

## 8.4 Multiply/Divide Rational Expressions

rational expression:  $f(x) = \frac{p(x)}{q(x)}$

$p(x)$  and  $q(x)$  are polynomials  
 $q(x) \neq 0$

Remember:  $\frac{2}{3} \cdot \frac{4}{5} = \frac{\cancel{2} \cdot 4}{3 \cdot 5} = \frac{8}{15}$

$$\frac{\overset{2}{\cancel{10}}}{7} \cdot \frac{3}{\cancel{25}_5} = \frac{30}{175} \quad \frac{\cancel{5} \cdot 6}{\cancel{8} \cdot 35}$$

$$\frac{6}{35}$$

Cancel factors only.  $\frac{\cancel{a}c}{b\cancel{e}} = \frac{a}{b}$

not  $\frac{a + c}{b + c}$

Example:  $\frac{x^2 - 8x + 16}{x^2 + 2x - 24}$

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

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



$$\text{Example: } \frac{5x^2y^3}{3xy^4} \cdot \frac{27x^5}{15x^4y} = \frac{135x^2y^3}{45x^5y^5}$$
$$\frac{3x^2}{y^2}$$

Example:  $\frac{20x - 5x^2}{x^2 - x} \cdot \frac{x^2 + 3x - 4}{x^2 - 16}$

$$\frac{-3}{15} = \frac{3}{-5}$$

$$= -\frac{3}{5}$$

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

$$\frac{-5\cancel{x}(4-x)}{\cancel{x}(x-1)} \cdot \frac{\cancel{(x+4)}\cancel{(x-1)}}{\cancel{(x-4)}(x+4)}$$

-5

$$(4-x) = -\frac{\cancel{(x-4)}}{\cancel{x-1}}$$

Example:  $\frac{x-4}{x^3+8} \cdot \frac{x^2-2x+4}{1}$

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

$$\frac{x-4}{x+2}$$

Remember:  $\frac{2}{3} \div \frac{5}{9}$

$$\frac{2}{3} \cdot \frac{9}{5} = \frac{18}{15} = \frac{6}{5}$$

flip & multiply

Example:  $\frac{x^2 - 4x - 21}{5x + 15} \div \frac{x^2 + 3x - 70}{x^2 - 100}$

$$\frac{\cancel{(x-7)} \cancel{(x+3)}}{5 \cancel{(x+3)}} \cdot \frac{\cancel{(x-10)} \cancel{(x+10)}}{\cancel{(x+10)} \cancel{(x-7)}}$$

$$\frac{x-10}{5}$$

Pg 577 7 – 17 odd, 25 – 43 odd