Answer key

The method: Factoring the denominators first

Factor every denominator, find the LCD, then add or subtract. Cancel any factor the answer shares with the denominator.

$$\frac{6}{x-2}+\frac{5}{x^2+5x-14}=\frac{6}{x-2}+\frac{5}{(x-2)(x+7)}$$ factor: $x^2+5x-14=(x-2)(x+7)$

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

rewrite each over the LCD, $(x-2)(x+7)$

$$\frac{6(x+7)+5}{(x-2)(x+7)}=\frac{6x+47}{(x-2)(x+7)}$$ add the numerators, then combine like terms

$$\frac{4}{x+6}-\frac{1}{x^2+x-30}=\frac{4}{x+6}-\frac{1}{(x+6)(x-5)}$$ factor: $x^2+x-30=(x+6)(x-5)$

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

rewrite each over the LCD, $(x+6)(x-5)$

$$\frac{4(x-5)-1}{(x+6)(x-5)}=\frac{4x-21}{(x+6)(x-5)}$$ subtract the whole second numerator, then combine like terms

$$\frac{3}{x-7}-\frac{9}{x^2-11x+28}=\frac{3}{x-7}-\frac{9}{(x-7)(x-4)}$$ factor: $x^2-11x+28=(x-7)(x-4)$

$$\frac{3}{x-7}-\frac{9}{(x-7)(x-4)}=\frac{3(x-4)}{(x-7)(x-4)}-\frac{9}{(x-7)(x-4)}$$

rewrite each over the LCD, $(x-7)(x-4)$

$$\frac{3(x-4)-9}{(x-7)(x-4)}=\frac{3x-21}{(x-7)(x-4)}$$ subtract the whole second numerator, then combine like terms

$$\frac{3x-21}{(x-7)(x-4)}=\frac{3(x-7)}{(x-7)(x-4)}=\frac{3}{x-4}$$ factor the top, then cancel $(x-7)$

Answer key

Problems 1 and 2 worked out · Version 0A

$$\frac{1}{x+7}+\frac{10}{x^2+4x-21}=\frac{1}{x+7}+\frac{10}{(x+7)(x-3)}$$ factor: $x^2+4x-21=(x+7)(x-3)$

$$\frac{1}{x+7}+\frac{10}{(x+7)(x-3)}=\frac{(x-3)}{(x+7)(x-3)}+\frac{10}{(x+7)(x-3)}$$

rewrite each over the LCD, $(x+7)(x-3)$

$$\frac{(x-3)+10}{(x+7)(x-3)}=\frac{x+7}{(x+7)(x-3)}$$ add the numerators, then combine like terms

$$\frac{x+7}{(x+7)(x-3)}=\frac{(x+7)}{(x+7)(x-3)}=\frac{1}{x-3}$$ factor the top, then cancel $(x+7)$

$$\frac{4}{x+4}+\frac{2}{x^2-2x-24}=\frac{4}{x+4}+\frac{2}{(x+4)(x-6)}$$ factor: $x^2-2x-24=(x+4)(x-6)$

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

rewrite each over the LCD, $(x+4)(x-6)$

$$\frac{4(x-6)+2}{(x+4)(x-6)}=\frac{4x-22}{(x+4)(x-6)}$$ add the numerators, then combine like terms

Factoring the denominators first · Version 0A

1) $\frac{1}{x-3}$ 2) $\frac{4x-22}{(x+4)(x-6)}$ 3) $\frac{-2x+4}{(x-3)(x+2)}$

4) $\frac{3x+14}{(x-3)(x+2)}$ 5) $\frac{1}{x+1}$ 6) $\frac{-x+8}{(x-7)(x-5)}$

7) $\frac{6x-30}{(x-3)(x-6)}$ 8) $\frac{2x}{(x-6)(x+1)}$ 9) $\frac{4x-26}{(x-4)(x-7)}$

10) $\frac{4x+6}{(x+5)(x+3)}$ 11) $\frac{x-11}{(x+1)(x-3)}$ 12) $\frac{x}{(x-3)(x+5)}$