

****Reminders- Test Friday, Extra Help Today!****
Lesson 46 Objective- SWBAT simplify algebraic complex fractions.

Kickoff- Simplify

$$y \left(\frac{y}{1} - \frac{25}{y} \right) + y \left(1 + \frac{5}{y} \right)$$

$$\left(\frac{y^2}{y} - \frac{25}{y} \right) + \left(\frac{y}{y} + \frac{5}{y} \right)$$

$$\left(\frac{y^2 - 25}{y} \right) + \left(\frac{y + 5}{y} \right)$$

$$\frac{y^2 - 25 + y + 5}{y}$$

$$\frac{y^2 + y - 20}{y} = \frac{(y+5)(y-4)}{y}$$

⑥ $\frac{4a^2}{a^2-9} - \frac{a-2}{3-a}$

$$= \frac{4a^2}{(a+3)(a-3)} - \frac{a-2}{-(a-3)(a+3)}$$

$$= \frac{4a^2}{(a+3)(a-3)} + \frac{a-2}{(a+3)(a-3)}$$

$$= \frac{4a^2 + a - 2}{(a+3)(a-3)}$$

⑩ $\frac{2x}{1-2x} + \frac{3x}{a+1} - \frac{3}{4x^2-1}$

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

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

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

$$= \frac{2x^2 + 5x - 3}{(a+1)(2x-1)}$$

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

Complex Fractions

- Factor denominators completely, and find common denom for num and denom.
- Add/Subtract * distribute -
- Keep Change flip
- Factor everything
- Simplify

Examples:

1) $\frac{1}{\frac{5}{9}}$

$$\frac{1}{\frac{5}{9}} = \frac{1}{1} \cdot \frac{9}{5} = \frac{9}{5}$$

2) $\frac{\frac{a+b}{2a}}{\frac{a+b}{3a}}$

$$\frac{\frac{a+b}{2a}}{\frac{a+b}{3a}} = \frac{a+b}{2a} \cdot \frac{3a}{a+b} = \frac{3a}{2a} = \frac{3}{2}$$

$3 \frac{x^2 + \frac{1}{x}}{6}$

$$\frac{\frac{x^2}{x} + \frac{1}{x}}{6} = \frac{\frac{x^2+1}{x}}{6} = \frac{x^2+1}{x} \cdot \frac{1}{6} = \frac{x^2+1}{6x}$$

$4 \frac{5x + \frac{1}{5}}{25x^2 - \frac{1}{25}}$

$$\frac{\frac{5x+1}{5}}{\frac{25x^2-1}{25}} = \frac{5x+1}{5} \cdot \frac{25}{25x^2-1} = \frac{5x+1}{5} \cdot \frac{25}{(5x+1)(5x-1)} = \frac{5}{5x-1}$$

$5 \frac{x^2 - \frac{8}{x}}{\frac{1}{4} - \frac{1}{x}}$

$$\frac{\frac{x^2 - \frac{8}{x}}{2x}}{\frac{x-4}{4x}} = \frac{x^2 - \frac{8}{x}}{2x} \cdot \frac{4x}{x-4} = \frac{4x^2 - 8}{2x(x-4)} = \frac{4(x^2 - 2)}{2x(x-4)} = \frac{2(x^2 - 2)}{x(x-4)}$$

$6 \frac{y^2 + \frac{24}{y}}{y^2 + \frac{12}{y}}$

$$\frac{\frac{y^2 + \frac{24}{y}}{y^2}}{\frac{y^2 + \frac{12}{y}}{y^2}} = \frac{y^2 + \frac{24}{y}}{y^2} \cdot \frac{y^2}{y^2 + \frac{12}{y}} = \frac{y^3 + 24}{y^2} \cdot \frac{y^2}{y^2 + \frac{12}{y}} = \frac{y^3 + 24}{y^2 + \frac{12}{y}}$$

$$= \frac{(y+4)(y-4)}{y^2} \cdot \frac{y^2}{(y+6)(y-2)} = \frac{y-4}{y-2}$$