Algebraic fractions

(2005-1)

25 Express the following as a single fraction in it's simplest form

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

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

$$= \frac{10x-15+2x+4}{(x+2)(2x-3)} = \frac{12x-11}{(x+2)(2x-3)}$$

(2006-1)

25 Express the following as a single fraction in its simplest form. [4]

$$\frac{4}{2x+3}+\frac{8}{x-2}$$

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

$$= \frac{4x-8+16x+24}{(2x+3)(x-2)} = \frac{20x+16}{(2x+3)(x-2)}$$

(2007-1)

24 Solve the equation $\frac{2}{2x+3}+\frac{1}{x+2}=3$ [5]

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

$$2x+4+2x+3 = 3(2x+3)(x+2)$$

$$4x+7 = 3(2x^2+3x+4x+6)$$

$$4x+7 = 6x^2+21x+18 \qquad \times 66 + 15$$

$$6x^2+17x+11 = 0$$

↓ PTO

(2008-1)

27 Express the following as a single fraction in its simplest form.

$$\frac{6}{2x-3}-\frac{5}{3x+7}$$

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

$$= \frac{18x+42-10x+15}{(2x-3)(3x+7)} \leftarrow (-5\times -3) = \frac{8x+57}{(2x-3)(3x+7)}$$

(2009-2)

18 Express $\frac{x}{2x+3}-\frac{5}{3x-1}$ as a single fraction in its simplest form. [4]

$$\frac{x(3x-1)-5(2x+3)}{(2x+3)(3x-1)} = \frac{3x^2-x-10x-15}{(2x+3)(3x-1)}$$

$$= \frac{3x^2-11x-15}{(2x+3)(3x-1)}$$

(2010-1)

19 Solve $\frac{x+6}{x+2}+\frac{6}{x-6}=2$ [6]

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

$$x^2+6x-6x-36+6x+12 = 2(x+2)(x-6)$$

$$x^2+6x-24 = 2(x^2+2x-6x-12)$$

$$x^2+6x-24 = 2x^2-8x-24$$

$$x^2-14x = 0 \leftarrow \text{Solve by factorising}$$

$$x(x-14) = 0$$

$$x=0 \text{ or } x=14$$

$$6x^2 + 17x + 11 = 0$$
$$6x^2 + 6x + 11x + 11 = 0$$
$$6x(x+1) + 11(x+1) = 0$$
$$(6x+11)(x+1) = 0$$

$6x = -11$ or $x = -1$

$x = -11/6$