Name _____   Date _____   Class_____

Multiplying and Dividing Rational Expressions
Reteach

Example Find the product and any excluded values. $\dfrac{x^2-2x-8}{x^2-1} \cdot \dfrac{x-1}{x^2-x-6}$

Step 1 Factor and multiply.
$$=\frac{(x-4)(x+2)(x-1)}{(x+1)(x-1)(x-3)(x+2)}$$

Step 2 Cancel common factors.
$$=\frac{(x-4)\cancel{(x+2)}\cancel{(x-1)}}{(x+1)\cancel{(x-1)}(x-3)\cancel{(x+2)}}$$

Step 3 Write simplified product.
$$=\frac{x-4}{(x+1)(x-3)}$$

Step 4 Note excluded values.
$$x \neq -2, x \neq -1, x \neq 1, x \neq 3$$

Find the product and any excluded values.

1. $\dfrac{x^2-5x-14}{x^2-16} \cdot \dfrac{x^2-x-20}{x+2}$

2. $\dfrac{x^2+6x-16}{x^2-3x} \cdot \dfrac{x}{x^2-3x+2}$

3. $\dfrac{x^2-14x+45}{6x^2-3x} \cdot \dfrac{3x}{2x^2-50}$

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Example Find the quotient and any excluded values. $\dfrac{x^2-x-12}{x+5} \div \dfrac{x^2+9x+18}{2x+10}$

Step 1 Rewrite as multiplication by reciprocal of divisor.
$$=\frac{x^2-x-12}{x+5} \cdot \frac{2x+10}{x^2+9x+18}$$

Step 2 Factor
$$=\frac{(x-4)(x+3)}{x+5} \cdot \frac{2(x+5)}{(x+6)(x+3)}$$

Step 3 Multiply
$$=\frac{2(x-4)(x+3)(x+5)}{(x+5)(x+6)(x+3)}$$

Step 4 Cancel common factors.
$$=\frac{2(x-4)\cancel{(x+3)}\cancel{(x+5)}}{\cancel{(x+5)}(x+6)\cancel{(x+3)}}$$

Step 5 Write simplified product.
$$=\frac{2(x-4)}{(x+6)}$$

Step 6 Note excluded values.
$$x \neq -6, x \neq -5, x \neq -3$$

Find the quotient and any excluded values.

4. $\dfrac{x^2-7x-18}{2x^2-32} \div \dfrac{x^2+x-2}{2x-8}$

5. $\dfrac{3x^2+6x+3}{x+5} \div \dfrac{3x+3}{x^2-25}$

6. $\dfrac{2x^2-3x+1}{5x^2} \div \dfrac{12x-6}{10x^3+5x^2}$

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