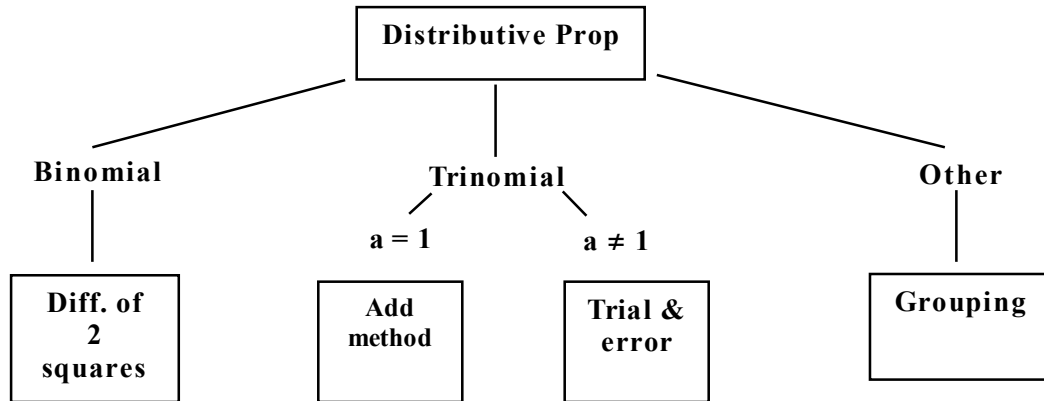


Factoring

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Factoring is the process of changing a polynomial expression that is essentially a sum into an expression that is essentially a product.



Factoring is used to simplify algebraic expressions and solve higher degree equations.

The diagram suggests that you always factor by first trying to use the **Distributive Property**. After that, you then determine if you have a binomial, trinomial or other.

If you have a BINOMIAL, we'll use the method called the **Difference of 2 Square**.

If you have a TRINOMIAL and the coefficient of the quadratic term (number in front of the squared term) is one, we'll use the **Addition Method**. If the coefficient of the quadratic term is NOT one, then we will use **Trial & Error** to factor.

If I don't have a binomial or trinomial, then I will use **Grouping**.

Let's look at factoring using the **Distributive Property**.

$$a(b + c) = ab + ac$$

To factor, we look for numbers or letters that appear in each term of a polynomial.

EXAMPLE Factor $4x + 12$

Is there a number or letter that appears in both terms? Hopefully you realized there was a 4 in both terms. Taking the 4 out, we have

$$4x + 12 = 4(x + 3)$$

EXAMPLE Factor $4x + 12xy$

I have a 4x in both terms, factoring that we have

$$4x + 12xy = 4x(1 + 3y)$$

Now let's see what happens if I have a binomial. The diagram suggests I use the **Difference of Two Square**.

$$a^2 - b^2 = (a - b)(a + b)$$

I use the Difference of Two Squares if I have a binomial, both terms being perfect squares, and a “ - “ sign separates them.

To factor a binomial using the Difference of Two Squares, you take the square root of each term, write them twice, as shown below, put a “+” sign between one and a “ - “ between the other.

EXAMPLE Factor $x^2 - 9$

$$x^2 - 9 = (x + 3)(x - 3)$$

EXAMPLE Factor $49x^2 - 81y^2$

The square roots of $49x^2$ and $81y^2$ are $7x$ and $9y$. Therefore we have

$$49x^2 - 81y^2 = (7x + 9y)(7x - 9y)$$