Algebra III

1/29/18

Adding and Subtracting

Rational Expressions

Warm up:

$$\frac{3}{4} - \frac{1}{4} = \frac{2}{4} = \frac{1}{2}$$

$$\frac{2 \cdot 1}{2 \cdot 5} + \frac{3}{10} = \frac{2+3}{10} = \frac{5}{10} > \frac{1}{2}$$

$$\frac{10+15}{50} = \frac{25}{50}$$

$$\frac{3 \cdot 5}{3 \cdot 12} + \frac{5 \cdot 2}{18 \cdot 2} = \frac{15+10}{36} = \frac{25}{36}$$

$$x \cdot \frac{3x}{x \cdot y} - \frac{y}{x}y = \frac{3x^2 - y^2}{xy} = \frac{(\sqrt{3}x + y)(\sqrt{3}x - y)}{xy}$$

$$\frac{3}{x^2 - y^2} - \frac{2}{x - y}$$

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

$$\frac{3 \quad -2x - 2y}{(x-y) \quad (x+y)}$$

$$\frac{2x-1}{x^2-x-6}-\frac{1}{x+2}$$

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

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

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

$$\frac{1}{x^3-1}-\frac{x}{x^2+x+1}$$

$$\frac{1}{(x-1)(x^2+x+1)}-\frac{x(x-1)}{(x^2+x+1)(x-1)}$$

$$\frac{1-x^2+x}{(x-1)(x^2+x+1)}=\boxed{\frac{-x^2+x+1}{(x-1)(x^2+x+1)}}$$

$$\frac{x-2}{x^2+5x+4} + \frac{2}{x^2+7x+12}$$

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

$$\frac{x^2+x-6 \; + \; 2x+2}{(x+4)(x+1)(x+3)}$$

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

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

$$\frac{x-1}{(x+3)(x+1)}$$