

MULTIPLYING AND DIVIDING RATIONAL EXPRESSIONS NOTES

Reminder 

To Multiply Two Fractions	
$\frac{a}{b} \cdot \frac{c}{d} = \frac{a \cdot c}{b \cdot d}$	$b \neq 0$ and $d \neq 0$

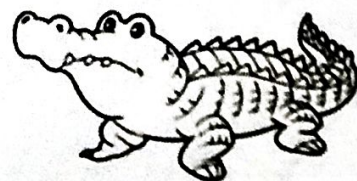
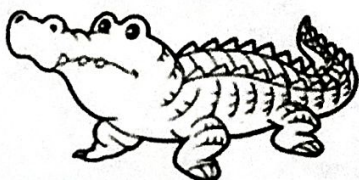
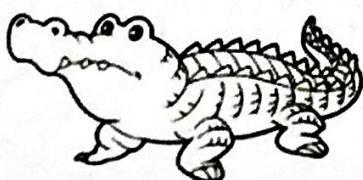
To Multiply Rational Expressions
1. Factor all numerators and denominators completely.
2. Divide out common factors.
3. Multiply numerators together and multiply denominators together.

Example:

$$\frac{3x+2}{2x-1} \cdot \frac{4-8x}{3x+2} = \frac{3x+2}{2x-1} \cdot \frac{4(1-2x)}{3x+2} = \frac{4(-1)(2x-1)}{2x-1} = \boxed{-4}$$

Example:

$$\frac{2x^2 + 7x - 15}{4x^2 - 8x + 3} \cdot \frac{8}{x+5} = \frac{(2x-3)(x+5)}{(2x-1)(2x-3)} \cdot \frac{8}{x+5} = \boxed{\frac{8}{2x-1}}$$



Reminder



To Divide Two Fractions

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{a \cdot d}{b \cdot c}, \quad b \neq 0, d \neq 0, \text{ and } c \neq 0$$

To Divide Rational Expressions

Invert the divisor (the second fraction) and multiply.

Example:

$$\frac{x^2+8x+15}{x^2} \div \frac{(x+3)^2}{1}$$

$$\frac{x^2+8x+15}{x^2} \cdot \frac{1}{(x+3)^2}$$

$$\frac{\cancel{(x+3)}(x+5)}{x^2} \cdot \frac{1}{\cancel{(x+3)}^2} = \boxed{\frac{x+5}{x^2(x+3)}}$$

Example:

$$\frac{12x^2-22x+8}{3x} \div \frac{3x^2+2x-8}{2x^2+4x}$$

$$\frac{12x^2-22x+8}{3x} \cdot \frac{2x^2+4x}{3x^2+2x-8}$$

Factorization steps:

$$2(6x^2-11x+4)$$

$$2(2x-1)(3x-4)$$

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

$$\frac{4x(2x-1)}{3x} = \boxed{\frac{4(2x-1)}{3}}$$

