now our answer will look either like this: (x +)(x -) or like this: (x -)(x +)

Finally, we need to add to the parenthesis the term we said that when multiplied by itself would equal the last term of our given problem. That was 6.

Our final answer will look either like this: (x + 6)(x - 6) or like this: (x - 6)(x + 6)

As a check for yourself, you could always multiply the parenthesis together. If your answer goes back to the original problem, then you know your answer is correct.

Here are some problems for you to try:

1. $x^2 - 16$
2. $x^2 - 81$
3. $4x^2 - 9$
4. $9x^2 - 100$

Answers:

1. (x + 4)(x - 4) or (x - 4)(x + 4)
2. (x + 9)(x - 9) or (x - 9)(x + 9)
3. (2x + 3)(2x - 3) or (2x - 3)(2x + 3)
4. (3x + 10)(3x - 10) or (3x - 10)(3x + 10)