

## Add &amp; Subtract Rational Expressions with Unlike Denominators

Simplify each expression.

$$1) \frac{5 \cdot 4}{5 \cdot 4y^2} + \frac{-4x \cdot 4y^2}{5 \cdot 4y^2}$$

$$\frac{20}{20y^2} + \frac{-16xy^2}{20y^2}$$

$$\frac{20 - 16xy^2}{20y^2} = \frac{4(5 - 4xy^2)}{5 \cdot 20y^2} = \frac{5 - 4xy^2}{5y^2}$$

$$2) \frac{5a \cdot 3a}{5a \cdot 3b} + \frac{-4a \cdot 3b}{5a \cdot 3b}$$

$$\frac{15a^2}{15ab} + \frac{-12ab}{15ab} = \frac{15a^2 - 12ab}{15ab}$$

$$\frac{3a(5a - 4b)}{5 \cdot 3ab} = \frac{5a - 4b}{5b}$$

$$3) \frac{2x \cdot x}{5x} + \frac{-2x}{5x}$$

$$\frac{2x^2}{5x} + \frac{-2x}{5x} = \frac{2x^2 - 2x}{5x}$$

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

$$4) \frac{4 \cdot 6m}{4 \cdot 5n^2} + \frac{3m \cdot 5n^2}{4 \cdot 5n^2}$$

$$\frac{24m}{20n^2} + \frac{15mn^2}{20n^2} = \frac{24m + 15mn^2}{20n^2}$$

$$5) \frac{5(v+2) \cdot 3}{3(v+2)}$$

$$\frac{5v+10}{3(v+2)} + \frac{12}{3(v+2)} = \frac{5v+22}{3(v+2)}$$

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

$$\frac{6x-30}{(x-4)(x-5)} + \frac{4x^2-16x}{(x-4)(x-5)} = \frac{4x^2-10x-30}{(x-4)(x-5)}$$

$$7) \frac{6(5b+4)(b-1)}{(b-1)(5b+4)}$$

$$8) \frac{3x(x+1)}{x-6} + \frac{-4x(x-6)}{x+1}$$

$$\frac{30b+24}{(b-1)(5b+4)} + \frac{b^2+b-2}{(b-1)(5b+4)}$$

$$\frac{b^2+31b+22}{(b-1)(5b+4)}$$

$$\frac{3x^2+3x}{(x-6)(x+1)} + \frac{-4x^2+24x}{(x-6)(x+1)} = \frac{-x^2+27x}{(x-6)(x+1)}$$

$$9) \frac{5}{x^2+2x-8} - \frac{83}{2x}$$

$$10) \frac{2(a-3)(3a-1)}{2(a-3)(a+3)} + \frac{4a(a+3)}{2(a-3)}$$

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

$$\frac{6a^2-20a+6}{2(a+3)(a-3)} + \frac{4a^2+12a}{2(a+3)(a-3)} = \frac{10a^2-8a+6}{2(a+3)(a-3)}$$

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

$$\frac{-3x^2-x+24}{x(x+4)(x-2)}$$



$$11) \frac{5(m+2)}{(m-4)} + \frac{5m}{(m+2)}$$

$$\frac{5m+10}{(m-4)(m+2)} + \frac{5m^2-20m}{(m-4)(m+2)}$$

$$\frac{5m^2-15m+10}{(m-4)(m+2)} = \frac{5(m^2-3m+2)}{(m-4)(m+2)}$$

or

$$13) \frac{3r^3}{(r+5)} + \frac{2}{3r^2(r+5)} = \frac{5(m-2)(m-1)}{(m-4)(m+1)}$$

$$\frac{9r^3}{3r^2(r+5)} + \frac{2r+10}{3r^2(r+5)}$$

$$\frac{9r^3+2r+10}{3r^2(r+5)}$$

$$15) \frac{3 \cdot 6b}{3(b+5)} + \frac{(b-1)(b+5)}{3(b+5)}$$

$$\frac{18b}{3(b+5)} + \frac{b^2+4b-5}{3(b+5)}$$

$$\frac{b^2+22b-5}{3(b+5)}$$

$$17) \frac{3b}{3b-3} + \frac{5}{b-6}$$

$$\frac{7b}{3(b-1)}$$

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

$$19) \frac{6}{k^2+2k-3} + \frac{-4}{k^2+5k-6}$$

$$\frac{6(k+6)}{(k-1)(k+3)(k+6)} + \frac{-4(k+3)}{(k+6)(k+3)(k-1)(k+3)}$$

$$\frac{6k+36}{(k-1)(k+3)(k+6)} + \frac{-4k-12}{(k-1)(k+3)(k+6)}$$

$$\frac{2k+24}{(k-1)(k+3)(k+6)}$$

$$12) \frac{4(x-6)}{x+6} + \frac{2x}{x-6}$$

$$\frac{4x-24}{(x+6)(x-6)} + \frac{2x^2+12x}{(x+6)(x-6)}$$

$$\frac{2x^2+16x-24}{(x+6)(x-6)} = 2(x^2+8x-12)$$

$$14) \frac{(x+6)(x-5)}{6x} + \frac{-6x}{x+6}$$

$$\frac{x^2+x-30}{6x(x+6)} + \frac{-36x^2}{6x(x+6)} = \frac{-35x^2+x-30}{6x(x+6)}$$

$$16) \frac{4(x-5)}{3x} + \frac{-5}{3x^2-15x}$$

$$\frac{4x-20}{3x(x-5)} + \frac{-5}{3x(x-5)} = \frac{4x-25}{3x(x-5)}$$

$$18) \frac{2(r^2+4r+4)}{36r^2} + \frac{3r \cdot 3}{r^2+4r+4}$$

$$\frac{2r^2+8r+8}{3r^2(r^2+4r+4)} + \frac{9r}{3r^2(r^2+4r+4)}$$

$$\frac{2r^2+17r+8}{3r(r^2+4r+4)}$$

$$20) \frac{6}{x^2+5x+4} + \frac{-6}{x^2+9x+20}$$

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

$$\frac{6x+30}{(x+1)(x+4)(x+5)} + \frac{-6x-6}{(x+1)(x+4)(x+5)}$$

$$\frac{24}{(x+1)(x+4)(x+5)}$$