Multiplying and Dividing Rational Expressions

Try On Your Own #1

1. $\dfrac{1}{2} \times \dfrac{2}{3}$

$\dfrac{1}{2} \times \dfrac{2}{3}$

2. $\dfrac{2x}{3} \times \dfrac{1}{x}$

3. $\dfrac{3x^2}{7} \times \dfrac{7}{x}$

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

5. $\dfrac{x+2}{x+1}$

6. $\dfrac{1}{2} \div \dfrac{1}{7}$

7. $\dfrac{2}{3} \div \dfrac{1}{3}$

8. $\dfrac{2}{3} \div \dfrac{3}{5}$

9. $\dfrac{x+2}{x+1} \div \dfrac{x+3}{x+1}$

Try On Your Own #2

Multiplying
- Factor numerators and denominators
- State all restrictions (values that make the denominator equal 0)
- Divide out factors
- Multiply numerators and denominators
- Simplify and state all restrictions

Example: Simplify and state all restrictions

1. $\dfrac{4}{x^2 + 7x + 12} \times \dfrac{3x^2 + 12x}{2} =$

2. $\dfrac{x^2 - 5x + 6}{3x} \times \dfrac{9x^2}{x^2 + 2x - 8} =$

Try On Your Own #3
Dividing
- Factor numerators and denominators
- State all restrictions
- Flip and multiply (change ÷ to x and use reciprocal of second expression)
- State new restrictions
- Divide out factors
- Multiply numerators and denominators
- Simplify and state all restrictions

Example: Simplify

1.

$$\frac{2x^2 + x - 6}{x^2 - 9} \div \frac{x^2 + 4x + 4}{5x^3 - 5x^2 - 30x} =$$

2.

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

Try Own Your Own – Extra Practice

Multiplying
- Factor numerators and denominators
- State all restrictions (values that make the denominator equal 0)
- Divide out factors
- Multiply numerators and denominators
- Simplify and state all restrictions

Example: Simplify and state all restrictions

1. $\dfrac{6}{x^2+5x+6} \times \dfrac{2x^2+6x}{3}$

2. $\dfrac{x^2-4x-5}{4x^2} \times \dfrac{12x}{x^2-6x-7}$

Dividing
- Factor numerators and denominators
- ## State all restrictions
- Flip and multiply (change ÷ to x and use reciprocal of second expression)
- State new restrictions
- Divide out factors
- Multiply numerators and denominators
- Simplify and state all restrictions

Example: Simplify
1.

$\dfrac{3x^2+4x-4}{x^2-3x-4} \div \dfrac{x^2+4x+4}{3x^3-6x^2-24x}$