NAME:

QUIZ 1- PRECALCULUS

Simplify or factor each expression:

$\frac{6y}{5x^2}+\frac{4}{3xy}$

$6m^2-25m-9$ (factor)

$\dfrac{\frac{1}{6}-\frac{8}{3p^2}}{\frac{2}{p}-\frac{1}{2}}$

$(3k^2-7k)-(5k^2+2k-8)$

Directions: Solve each equation.

$x^2-4x-45=0$

$|6w-15|=3w-21$

$$\frac{2}{x+5}=\frac{x+2}{3x+11}$$

$$\frac{6y}{5x^2}+\frac{4}{3xy}$$

"TO COMPARE OR COMBINE, THEY MUST BE THE SAME KIND!"

Let's start with finding a common denominator:

Step 1: What expression can both numbers be a part of? $15x^2y$

Step 2: Find what needs to be multiplied to the each side for the denominator to be $15x^2y$

$$\frac{3y}{3y}\ \frac{6y}{5x^2}+\frac{4}{3xy}\ \frac{5x}{5x} \dashrightarrow \frac{18y^2}{15x^2y}+\frac{20x^2}{15x^2y}$$

Step 3: Now that they are the same "kind", you can add the numerators (tops) together. Leave the denominator (bottom)!

$$\frac{18y^2+20x}{15x^2y}$$

FACTOR $6m^2 - 25m - 9$

Ok, 2 ways to tackle this:

- Find factors of 6 and 9.
- Realize that in order to reverse distribute this, one of the factors of 6 multiplied by a factor of 9 and then added together, must equal -25.
- Create your two factors and start plugging in the numbers.

$6m^2 - 25m - 9$

3, 2	**3, 3**
6, 1	**9, 1**

(3m + 3)(2m -3)
(2m + 3)(3m -3)
(6m + 3)(1m -3)
(1m + 3)(6m -3)

- Determine which one works with the FOIL method.

(3m + 1)(2m -9)
(2m + 9)(3m -1)
(6m + 9)(1m -1)
(1m + 1)(6m -9)

OR...

Factor $6m^2 - 25m - 9$

Since the leading coefficient isn't a "1" (it is a "6"), this can be a little more complicated.

You decide which method is easiest for you!

- Find factors of (6)(9) = 54 that add up to -25.
- We will use -27 and +2
- Then we can split that middle term (-25m) into 2 terms

  $6m^2 - 27m + 2m - 9$
- Now, factor in pairs

  $(6m^2 - 27m) + (2m - 9)$

  $3m(2m - 9) + 1(2m - 9)$

- Since they both have (2m-9), you can combine the others to form the answer.

$3m(2m - 9) + 1(2m - 9)$

(3m +1)(2m-9)

Personally, I think this way is simpler, but if you did not originally learn this way, it may take some getting used to.

$$\frac{\frac{1}{6}-\frac{8}{3p^2}}{\frac{2}{p}-\frac{1}{2}}$$

Break it up!

~~To compare~~ or combine they must be the same kind!

$$\frac{1}{6}-\frac{8}{3p^2} \quad \bigstar \quad \frac{2}{p}-\frac{1}{2}$$

1) Find common denominators for both sets of expressions and combine

$$\frac{p^2}{6p^2}-\frac{16}{6p^2} \longrightarrow \frac{p^2-16}{6p^2} \longrightarrow \frac{(p+4)(p-4)}{6p^2}$$

$$\frac{4}{2p}-\frac{p}{2p} \longrightarrow \frac{(4-p)}{2p} \xrightarrow{\text{Same as}} \frac{(p-4)}{2p}$$

2) Since the original equation was a division of fractions, we can do the switch-a-roo and ***multiply by the reciprocal***.

$$\frac{(p+4)(p-4)}{6p^2} * \frac{2p}{(p-4)} \xrightarrow{\text{REDUCE}} \frac{(p+4)(\cancel{p-4})}{\cancel{6p^2}\,3p} * \frac{\cancel{2p}}{(\cancel{p-4})}$$

$$\frac{(p+4)}{3p}$$

$$(3k^2 - 7k) - (5k^2 + 2k - 8)$$

FIRST: distribute the -1 to the second expression

$$(3k^2 - 7k) - 5k^2 - 2k + 8)$$

NEXT: combine like terms

$$3k^2 - 7k - 5k^2 - 2k + 8)$$

$$-2k^2 - 9k + 8$$

$$x^2 - 4x - 45 = 0$$

This is the same as the other one but this time we will solve the equation.

- Find factors of (1)(-45) = -45 that add up to -4.
- I used +5 and -9
- Then we can split that middle term (-4x) into 2 terms

  $x^2 + 5x - 9x - 45$
- Now, factor in pairs

  $(x^2 + 5x) + (-9x - 45)$

  $x(x + 5) + -9(x + 5)$

- Since they both have (x+5), you can combine the others to form the equation

  (x+5)(x-9) = 0

- Now, set each parenthesis equal to zero and solve
- $x + 5 = 0$ $\qquad$ $x - 9 = 0$

  $x = -5$ $\qquad$ $x = 9$

Still unsure? Throw your answers back into the original equation to check.

$$|6w - 15| = 3w - 21$$

- To work out absolute value equations, your absolute value has to be on its own on one side of the equation, which this is. Phew!
- Set up the equation equal to a positive **AND** negative

6w – 15 = 3w – 21

6w – 15 = -(3w – 21) **or**
6w – 15 = -3w + 21

- Now solve each equation

6w – 15 = 3w – 21
3w = -6

w = -2

6w – 15 = -3w + 21
9w = 36

w = 4

Still unsure? Throw your answers back into the original equation to check.

3(-2) = -6 YES

9(4) = 36 YES

$$\frac{2}{x+5} = \frac{x+2}{3x+11}$$

- This equation is set up like a ratio. This means you can cross multiply.

$$2(3x+11) = (x+5)(x+2)$$

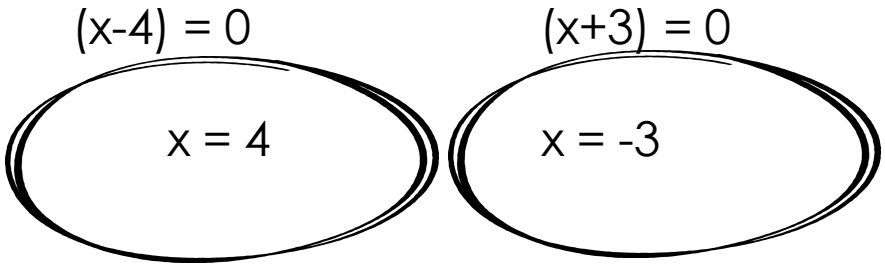
$$6x+22 = x^2+7x+10$$

- Now, combine like terms

$$0 = x^2 - x - 12$$

- Reverse distribute and set equal to 0

$$(x-4)(x+3) = 0$$



Not a fan of FOIL? Why not multiply vertically?

$$
\begin{array}{r}
x \quad -4 \\
\underline{x \quad +3} \\
3x \quad -12 \\
x^2 \quad -4x \\
\hline
x^2 \quad -x \quad -12
\end{array}
$$