

Lesson Three - Dividing Rational Expressions

Division

Review: $\frac{2}{5} \div \frac{3}{7} = \frac{2}{5} \cdot \frac{7}{3} = \frac{14}{15}$

reciprocal ↓

Steps for Dividing:

- Factor and state restrictions (before flip)
- Multiply by the reciprocal
- State Restrictions (after flip) → from denom of first rat'l exp and both num and denom of second rat'l exp
- Divide out any like factors
- Multiply numerators, multiply denominators

Examples: Simplify and state restrictions

1. $\frac{7n^3}{4} \div \frac{(7n)^2}{-12}$

$$\frac{7n^3}{4} \cdot \frac{-12}{(7n)^2} \quad n \neq 0$$

$$\frac{\cancel{7}n^3}{4} \cdot \frac{-12}{\cancel{7}n^2} = \frac{-3n}{1}$$

2. $\frac{5(x-3)}{2x} \div \frac{10(x-3)}{3x(x+5)}$

$$\frac{5(x-3)}{2x} \cdot \frac{3x(x+5)}{10(x-3)} \quad x \neq -5, 0, 3$$

$$\frac{\cancel{5}(x-3)}{\cancel{2}x} \cdot \frac{3x(x+5)}{\cancel{10}(x-3)} = \frac{3(x+5)}{4}$$

$$3. \frac{4-x^2}{5x-10} \div \frac{3x-15}{x-5}$$

$$\frac{4-x^2}{5x-10} \cdot \frac{x-5}{3x-15}$$

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

$$\frac{-\cancel{(x-2)}(x+2)}{5\cancel{(x-2)}} \cdot \frac{\cancel{(x-5)}}{3\cancel{(x-5)}}$$

$$-\frac{(x+2)}{15}$$

$$x \neq 2, 5$$

GCF
Diff of squares
PSF

$$4. \frac{x^2-9x+20}{2x^2+6x-8} \div \frac{3x+15}{x^2-1}$$

$$\frac{x^2-9x+20}{2x^2+6x-8} \cdot \frac{x^2-1}{3x+15}$$

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

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

$$\frac{(x-5)(x-4)(x+1)}{6(x+4)(x+5)}$$

$$x \neq -5, -4, -1, 1$$

$$5. \frac{6x}{2x^2+3x-9} \div \frac{8x^4}{4x^2-9} =$$

$$\frac{6x}{2x^2+3x-9} \cdot \frac{4x^2-9}{8x^4}$$

$$\frac{\cancel{3}\cancel{2}x}{\cancel{2}(x-3)(x+3)} \cdot \frac{\cancel{4}\cancel{2}x^2-9}{\cancel{8}x^4}$$

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

P -18
S 3
F $\frac{6}{2} = \frac{3}{1}$

$$x \neq -3, \pm \frac{3}{2}, 0$$

$$2x-3 \neq 0$$

$$2x \neq 3$$

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

Assignment: Pg. 539 7c, d, 8a,c,d, 11b, 12a, c MC#1,2