7.2: Multiplying & Dividing Rational Expressions

Steps: 1) factor

multiply
- 2) replace expressions with their factors
- 3) multiply fractions
- 4) cancel
- 5) write factors that are left

Steps: 1) keep, change, flip

divide → 2) step 1-5 for multiply

Ex 1) $\frac{x^2}{x+9} \cdot \frac{x^2+15x+54}{x^2-4x}$

$x^2+15x+54$

$54x^2$

$9x \quad 6x$

$\frac{x^2}{x}+\frac{9x}{x}\Big|\frac{6x}{6}+\frac{54}{6}$

$x(x+9)\Big|+6(x+9)$

$(x+9)(x+6)$

$\frac{x^2-4x}{x}$ $\frac{}{x}$ GCF: x

$x(x-4)$

$\frac{x^2}{x+9} \cdot \frac{(x+9)(x+6)}{x(x-4)}$

$\frac{x^2(x+9)(x+6)}{x(x+9)(x-4)}$

$\frac{x(x+6)}{x-4}$

Ex 2) $\frac{5x+15}{x^2-9} \cdot \frac{8x+24}{4}$

$\frac{5x+15}{5} \quad \frac{5}{5}$ GCF: 5

$5(x+3)$

x^2-9

$\sqrt{x^2} = x$

$\sqrt{9} = 3$

$(x+3)(x-3)$

$\frac{8x+24}{8} \quad \frac{8}{8}$ GCF: 8

$8(x+3)$

$\frac{5(x+3)}{(x+3)(x-3)} \cdot \frac{8(x+3)}{4} \rightarrow \frac{40(x+3)(x+3)}{4(x+3)(x-3)}$ (40 = 10)

$\boxed{\frac{10(x+3)}{x-3}}$

you try: $\frac{6m^2+7m+2}{3m^2-17m+10} \cdot \frac{12m^2-8m}{4m^2-1}$

$\frac{(3m+2)(2m+1)}{(3m-2)(m-5)} \cdot \frac{4m(3m-2)}{(2m+1)(2m-1)}$

$\boxed{\frac{4m(3m+2)}{(m-5)(2m-1)}}$

Ex 3) $\frac{x^2+9x+20}{x^2-25} \div \frac{x+4}{x-4}$ flip

keep change

$\frac{x^2+9x+20}{x^2-25} \cdot \frac{x-4}{x+4}$

$x^2+9x+20$ $\quad 20x^2$

$5x \quad 4x$

x^2-25

$\sqrt{x^2} = x$

$\sqrt{25} = 5$

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

$\frac{x^2}{x} + \frac{5x}{x} \mid \frac{4x}{4} + \frac{20}{4}$

$x(x+5) \mid +4(x+5)$

$(x+5)(x+4)$

$\frac{(x+5)(x+4)}{(x+5)(x-5)} \cdot \frac{x-4}{x+4} \rightarrow \boxed{\frac{x-4}{x-5}}$

you try: $\frac{x+4}{x-4} \div \frac{x^2-16}{1}$

$\frac{x+4}{x-4} \cdot \frac{1}{(x+4)(x-4)} \rightarrow \boxed{\frac{1}{(x-4)^2}}$