Algebraic Fractions

Recap numerical fractions

Addition

Ex 1

$$\frac{2}{7} + \frac{3}{5}$$

$$= \frac{2\times5 + 3\times7}{7\times5}$$

$$= \frac{10+21}{35}$$

$$= \frac{31}{35}$$

Ex 2

$$\frac{3}{4} + \frac{1}{6}$$

$$= \frac{9+2}{12}$$

$$= \frac{11}{12}$$

Algebraic Fractions

Ex 1

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

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

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

Ex 2

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

$$= \frac{2x+8+3x-9}{(x-3)(x+4)}$$

$$= \frac{5x-1}{(x-3)(x+4)}$$

Exercise

1) $\frac{3}{x} + \frac{5}{x+5}$

$$= \frac{3(x+5)+5x}{x(x+5)}$$

$$= \frac{3x+15+5x}{x(x+5)}$$

$$= \frac{8x+15}{x(x+5)}$$

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

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

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

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

Ex 3 $\frac{2}{x+1} + \frac{3}{x} + \frac{4}{x+2}$

$$= \frac{2x(x+2)+3(x+1)(x+2)+4x(x+1)}{x(x+1)(x+2)}$$

$$= \frac{2x^2+4x+3(x^2+3x+2)+4x^2+4x}{x(x+1)(x+2)}$$

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

$$= \frac{9x^2 + 17x + 6}{x(x+1)(x+2)}$$

Ex 4 $\quad \frac{2x-1}{3} + \frac{x}{5} = \frac{5(2x-1)+3x}{15}$

$$= \frac{10x - 5 + 3x}{15}$$

$$= \frac{13x - 5}{15}$$

Exercise

1) $\frac{2x}{5} + \frac{x+1}{4}$

$$= \frac{4(2x)+5(x+1)}{20}$$

$$= \frac{8x+5x+5}{20}$$

$$= \frac{13x+5}{20}$$

2) $\frac{x+1}{2} + \frac{x+2}{3}$

$$\frac{3(x+1)+2(x+2)}{6}$$

$$= \frac{3x+3+2x+4}{6}$$

$$= \frac{5x+7}{6}$$

1 Simplify each of these.

a $\frac{x}{2} + \frac{x}{3}$ $= \frac{3x+2x}{6} = \frac{5x}{6}$

d $\frac{x}{2} + \frac{y}{3}$ $= \frac{3x+2y}{6}$

g $\frac{2x-1}{2} + \frac{3x-1}{4}$

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

g) $\frac{2x-1}{2} + \frac{3x-1}{4} = \frac{2(2x-1)+3x-1}{4}$

$= \frac{4x-2+3x-1}{4}$

$= \frac{7x-3}{4}$

j) $\frac{x-4}{5} + \frac{2x-3}{2} = \frac{2(x-4)+5(2x-3)}{10}$

$= \frac{2x-8+10x-15}{10}$

$= \frac{12x-23}{10}$

Subtraction

Ex1 $\dfrac{x+1}{2} - \dfrac{x+2}{3}$

$= \dfrac{3(x+1) - 2(x+2)}{6}$

$= \dfrac{3x+3-2x-4}{6}$

$= \dfrac{x-1}{6}$

Ex2 $\dfrac{2}{x-1} - \dfrac{3}{x+2}$

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

$= \dfrac{2x+4-3x+3}{(x-1)(x+2)}$

$= \dfrac{-x+7}{(x-1)(x+2)}$

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2 Simplify each of these.

a $\dfrac{x}{2} - \dfrac{x}{3}$ $= \dfrac{3x-2x}{6} = \dfrac{x}{6}$

d $\dfrac{x}{2} - \dfrac{y}{3}$ $= \dfrac{3x-2y}{6}$

g $\dfrac{2x+1}{2} - \dfrac{3x+3}{4}$

j $\dfrac{x-4}{5} - \dfrac{2x-3}{2}$

g)

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

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

$$= \frac{4x+2-3x-3}{4}$$

$$= \frac{x-1}{4}$$

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i)

$$\frac{x-4}{5} - \frac{2x-3}{2}$$

$$= \frac{2(x-4) - 5(2x-3)}{10}$$

$$= \frac{2x-8-10x+15}{10}$$

$$= \frac{-8x+7}{10}$$