

Multiplying Rational Functions

Ex. Simplify $\frac{1}{9x+63} \cdot \frac{9x+90}{x+10}$

$$\frac{1}{9(x+7)} \cdot \frac{9(x+10)}{x+10} = \boxed{\frac{1}{x+7}}$$

Ex. Simplify $\frac{30x-36}{20x-24} \cdot \frac{4}{7x^2}$

$$\frac{6(5x-6)}{4(5x-6)} \cdot \frac{4}{7x^2} = \boxed{\frac{6}{7x^2}}$$

Ex. Simplify $\frac{x+1}{x^2-25} \cdot \frac{x^2+4x-60}{x+1}$

$$\frac{x+1}{(x+5)(x-5)} \cdot \frac{(x+10)(x-6)}{x+1}$$

$$\boxed{\frac{(x+10)(x-6)}{(x+5)(x-5)}}$$

Ex. Simplify $\frac{x+2}{x^2-2x-8} \cdot \frac{x^2+3x-28}{x+1}$

$$\frac{x+2}{(x-4)(x+2)} \cdot \frac{(x-4)(x+7)}{x+1} = \boxed{\frac{x+7}{x+1}}$$

Dividing Rational Functions

What do you have to remember about dividing Fractions?

Ex. $\frac{3}{4} \div \frac{7}{6} = \frac{3}{4} \cdot \frac{6}{7} = \frac{218}{28} = \frac{9}{14}$

Ex. Simplify $\frac{6x+42}{8x^3-80x^2} \div \frac{x-8}{8x^3-64x^2}$

$$\frac{6x+42}{8x^3-80x^2} \cdot \frac{8x^3-64x^2}{x-8}$$

$$\frac{6(x+7)}{8x^2(x-10)} \cdot \frac{8x^2(x-8)}{x-8}$$

$$= \boxed{\frac{6(x+7)}{x-10}}$$

Ex. Simplify $\frac{x^2+11x+18}{5x+10} \div \frac{14x-8}{35x-20}$

$$\frac{x^2+11x+18}{5x+10} \cdot \frac{35x-20}{14x-8}$$

$$\frac{(x+9)(x+2)}{5(x+2)} \cdot \frac{5(7x-4)}{2(7x-4)} = \frac{x+9}{2}$$

Ex. Simplify $\frac{9x+63}{x^2+3x-28} \div \frac{8x^2}{5x^3-20x^2}$

$$\frac{9x+63}{x^2+3x-28} \cdot \frac{5x^3-20x^2}{8x^2}$$

$$\frac{9(x+7)}{(x-4)(x+7)} \cdot \frac{5x^2(x-4)}{8x^2}$$

$$\frac{45}{8}$$

Ex. Simplify $\frac{x^2-7x+6}{x+8} \div \frac{x^2+7x-8}{x^2+6x-16}$

$$\frac{x^2-7x+6}{x+8} \cdot \frac{x^2+6x-16}{x^2+7x-8}$$

$$\frac{(x-6)(x-1)}{x+8} \cdot \frac{(x-2)(x+8)}{(x-1)(x+8)}$$

$$\frac{(x-6)(x-2)}{(x+8)}$$