

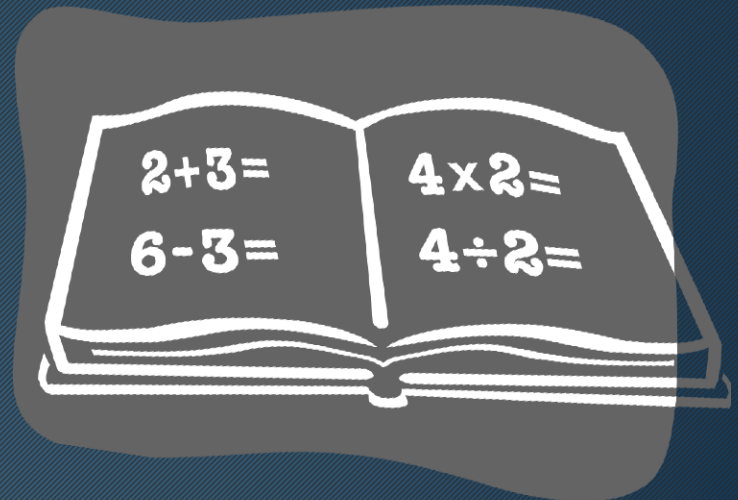


10th Grade Algebra -Polynomials

Ms. Milner

After this
Power
Point you
will be
able to....

1. Simplify monomials and monomial expressions using the laws of integral exponents.
2. Add, subtract, and multiply polynomials.
3. Factor polynomial expressions.



What Are Polynomials?

- Polynomial comes from poly- (meaning “many”) and nomial (in this case meaning “term”)... so it says “many terms”
- A Polynomial is made up of terms that are only added, subtracted or multiplied.



The diagram shows the polynomial $4xy^2 + 3x - 5$ written in purple on a light yellow background. Three horizontal lines are drawn under each term: $4xy^2$, $3x$, and -5 . Three yellow lines connect these underlines to the word "terms" written in yellow below the polynomial.

$$4xy^2 + 3x - 5$$

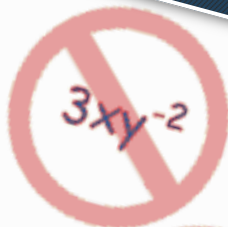
terms

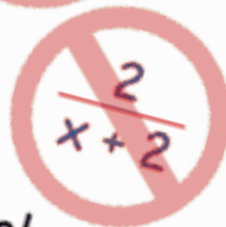
exponents: 0,1,2,...

$$5xy^2 - 3x + 5y^3 - 3$$

terms

A Polynomial


$$3xy^{-2}$$


$$\frac{2}{x+2}$$

Not Polynomials

Simplifying Monomials!

Don't forget PEMDAS (Please excuse my dear aunt sally) Parentheses, exponents, multiplication, division, addition, and subtraction.

To simplify monomials you must simply add or subtract like terms. Such as the x and the y terms.
Example: Take $3x + 3 - 2x + 4$ to simplify this function
all you need to do is add the like terms...

$$\underline{3x} + 3 - \underline{2x} + 4$$

$$x + \underline{3} + \underline{4} = x + 7$$

$(4x^3 + x^2 - 2x + 3) + (3x^2 + 5x)$
to simplify this expression you
must first drop the parentheses

$$4x^3 + x^2 - 2x + 3 + 3x^2 + 5x$$

Now you add all of your like terms
(review vocabulary sheet from last
lesson)

Your solution should be:

$$4x^3 + 4x^2 + 3x + 3$$

Note: In math usually the term with
the highest degree (Vocabulary
sheet?) goes in front of the equation.



Polynomials!

Adding

Subtracting polynomials!

$$(3x^2 - 5x - 6) - (4x^3 - 5x^2 + 2x - 3)$$

To subtract these polynomials you must first distribute the negative sign to the second equation

$$3x^2 - 5x - 6 - 4x^3 + 5x^2 - 2x + 3$$

This changes the signs and clears the parentheses

Now you can combine like terms and simplify

$$-4x^3 + 8x^2 - 7x - 3$$





Multiplying Polynomials!

$$(3x + 5)(3x - 4)$$

To solve this we use a method called FOIL (first, inner, outer, and last)

$$(3x)(3x) + (3x)(-4) + (5)(3x) + (5)(-4)$$

This gives us:

$$9x^2 - 12x + 15x - 20$$

Which when we combine like terms gives us the solution

$$9x^2 + 3x - 20$$

Reminder: When multiplying terms with exponents you add the exponents. When dividing terms with exponents you subtract the exponents.

Take 10 min to simplify the following equations.

1. $(3x^2 + x - 2) + (x^4 + 2x^3 - x^2 + 5)$
2. $(5x + 7) - (-3x^3 + 4x + 3)$
3. $(x^5 + 5x^3 - 3x^2 + 4x - 1) - (2x^4 - 5x^3 - x^2 - 4x - 1)$
4. $(x + 2)^2$
5. $(x + 5)(x - 2)(x + 1)$

Numbers 4 and 5 might be tricky, but remember all of the rules we have discussed in previous lessons and apply them here.



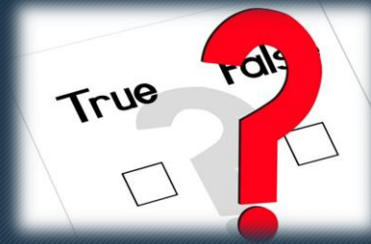
$$1. x^4 + 2x^3 + 2x^2 + x + 3$$

$$2. 3x^3 + x + 4$$

$$3. x^5 - 2x^4 + 10x^3 - 2x^2 + 8x$$

$$4. x^2 + 4x + 4$$

$$5. x^3 + 4x^2 - 7x - 10$$



Answers!

So how did you do? Did those last two questions confuse you? Lets try them.



Solve It!



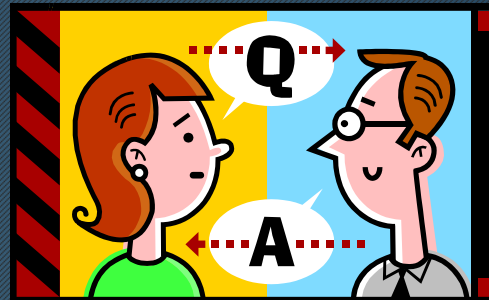
$$(x + 2)^2 \quad \text{This equals} \quad (x + 2)(x + 2)$$

Now we can solve by using our FOIL method.
Remember: First Inner Outer Last

$$\begin{aligned}(x)(x) + (2)(x) + (2)(x) + (2)(2) \\ = x^2 + 2x + 2x + 4\end{aligned}$$

Now we can simplify!

$$x^2 + 4x + 4$$



Now for the last problem:

$$(x + 5)(x - 2)(x + 1)$$

To solve this we start with the first two equations in parentheses and FOIL

$$\begin{aligned} & [(x)(x) + (-2)(x) + (5)(x) + (5)(-2)](x + 1) \\ & = [x^2 - 2x + 5x - 10](x + 1) \end{aligned}$$

Now combine like terms:

$$= (x^2 + 3x - 10)(x + 1)$$

Now we can solve by using our FOIL method on the last part of the problem.

$$\begin{aligned} & (x^2)(x) + x^2 + (3x)(x) + 3x + (-10)(x) - 10 \\ & = x^3 + x^2 + 3x^2 + 3x - 10x - 10 \end{aligned}$$

Combine like terms:

$$= x^3 + 4x^2 - 7x - 10$$

Solve It!





Polynomials

Factoring

Factoring is simplifying, just backwards. Instead of using the FOIL method to simplify an expression, we are going to try and do the opposite.

We will stick to simple factoring in this lesson. In the following lesson we will learn even more factoring.



Examples

Factor $3x + 3$

Since the 3 is a number that is repeated more than once we can “pull” it out of the equation by setting up parentheses.

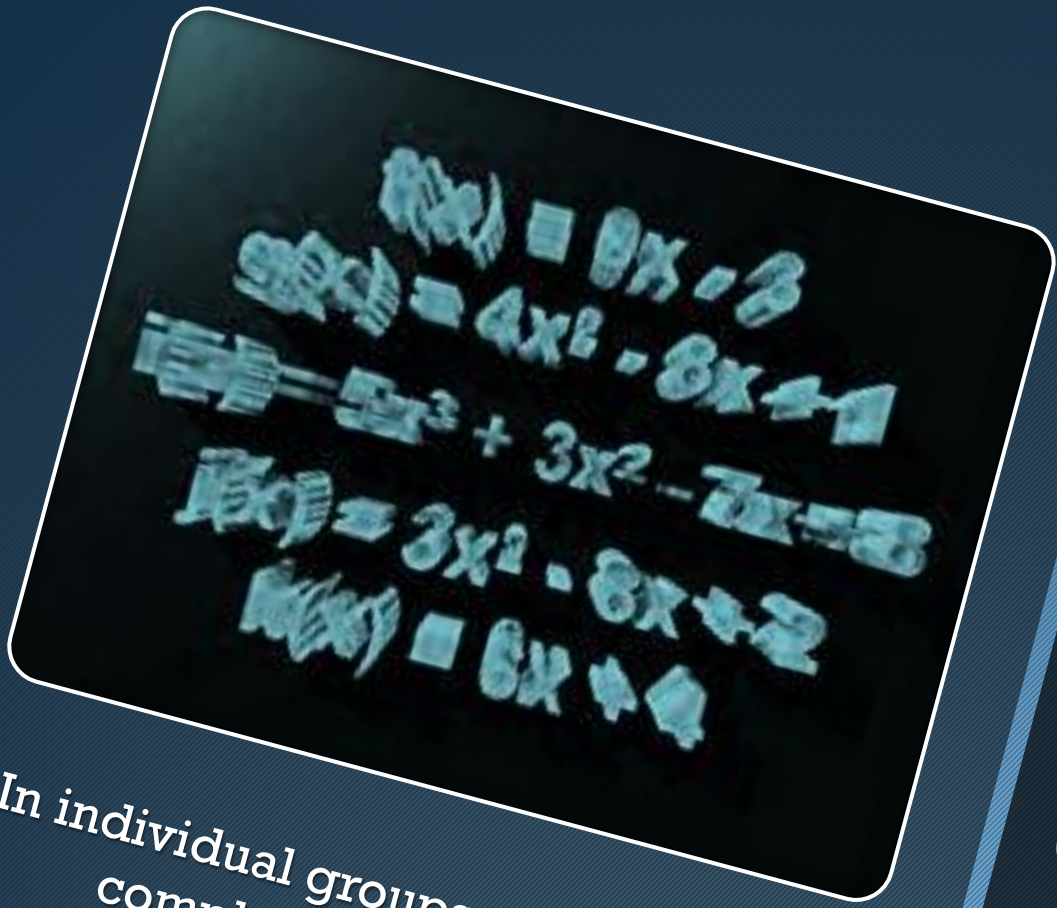
$$3(x + 1)$$

The same goes for the following equation:

$$2x^2 + 4x + 8$$

Since the 2 is a factor of each term we can factor it.

$$2(x^2 + 2x + 4)$$



In individual groups of three factor completely the following equations.

Group Time!





1. $12x + 24$
2. $4x + 8y + 16$
3. $-7xy - 14y$
4. $5xyz + 10xy + 15x$
5. $50x + 25z + 25y$
6. $6x + 3$
7. $8xy - 4x^2$
8. $x^2 + x$
9. $xyz + 2xy$
10. $30x - 20y$

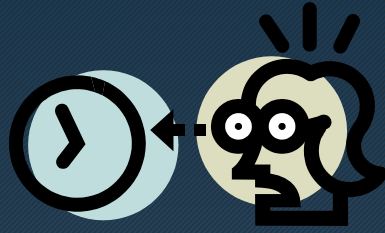


Check Your Work



1. $12x + 24 = 12(x + 2)$
2. $4x + 8y + 16 = 4(x + 2y + 4)$
3. $-7xy - 14y = -7y(x + 2)$
4. $5xyz + 10xy + 15x = 5x(yz + 2y + 3)$
5. $50x + 25z + 25y = 25(2x + z + y)$
6. $6x + 3 = 3(2x + 1)$
7. $8xy - 4x^2 = 4x(2y - x)$
8. $x^2 + x = x(x + 1)$
9. $xyz + 2xy = xy(z + 2)$
10. $30x - 20y = 10(3x - 2y)$





- <http://www.purplemath.com/>
- <http://www.mathsisfun.com/>
- <http://www.webmath.com/>
- <http://www.slidermath.com/rpoly/Polym4.shtml>

Above is a list of websites that have fun and interesting ways to study and learn polynomials and other subjects.

Take a Look at These!



**THANK
YOU**

Research Done:

<http://homepage.mac.com/shelleywalsh/MathArt/Polynomial.html>

<http://www.mathsisfun.com/algebra/polynomials.html>

**Don't Forget Your
Homework**