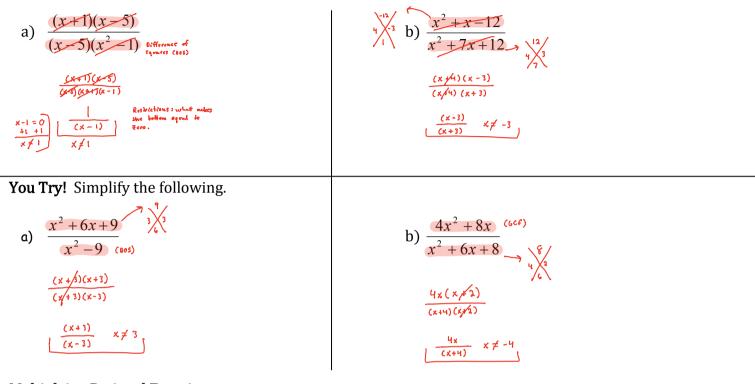
## Math 3 Unit 5 Day 3 Notes – Multiplying & Dividing Rational Expressions

Name:	Key
Date:	

**Example 1:** Simplify the following.



## **Multiplying Rational Functions**

When multiplying rational functions, meaning you are multiplying two factions together, you multiply straight across the top and straight across the bottom, simplifying where you can.

$$\frac{a \cdot c}{b \cdot d} = \frac{ac}{bd}$$

**Example 2:** Simplify completely. **Example 3:** Simplify Completely.  $\frac{x^{2}+2x-8}{x^{2}+4x+3} \frac{3x+3}{x-2}$ (6cf)  $(pos) x^2 - 9 x + 2$  $\frac{x+2}{x^2+5x+6} \cdot \frac{x+2}{3x-9} \quad (b < cf)$   $\frac{x+2}{3x-9} \quad (b < cf)$   $\frac{x+3}{(x+3)(x+3)} \cdot \frac{(x+2)}{3(x+3)}$  $\frac{(x+4)(x/\lambda)}{(x+3)(x/1)} \cdot \frac{3(x/1)}{(x/\lambda)}$  $\frac{3(x+4)}{(x+3)} \quad x \neq -3$  $\frac{1}{3}$ You Try! Multiply the following & state the restrictions.  $\frac{3}{1-2} b) \frac{x^2 + x - 6}{x - 5} \cdot \frac{x^2 - 25}{x^2 + 4x + 3} \frac{3}{1\sqrt{3}}$  $\frac{t^{2}+19t+84}{4t-4} \cdot \frac{2t-2}{t^{2}+9t+14} \rightarrow \frac{t^{4}}{t^{7}}$  $\frac{(x+3)(x-2)}{(x-5)} \cdot \frac{(x+5)(x-5)}{(x+1)(x+5)}$  $\frac{(x + i\lambda)(x + 1)}{4(x - 1)} \cdot \frac{\lambda(x - 1)}{(x + \lambda)(x + 1)}$  $\frac{(x-\lambda)(x+5)}{(x+1)} \quad x \neq -1$  $\frac{\lambda(x+1\lambda)}{H(x+\lambda)}$  $\frac{(\chi+i2)}{2(\chi+2)} \quad \chi \neq -2$ 

## **Dividing Rational Functions**

When dividing rational functions, you multiply the first fraction by the **reciprocal** of the second fraction, simplifying where you can. SAME-CHANGE-FLIP!

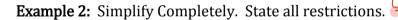
$$\frac{\overset{k}{a}}{b} \div \frac{\overset{c}{c}}{d} = \frac{a}{b} \underbrace{\overset{\star}{\bullet}}{c} = \underbrace{ad}_{bc}$$

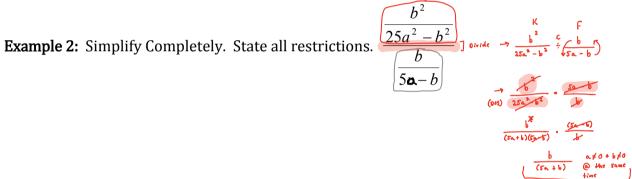
**Example 1:** Simplify completely and state the restrictions.

$$\frac{a+2}{a+3} \stackrel{c}{\leftrightarrow} \frac{a^2+a-12}{a^2-9} \xrightarrow{(x+2)} \frac{(x+2)}{(x+3)} \cdot \frac{x^2-9}{x^2+x^{-12}} \stackrel{(005)}{(x+3)}$$

$$\frac{(x+2)}{(x+3)} \cdot \frac{(x-3)(x+3)}{(x+4)(x-3)}$$

$$\frac{(x+2)}{(x+4)(x-3)} \times \frac{(x+2)}{(x+4)(x-3)}$$





You Try! Divide the following. Be sure to state all restrictions.

a) 
$$\frac{\frac{-12b+18}{b^2-25}}{\frac{4b-6}{b^2-3b-10}} \rightarrow \frac{\frac{-(2b+1)^8}{b^2-25}}{\frac{4b-6}{b^2-3b-10}} \div \frac{\frac{4b-6}{b^2-3b-10}}{\frac{-(2b+1)^8}{b^2-25}} \div \frac{\frac{4b-6}{b^2-3b-10}}{\frac{4b-6}{4b-6}} - 5 \int_{-3}^{10} x^2 + \frac{3(x+4)}{2(x+4)} \div \frac{(x+4)}{x+2} + \frac{3(x+4)}{2(x+4)} \div \frac{(x+4)}{(x+4)(x+4)} + \frac{3(x+4)}{2(x+4)} \div \frac{(x+4)}{2(x+4)} + \frac{3(x+4)}{2(x+4)} \div \frac{(x+4)}{2(x+4)} + \frac{3(x+4)}{2(x+4)} + \frac{3(x+4)}$$