

7.2 Adding and Subtracting Rational Functions

Ex 1: Simplify $\frac{m-6}{9m+18} + \frac{5}{9m+18}$

① Check for common denominator ✓

② Add numerators

$$m-6 + 5 = m-1$$

③ Rewrite, keeping denominator

$$\frac{m-1}{9m+18} \quad \frac{m-1}{9(m+2)}$$

④ Check if it's in simplest form

Try it... $\frac{5x-5}{2x-10} + \frac{x+2}{2x-10}$ ✓

$$5x-5 + x+2 = 6x-3$$

$$\frac{6x-3}{2x-10}$$

$$\frac{3(2x-1)}{2(x-5)}$$

Ex 2: Simplify $\frac{b-2}{4b^3-4b^2} - \frac{b-4}{4b^3-4b^2}$ ✓

subtract $b-2 - (b-4)$

$$b-2 - b+4 = 2$$

$$\frac{2}{4b^3-4b^2}$$

$$\frac{2}{4b^2(b-1)}$$

$$\frac{1}{2b^2(b-1)}$$

Try it... $\frac{b+4}{4b+8} - \frac{5b+6}{4b+8}$

$$b+4 - (5b+6)$$

$$b+4 - 5b - 6 = -4b - 2$$

$$\frac{-4b-2}{4b+8}$$

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

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

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Ex 3: $\frac{x+1}{x-5} + \frac{6}{3x}$

Not a common denominator
to get one

$$\frac{(3x)x+1}{(3x)x-5} + \frac{(x-5)(6)}{(x-5)(3x)} \Rightarrow \frac{3x^2+3x}{3x^2-15x} + \frac{6x-30}{3x^2-15x}$$

$$\frac{3x^2+3x+6x-30}{3x^2-15x}$$

$$= \frac{3x^2+9x-30}{3x(x-5)} = \frac{3(x^2+3x-10)}{3x(x-5)} = \frac{3(x+5)(x-2)}{3x(x-5)} = \frac{(x+5)(x-2)}{x(x-5)}$$

* Since we are going to simplify we could leave bottom as $3x(x-5)$

Try it... $\frac{2(x-1)}{2(x-3)} - \frac{3(x-3)}{2(x-3)}$

$$\frac{2x-2}{2(x-3)} - \frac{3x-9}{2(x-3)}$$

$$\frac{2x-2-(3x-9)}{2(x-3)} = \frac{2x-2-3x+9}{2(x-3)} = \frac{-x+7}{2(x-3)}$$

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

Ex 4: $\frac{2}{p+4} - \frac{4p}{p-2}$

$$\frac{2(p-2)}{(p+4)(p-2)} - \frac{4p(p+4)}{(p+4)(p-2)}$$

$$\frac{2p-4-4p^2+16p}{(p+4)(p-2)}$$

$$2p-4-(4p^2+16p)$$

$$2p-4-4p^2-16p$$

$$-4p^2-14p-4$$

$$\frac{-4p^2-14p-4}{(p+4)(p-2)}$$

$$\frac{-2(2p^2-7p-2)}{(p+4)(p-2)}$$

Try it... $\frac{6n(3n-5)}{n-4(3n-5)} + \frac{2n(n-4)}{3n-5(n-4)}$

$$\frac{18n^2-30n}{(n-4)(3n-5)} + \frac{2n^2-8n}{(n-4)(3n-5)}$$

$$20n^2-38n$$

$$\frac{20n^2-38n}{(n-4)(3n-5)} = \frac{2n(10n-19)}{(n-4)(3n-5)}$$