

## Multiplying & Dividing Rational Exp.

Recall:

$$\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$$

$$\frac{\cancel{2}^1}{\cancel{3}^1} \times \frac{1}{5} = \frac{6}{15} = \frac{2}{5}$$

$$\frac{2}{3} \div \frac{3}{5} = \frac{2}{3} \times \frac{5}{3} = \frac{10}{9}$$

$$\frac{2}{3} \div \frac{5}{3} \times \frac{1}{2} = \frac{\cancel{2}^1}{\cancel{3}^1} \times \frac{\cancel{3}^1}{5} \times \frac{1}{\cancel{2}^1} = \frac{1}{5}$$

$$\frac{\cancel{4x^2}^1}{\cancel{3xy}^1} \cdot \frac{\cancel{y^2}^1}{\cancel{8x}^2} = \frac{y}{6}$$

NPV:  
x ≠ 0, y ≠ 0

OR

$$\frac{4x^2}{3xy} \cdot \frac{y^2}{8x} = \frac{\cancel{4x^2}^1}{\cancel{24x^2y}^1} = \frac{1y}{6} = \frac{y}{6}$$

So what about:

$$\frac{(x^2-x-12)}{(x^2-9)} \times \frac{(x^2-4x+3)}{(x^2-4x)}$$

- STEPS:**
- ① Factor!
  - ② NPV BEFORE Cancelling
  - ③ Kill anything that divides to 1
  - ④

$$= \frac{(x-1)}{x}$$

NPV:  $x \neq \pm 3, 0, 4$

Ex 2  $\frac{(x^2-4)}{(x^2-4x)} \div \frac{(x^2+x-6)}{(x^2+x-20)}$

① Factor

NPV:  
 $x \neq 0, 4, -5$   
 $-3, 2$

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

- ② NPV
- ③ Deal with the  $\div$
- ← New  $\star$  denom. so new NPV's

$$= \frac{(x+2)(x+5)}{x(x+3)}$$

④ Now  $\Leftarrow$  Cancel

$$\frac{(2x^2 - 7x - 15)}{(2x^2 - 10x)} \div \frac{(x^2 - 9)}{6} \times \frac{(3 - 2x)}{1}$$

NPV:  
 $x \neq 0, 5, \pm \frac{3}{2}$

$$\frac{(2x+3)(x-5)}{2x(x-5)} \div \frac{(2x-3)(2x+3)}{6} \times \frac{(3-2x)}{1}$$

$\frac{\cancel{2x+3}\cancel{(x-5)}}{\cancel{2x}\cancel{(x-5)}} \times \frac{\cancel{6}\cancel{(2x-3)}\cancel{(2x+3)}}{\cancel{6}} \times \frac{\cancel{(3-2x)}}{1}$

$$\frac{-3}{2x}$$

6.2