March 21st

Due Today: BtB 9
Due Tomorrow: HW 10.1

Unit 10: Algebraic Fractions

Lesson 10.1: What is an Algebraic Fraction?

Get Ready:

Fill in your mastery ticket

get out BtB 9

	HM	M	AM	LM	NM
Algebraic Solutions	18	15-17	13-14	9-12	0-8
Graphical	21	18-20	15-17	11-14	0-10
Modeling + Functions	18	15-17	13-14	9-12	0-8

Algebraic Fractions

DEFINITION:

A fancy fraction where both the numerator and the denominator are algebraic expressions (polynomials)

EXAMPLES: $\frac{x^2+5x+6}{3x+6}$, $\frac{x+2}{2x+4}$, $\frac{x^2-9}{3x}$

We can....

1. evaluate
2. find excluded values
3. Simplify
4. Add + Subtract
5. Multiply + Divide

What can we do with Algebraic Fractions?

1. **Evaluate**- plug in a value for the variable and simplify.

example: Evaluate the following expression for x = 10.

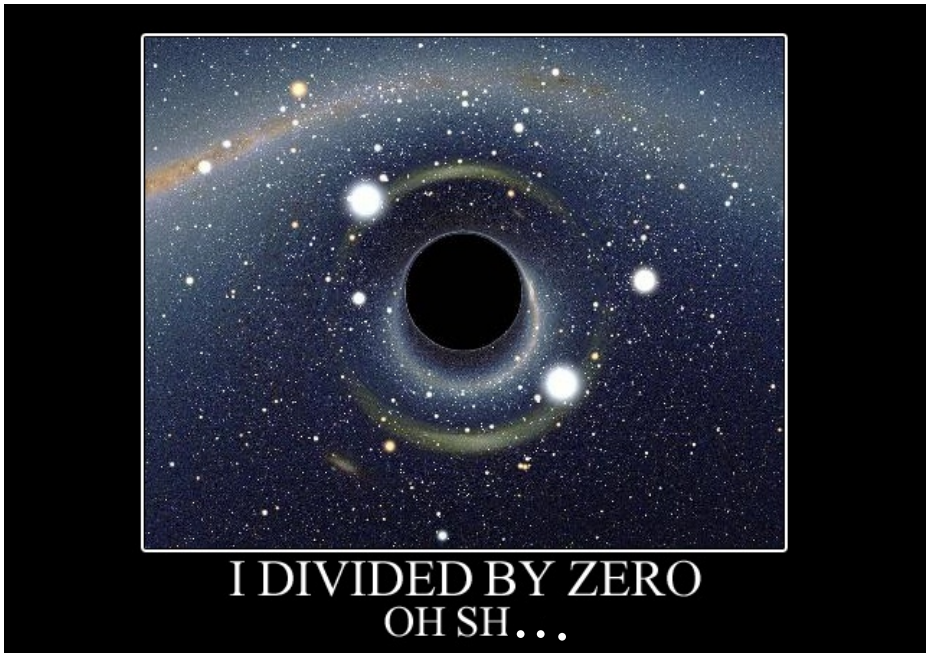
$$\frac{4X + 10}{X - 5} = \frac{4(10)+10}{10-5} = \frac{50}{5} = 10$$

How about if x = 5

$$= \frac{4(5)+10}{5-5} = \frac{20+10}{0} = \frac{30}{0}$$

undefined

We Cannot divide by Zero!


I DIVIDED BY ZERO
OH SH. . .

What can we do with Algebraic Fractions?

2. **Find the excluded values** -the value (s) of x that make the denominator zero! We can't divide by zero!!! the fraction will be undefined!!

-Set the denominator = 0 and Solve!

ex 1:

$\frac{x^2 + 2x - 1}{-2x - 8}$

$-2x - 8 = 0$
$+8 \quad +8$
$\frac{-2x}{-2} = \frac{8}{-2}$
$x = -4$

ex val: -4

ex 2:

$\frac{a + 5}{a^2 - 9}$

$a^2 - 9 = 0$
$(a+3)(a-3) = 0$
$a+3=0, \quad a-3=0$
$-3 \quad -3 \quad +3 \quad +3$
$a = -3, 3$

ex val: 3, -3

ex 3:

$\frac{15}{z^2 - 2z + 1}$

ex 4:

$\frac{2x + 10}{3}$

$3 = 0$

No ex vals

What can we do with Algebraic Fractions?

3. **Simplify**- Factor each polynomial and cancel is possible.

YOU MUST FACTOR FIRST! YOU CAN ONLY CANCEL OUT WHOLE FACTORS!

$$\frac{x^2 + 2x + 1}{x^2 - 1} \leftarrow \text{dots} = \frac{(x+1)(x+1)}{(x+1)(x-1)} = \frac{x+1}{x-1}$$

ex 2:

$$\frac{x^2 + 7x + 10}{2x + 10}$$ ← gcf

$$= \frac{(x+5)(x+2)}{2(x+5)}$$

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

ex 3:

$$\frac{15a^5 - 10a^3}{5a^2}$$ ← gcf — monomial

$$\frac{5a^3(3a^2 - 2)}{5a^2}$$

*we can simplify monomials

$$\frac{5a^3}{5a^2} = a$$

$$a(3a^2 - 2)$$

THE WORST MISTAKE EVER:

$$\frac{x^2 + 8x + 12}{x^2 + 2}$$

his is BREAKING UP A POLYNOMIAL! DON"T DO IT!

DONT BREAK THE POLYS!

I swear that i will always factor first and only cancel out whole factors. I will never ever ever break up a polynomial by only canceling one piece of it.

EVALUATE Plug in the given value into the expression. Your answer should be an integer or fraction.

Find Ex Vals Set the DENOMINATOR equal to zero and solve. Your answer could be zero, one, two or three values

Simplify Factor the numerator and denominator separately and cancel out any whole factors.

(1) $\frac{m^2-6m+5}{m-5}$

$\frac{(m-5)(m-1)}{m-5}$

$= m-1$

(2) $\frac{n+9}{n^2+8n-9}$

$\frac{n+9}{(n+9)(n-1)}$

$= \frac{1}{n-1}$

Unit 10: Algebraic Fractions

Lesson #	Name	Recap	HW
10.1	Intro to Quadratics		HW 10.1