Day 2

Multiplying & Dividing Rationals

Old Example: $\frac{2}{y} \times \frac{6x}{13} = \boxed{\frac{12x}{13y}}$

Steps to multiplying Rationals

1. Factor when needed
2. multiply straight across
3. Simplify

Ex 1: $\frac{x^2+7x+12}{x+5} \cdot \frac{x+3}{x^2+5x+4}$

1. $\frac{(x+4)(x+3)}{x+5} \cdot \frac{x+3}{(x+4)(x+1)}$

2. $\frac{(x+4)(x+3)(x+3)}{(x+5)(x+4)(x+1)}$

3. $\boxed{\frac{(x+3)^2}{(x+5)(x+1)}}$

Don't forget Restrictions ☺

$x \neq -5, -4, -1$

Ex 2

$$\frac{x^2-4}{x^2-1} \cdot \frac{x+1}{x^2+2x}$$

$$\frac{(x+2)(x-2)}{(x+1)(x-1)} \cdot \frac{x+1}{x(x+2)} = \frac{(x+2)(x-2)(x+1)}{(x+1)(x-1)\,x\,(x+2)} = \boxed{\frac{x-2}{(x-1)x}}$$

$x \neq -1, 1, 0, -2$

Old Example: $\frac{1}{2} \div \frac{3}{4} = \frac{1}{2} \cdot \frac{4}{3} = \frac{4}{6} = \frac{2}{3}$

Keep Change Flip!

Ex 3

$$\frac{x-4}{(3x+2)(x-2)} \div \frac{5(x-4)}{(x-2)(7x-5)}$$

This whole thing is a denominator

$$\frac{x-4}{(3x+2)(x-2)} \cdot \frac{(x-2)(7x-5)}{5(x-4)} = \boxed{\frac{7x-5}{5(3x+2)}}$$

Restrictions: $x \neq 2, 4, -\frac{2}{3}, \frac{5}{7}$

Ex 4 $\dfrac{a^2+2a-15}{a^2-16} \div \dfrac{a+1}{3a-12} \overset{KCF}{\Rightarrow} \dfrac{a^2+2a-15}{a^2-16} \cdot \dfrac{3a-12}{a+1}$

$\dfrac{(a-3)(a+5)}{(a+4)(a-4)} \cdot \dfrac{3(a-4)}{a+1} = \boxed{\dfrac{3(a-3)(a+5)}{(a+4)(a+1)}}$

$a \neq -4, -1, 4$

Ex 5 $\dfrac{14a^3-28a^2}{7a^2-36a-36} \div \dfrac{6a-12}{21a+18}$

$\dfrac{14a^2(a-2)}{(7a+6)(a-6)} \cdot \dfrac{3(7a+6)}{6(a-2)} = \boxed{\dfrac{7a^2}{(a-6)}}$

$a \neq 2, 6, \frac{-6}{7}$