

What you will learn about:
Rational Expressions

Simplifying Rational Expressions

Simplify each expression

$$-\frac{36x^3}{42x^2} = -\frac{6x}{7} \quad \frac{16r^2}{16r^3} = \frac{1}{r} \quad -\frac{70n^2}{28n} = -\frac{10n}{4} = -\frac{5n}{2}$$

$$\frac{2r-4}{r-2} = \frac{2(\cancel{r-2})}{\cancel{r-2}} = 2 \quad \frac{45}{10a-10} = \frac{45}{10(a-1)} = \frac{9}{2(a-1)} \quad \frac{x-4}{3x^2-12x} = \frac{\cancel{x-4}}{3x(\cancel{x-4})} = \frac{1}{3x}$$

$$\frac{15a-3}{24} = \frac{\cancel{3}(5a-1)}{\cancel{24}8} = \frac{5a-1}{8}$$

$$\frac{v-5}{v^2-10v+25} = \frac{\cancel{v-5}}{(v-5)(v-5)} = \frac{1}{v-5}$$

$$\frac{x+6}{x^2+5x-6} = \frac{\cancel{x+6}}{(x+6)(x-1)} = \frac{1}{x-1}$$

$$\frac{v^2-7v-30}{v^2-5v-24} = \frac{(v-10)(v+3)}{(v-8)(v+3)} = \frac{v-10}{v-8}$$

$$\frac{x^2+8x+12}{x^2+3x-18} = \frac{(x+4)(x+2)}{(x+6)(x-3)} = \frac{x+2}{x-3}$$

$$\frac{b^2+3b-28}{b^2-49} = \frac{(\cancel{b-7})(b+4)}{(\cancel{b-7})(b+7)} = \frac{b+4}{b+7}$$

$$\frac{6a^3+42a^2}{2a^2+26a+84}$$

$$\frac{6a^2(a+7)}{2(a^2+13a+42)}$$

$$\frac{\cancel{3}a^2(a+7)}{2(a+7)(a+6)}$$

$$\frac{3a^2}{2(a+6)}$$

$$\frac{9x^2+81x}{x^3+8x^2-9x}$$

$$\frac{9x(x+9)}{x(x^2+8x-9)}$$

$$\frac{9\cancel{x}(x+9)}{x(x+9)(x-1)}$$

$$\frac{9}{x-1}$$

$$\frac{x^3-x^2-42x}{2x^2-20x+42}$$

$$\frac{x(x^2-x-42)}{2(x^2-10x+21)}$$

$$\frac{x(x-7)(x+6)}{2(x-3)(x-7)} = \frac{x(x+6)}{2(x-3)}$$

$$\frac{x^2+2x-80}{2x^3-24x^2+64x}$$

$$\frac{(x+10)(x-8)}{2x(x^2-12x+32)}$$

$$\frac{(x+10)(x-8)}{2x(x-4)(x-8)} = \frac{(x+10)}{2x(x-4)}$$

Adding/Subtracting Rational Functions

Simply each expression

Common Denominator

+/- top and
Leave denominator

$$\frac{u-v}{8v} + \frac{6u-3v}{8v}$$

$$\frac{7u-4v}{8v}$$

$$\frac{m-3n}{6m^3n} - \frac{m+3n}{6m^3n}$$

$$\frac{-6n}{6m^3n} = -\frac{1}{m^3}$$

$$\frac{5}{a^2+3a+2} + \frac{5a+1}{a^2+3a+2}$$

$$\frac{5a+6}{a^2+3a+2}$$

$$\frac{x+2}{2x^2+13x+20} - \frac{x+3}{2x^2+13x+20}$$

$$\frac{-1}{2x^2+13x+20}$$

$$\frac{5a+6}{(a+2)(a+1)}$$

$$x+2 - (x+3)$$

$$x+2-x-3$$

$$-1$$

$$\frac{(x-8)}{(x-8)} \frac{3}{(x+7)} + \frac{4}{(x-8)(x+7)} (y+7)$$

$$\frac{(n+6)5}{(n+6)(n+5)} - \frac{4n}{(n+6)(n+5)} (n+5)$$

$$\frac{3y-24}{(x+7)(x-8)} + \frac{4y+28}{(x+7)(x-8)}$$

$$\frac{5n+30}{(n+5)(n+6)} - \frac{4n^2+20n}{(n+5)(n+6)}$$

$$\frac{7x+4}{(x+7)(x-8)}$$

$$\frac{-4n^2-15n+30}{(n+5)(n+6)} \quad \begin{matrix} 4(x+12) \\ 3(x+6) \end{matrix}$$

$$\frac{(2x+3) \frac{2x}{5x+4} + \frac{6x(5x+4)}{2x+3}}$$

$$\frac{2}{3x^2+12x} + \frac{8}{2x} = \frac{2}{3x(x+4)} + \frac{8}{2x}$$

$$\frac{4x^2+6x}{(5x+4)(2x+3)} + \frac{30x^2+24x}{(5x+4)(2x+3)}$$

$$\frac{4}{6x(x+4)} + \frac{24x+16}{6x(x+4)}$$

$$\frac{34x^2+30x}{(5x+4)(2x+3)}$$

$$\frac{24x+16}{6x(x+4)}$$

$$\frac{7n}{n+1} + \frac{8}{n-7}$$

$$\frac{(x+3)(x+2)}{(x+3)(x-7)} \frac{x^2+4x+13}{x^2-4x-21} = \frac{x^2+5x+6}{(x-7)(x+3)} \frac{x^2+4x+13}{(x-7)(x+3)}$$

$$\frac{7n^2-49n}{(n+1)(n-7)} + \frac{8n+8}{(n+1)(n-7)}$$

$$\frac{x^2+5x+6}{(x-7)(x+3)} - \frac{x^2+4x+13}{(x-7)(x+3)}$$

$$\frac{7n^2-41n+8}{(n+1)(n-7)}$$

$$\frac{4x}{(x-7)(x+3)} = \frac{1}{x+3}$$

$$\frac{(x-3) \left(\frac{3x-1}{x^2+2x-3} - \frac{(x-4)(x-1)}{x^2-9} \right)}{(x+3)(x-1) (x+3)(x-3)}$$

$$\frac{x^2+8x+2}{(x+2)(x+1)} - \frac{x^2-5x+6}{(x-3)(x-2)}$$

$$\frac{3x^2-10x+3}{(x-3)(x+3)(x-1)} - \frac{x^2-5x+4}{(x-3)(x+3)(x-1)}$$

$$\frac{4x(x^2-5x+6)}{(x+2)(x+1)(x-3)(x-2)} - \frac{3(x^2+3x+2)}{(x+2)(x+1)(x-3)(x-2)}$$

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

$$\frac{4x^3-20x^2+24x}{(x+2)(x+1)(x-3)(x-2)} - \frac{3x^2+9x+6}{(x+2)(x+1)(x-3)(x-2)}$$

$$\frac{4x^3-23x^2+15x-6}{(x+2)(x+1)(x-3)(x-2)}$$