

Adding/Subtracting Rational Expressions

Simplify each expression.

$$1) \frac{u-v}{8v} + \frac{6u-3v}{8v}$$

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

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

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

$$5) \frac{r+6}{3r-6} + \frac{r+1}{3r-6}$$

$$\frac{2r+7}{3r-6}$$

$$7) \frac{6}{x-1} - \frac{5x}{4}$$

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

$$9) \frac{3}{x+7} + \frac{4}{x-8}$$

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

$$11) \frac{7}{3} - \frac{8}{12x-8}$$

$$\frac{21x-20}{3(3x-2)}$$

$$13) \frac{2x}{5x+4} + \frac{6x}{2x+3}$$

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

$$2) \frac{m-3n}{6m^3n} - \frac{(m+3n)}{6m^3n} = \frac{m-3n + -m-3n}{6m^3n}$$

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

$$4) \frac{5}{10n^2+16n+6} + \frac{n-6}{10n^2+16n+6}$$

$$\frac{-1+n}{10n^2+16n+6}$$

$$6) \frac{x+2}{2x^2+13x+20} - \frac{x+3}{2x^2+13x+20}$$

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

$$8) \frac{6 - \frac{x+5}{(7x-5)(x+4)}}{\frac{42x^2+137x-125}{(7x-5)(x+4)}}$$

$$\frac{(7x-5)(x+4) \cdot 6 - (x+5)}{(7x-5)(x+4)}$$

	7x	-5	
x	7x ²	-5x	6(7x ² +23x-20)
4	28x	-20	42x ² +138x-120
			-x-5
			42x ² +137x-125
			(7x-5)(x+4)

$$10) \frac{3}{4v^2+4v} - \frac{7}{2}$$

$$\frac{3-14v^2-14v}{4v(v+1)}$$

$$12) \frac{5}{n+5} + \frac{4n}{2n+6}$$

$$\frac{15n+15+2n^2}{(n+3)(n+5)}$$

$$14) \frac{2}{3x^2+12x} + \frac{8}{2x}$$

$$\frac{50+12x}{3x(x+4)}$$

$$15) \frac{7n}{n+1} + \frac{8}{n-7}$$

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

$$17) \frac{3}{8} - \frac{3}{3x+4}$$

$$\frac{9x-12}{8(3x+4)}$$

$$19) \frac{3}{x+6} + \frac{7}{x-2}$$

$$\frac{10x+36}{(x+6)(x-2)}$$

$$21) \frac{5n+5}{5n^2+35n-40} + \frac{7n}{3n}$$

$$\frac{52n-53+7n^2}{3(n+8)(n-1)}$$

$$23) \frac{\frac{25}{4}}{\frac{1}{5} - \frac{4}{25}}$$

$$\frac{625}{4}$$

$$25) \frac{\frac{a}{25} - \frac{a}{5}}{\frac{a}{4} - \frac{4}{25}}$$

$$16) \frac{2}{n+8} + \frac{4}{n+1}$$

$$\frac{6n+34}{(n+1)(n+8)}$$

$$18) \frac{3}{b-8} + \frac{7}{b+3}$$

$$\frac{10b-47}{(b+3)(b-8)}$$

$$20) \frac{4}{x+1} - \frac{2}{x+2}$$

$$\frac{2x+6}{(x+1)(x+2)}$$

$$22) \frac{3}{n-5} + \frac{6}{3n-8}$$

$$\frac{15n-54}{(3n-8)(n-5)}$$

$$* 24) \frac{8}{\frac{4}{9} + \frac{16}{9}} = \frac{8}{\frac{20}{9}} = \frac{2 \cancel{8}}{1} \cdot \frac{9}{20} = \frac{18}{5}$$

$$26) \frac{\frac{5}{4}}{\frac{5}{m} - \frac{4}{m}}$$

$$\frac{5m}{4}$$

Critical thinking questions:

27) Simplify: $\frac{a}{b} + \frac{c}{d}$

$$\frac{ad+bc}{bd}$$

28) Split into a sum of two rational expressions with unlike denominators:

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

Many solutions. Ex: $\frac{1}{x+1} + \frac{1}{x+2}$