Solutions to Past Paper Questions – Algebraic Fractions

15) (a) $2 \times 5 = 10$, so find two numbers which multiply to 10 and add to 7:   2 and 5

So $2x^2 + 7x + 5 = 2x^2 + 2x + 5x + 5$

$$= 2x(x + 1) + 5(x + 1)$$
$$= (2x + 5)(x + 1)$$

(b) $\dfrac{3}{x+1} + \dfrac{5x}{(2x+5)(x+1)}$

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

$$= \frac{6x+15+5x}{(2x+5)(x+1)}$$

$$= \frac{11x+15}{(2x+5)(x+1)}$$

16) $\dfrac{1}{3x} + \dfrac{1}{2x} - \dfrac{1}{6x} = \dfrac{2+3-1}{6x} = \dfrac{4}{6x} = \dfrac{2}{3x}$

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

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

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

$$\frac{7}{2x} = \frac{1}{3}$$

Cross-multiply

$7 \times 3 = 1 \times 2x$

$21 = 2x$

$x = 10.5$

17) (a) $(x + 1)(x + 2)$ (b) $\dfrac{3}{x+1} + \dfrac{3x}{(x+1)(x+2)}$

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

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

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

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

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

18) $\dfrac{7(x-1)+1(x+2)}{(x+2)(x-1)} = 4$

$$7x-7+x+2 = 4(x+2)(x-1)$$
$$8x-5 = 4(x^2+x-2)$$
$$0 = 4x^2-4x-3$$
$$0 = (2x+1)(2x-3)$$
$$x=-\frac{1}{2} \ or \ x=\frac{3}{2}$$