

Math 3

Get out your homework and begin the warm-up

Simplify the expressions

$$4) \frac{32n^2}{24n} = \frac{4n}{3} \quad n \neq 0$$

$$12) \frac{x+6}{x^2+5x-6}$$

$$\frac{-1 \cancel{-6}}{5} \cdot \frac{\cancel{(x+6)}}{\cancel{(x-1)}(x+6)}$$

$x \neq 1$ $\frac{1}{x-1}$
 $x \neq -6$

Multiply Rational Expressions

Multiply Rational Expressions

Let $a, b, c,$ and d be polynomials,

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

where $b \neq 0$ and $d \neq 0$.

Find the product.

Example 1:

$$\frac{3x^2}{4x} \cdot \frac{6x^2}{9x^3} = \frac{3x}{4} \cdot \frac{2}{3x}$$

$$\frac{6x}{12x}$$

$$= \frac{1}{2} \quad x \neq 0$$

Example 2:

$$\frac{5x^2 - 5x}{x^2 - 7x + 10} \cdot \frac{x^2 - 3x - 10}{8x^2 + 16x} = \frac{\cancel{5x(x-1)}}{\cancel{(x-5)(x-2)}} \cdot \frac{\cancel{(x-5)(x+2)}}{\cancel{8x(x+2)}}$$

$$\begin{array}{r} \cancel{10} \\ \cancel{-5} \quad \cancel{-2} \\ \cancel{-7} \end{array}$$

$$\begin{array}{r} \cancel{-10} \\ \cancel{-5} \quad \cancel{2} \\ \cancel{-3} \end{array}$$

$$\frac{5x(x-1)}{8x(x-2)}$$

$x \neq 5$	$x \neq 0$	$\frac{5(x-1)}{8(x-2)}$
$x \neq 2$	$x \neq -2$	

Example 3:

$$\frac{x^2 - 9}{5x + 15} \cdot \frac{4x + 4}{x^2 - 7x + 12} = \frac{\cancel{(x+3)(x-3)}}{\cancel{5(x+3)}} \cdot \frac{4(x+1)}{\cancel{(x-4)(x-3)}}$$

$$\begin{array}{r} \cancel{12} \\ \cancel{-4} \quad \cancel{-3} \\ \cancel{-7} \end{array}$$

$x \neq -3$	$\frac{4(x+1)}{5(x-4)}$
$x \neq 4$	
$x \neq 3$	

Example 4:

$$\frac{2x}{x^2 - 6x + 8} \cdot (x-4) = \frac{2x}{\cancel{(x-4)}(x-2)} \cdot \frac{\cancel{x-4}}{1}$$

$$\begin{array}{r} 8 \\ -4 \quad -2 \\ \hline -6 \end{array}$$

$$\begin{array}{l} x \neq 4 \\ x \neq 2 \end{array} \quad \frac{2x}{x-2}$$

Divide Rational Expressions

Divide Rational Expressions
 Let a, b, c, and d be polynomials,
 $\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$
 where $b \neq 0, c \neq 0$ and $d \neq 0$.

Find the quotient.

Example 5:

$$\frac{x^4}{5x} \div \frac{7x^4}{15x^2} = \frac{x^4}{5x} \cdot \frac{15x^2}{7x^4}$$

$$\frac{x^3}{5} \cdot \frac{15}{7x^2} = \frac{15x^3}{35x^2} = \frac{3x}{7}$$

$x \neq 0$

Example 6:

$$x-1=0$$
$$+1 \quad +1$$

$$\frac{x^2-2x-15}{3x-3} \div \frac{x^2+5x+6}{x-1} = \frac{x^2-2x-15}{3x-3} \cdot \frac{x-1}{x^2+5x+6}$$

$$\frac{-15}{-5} \cdot \frac{3}{-2}$$

$$\frac{6}{3} \cdot \frac{2}{5}$$

$$\frac{(x-5)(x+3)}{3(x-1)}$$

$$\frac{x-1}{(x+3)(x+2)}$$

$$\frac{x \neq 1 \quad x \neq -2}{x \neq -3} \cdot \frac{(x-5)}{3(x+2)}$$

Example 7:

$$\frac{x^2-4x-5}{5x+5} \div \frac{x^2-25}{2x} = \frac{(x+1)(x-5)}{5(x+1)} \cdot \frac{2x}{(x+5)(x-5)}$$

$$\frac{x \neq 5}{x \neq -1} \cdot \frac{2x}{5(x+5)}$$
$$x \neq -5$$

Example 8:

$$\frac{x^2 + 5x - 14}{2x^2} \div \frac{(x+7)}{1} \cdot \frac{\cancel{(x+7)}(x-2)}{2x^2} \cdot \frac{1}{\cancel{x+7}}$$

$$\begin{array}{l} x \neq -7 \\ x \neq 0 \end{array} \quad \frac{(x-2)}{2x^2}$$