① $\frac{x-4}{3} + \frac{5x}{3} = \boxed{\frac{6x-4}{3}}$

② $\frac{2x+5}{7} + \frac{-x}{7} = \boxed{\frac{x+5}{7}}$

③ $\frac{8}{x} + \frac{x+9}{x} = \boxed{\frac{x+17}{x}}$

④ $\frac{3x-8}{4x} + \frac{-x+8}{4x} = \frac{2x}{4x} = \frac{1}{2}$

⑤ $\frac{3x-6}{24x} + \frac{3x+6}{24x} = \frac{6x}{24x} = \frac{1}{4}$

⑥ $\frac{2x+3}{x+5} + \frac{-1(x-3)}{x+5} = \frac{2x+3}{x+5} + \frac{-x+3}{x+5}$

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

(7) $\frac{2x+3}{x+4} + \frac{-1(x-7)}{x+4} = \frac{2x+3}{x+4} + \frac{-x+7}{x+4}$

$= \boxed{\frac{1x+10}{x+4}}$

(8) $\frac{8}{3(x+8)} + \frac{4}{3(x+8)} = \frac{12}{3(x+8)} = \frac{12}{3} \cdot \frac{1}{x+8}$

$= \frac{4}{1} \cdot \frac{1}{x+8} = \boxed{\frac{4}{x+8}}$

(9) $\frac{3}{2(x-9)} + \frac{9}{2(x-9)} = \frac{12}{2(x-9)} = \frac{12}{2} \cdot \frac{1}{x-9}$

$= \frac{6}{1} \cdot \frac{1}{x-9} = \boxed{\frac{6}{x-9}}$

(10) $\frac{7}{3(x-1)} + \frac{5}{3(x-1)} = \frac{12}{3(x-1)} = \frac{12}{3} \cdot \frac{1}{x-1}$

$= \frac{4}{1} \cdot \frac{1}{(x-1)} = \boxed{\frac{4}{x-1}}$

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

$= \boxed{\frac{3x+13}{x+5}}$

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

$= \frac{1x+2}{x^2-4} = \frac{\cancel{x+2}}{(\cancel{x+2})(x-2)} = \boxed{\frac{1}{x-2}}$

(13) $\frac{5x+1}{x^2-64} + \frac{-1(4x-7)}{x^2-64} = \frac{5x+1}{x^2-64} + \frac{-4x+7}{x^2-64}$

$= \frac{x+8}{x^2-64} = \frac{\cancel{x+8}}{(x-8)(\cancel{x+8})} = \boxed{\frac{1}{x-8}}$

(14) $$\frac{2x^2+7x-3}{x^2+4x-12} + \frac{-1(2x^2+6x-1)}{x^2+4x-12}$$

$$\frac{2x^2+7x-3}{x^2+4x-12} + \frac{-2x^2-6x+1}{x^2+4x-12}$$

$$\frac{1x-2}{x^2+4x-12} = \frac{\cancel{(x-2)}}{\cancel{(x-2)}(x+6)}$$

$$= \boxed{\frac{1}{x+6}}$$

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

$$\frac{\cancel{x-1}}{\cancel{(x-1)}(x-4)} = \boxed{\frac{1}{x-4}}$$

(16) $$\frac{5x-4}{x^2-6x-7} + \frac{5-4x}{x^2-6x-7}$$

$$\frac{x+1}{x^2-6x-7} = \frac{\cancel{(x+1)}}{(x-7)\cancel{(x+1)}} = \boxed{\frac{1}{x-7}}$$

(17) $$\frac{3x-8}{x^2-9} + \frac{-1(2x-5)}{x^2-9} = \frac{3x-8}{x^2-9} + \frac{-2x+5}{x^2-9}$$

$$= \frac{x-3}{x^2-9} = \frac{\cancel{x-3}}{\cancel{(x-3)}(x+3)} = \boxed{\frac{1}{x+3}}$$

(18) $$\frac{4x-7}{x^2-25} + \frac{-(3x-2)}{x^2-25} = \frac{4x-7}{x^2-25} + \frac{-3x+2}{x^2-25}$$

$$= \frac{1x-5}{x^2-25} = \frac{\cancel{x-5}}{\cancel{(x-5)}(x+5)} = \boxed{\frac{1}{x+5}}$$

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

$LCD(3x, x) = 3x$

Stack $3x$
x

$3x$

$\frac{2}{3x} + \frac{4}{x} \cdot \frac{3}{3}$

$\frac{2}{3x} + \frac{12}{3x}$

$\boxed{\frac{14}{3x}}$

(20) $\frac{6}{x} + \frac{7}{5x^2}$

$LCD(x, 5x^2) = 5x^2$

Stack x
$x \; x \; 5$

$x \; x \; 5 = 5x$

$\frac{5x}{5x} \cdot \frac{6}{x} + \frac{7}{5x^2}$

$\frac{30x}{5x^2} + \frac{7}{5x^2}$

$\frac{30x+7}{5x^2}$

(21) $\frac{3}{x} + \frac{6}{7x^2}$

$LCD(x, 7x^2) = 7x^2$

Stack

$7 \times x$

x

$7 \times x = 7x^2$

$\frac{7x}{7x} \cdot \frac{3}{x} + \frac{6}{7x^2}$

$\frac{21x}{7x^2} + \frac{6}{7x^2}$

$\boxed{\frac{21x+6}{7x^2}}$

(22) $\frac{4}{x} + \frac{7}{6x^2}$

$LCD(x, 6x^2) = 6x^2$

Stack

x

$x \times 3 \cdot 2$

$6x^2$

$\frac{6x}{6x} \cdot \frac{4}{x} + \frac{7}{6x^2}$

$\frac{24x}{6x^2} + \frac{7}{6x^2}$

$\frac{24x+7}{6x^2}$

(23) $\frac{6}{5x^3y} + \frac{-1}{2x^2y^3}$

LCD $(5x^3y, 2x^2y^3) = 2 \cdot 5x^3y^3$

$=$ max of each factor $= 10x^3y^3$

Stack method

$$\begin{array}{lll} 5 & xxx & y \\ 2 & xx & yyy \\ \hline 2 \cdot 5 & xxx & yyy = 10x^3y^3 \end{array}$$

$$\frac{6}{5x^3y} \cdot \frac{2y^2}{2y^2} + \frac{-1}{2x^2y^3} \cdot \frac{5x}{5x}$$

$$\frac{12y^2}{LCD} + \frac{-5x}{LCD} = \frac{12y^2 - 5x}{10x^3y^3}$$

(24) $\frac{5}{xy} + \frac{7}{2x^2}$

LCD $(xy, 2x^2) = 2x^2y$

LCD = max of all factors

stack method

$$\begin{array}{c} x\ y \\ \hline 2\ x\ x \\ \hline 2\ x\ x\ y \end{array} = 2x^2y$$

$\frac{2x}{2x} \cdot \frac{5}{xy} + \frac{7}{2x^2} \cdot \frac{y}{y}$

$\frac{10x}{LCD} + \frac{7y}{LCD} = \frac{10x + 7y}{2x^2y}$

(25) $\frac{2x}{1} + \frac{x}{y}$ $\quad LCD(1, y) = y$

$$\frac{2x}{1}\cdot\frac{y}{y} + \frac{x}{y}$$

$$\boxed{\frac{2xy + x}{y}}$$

(26) $\frac{5x-3}{4x} + \frac{-1}{6x}$ $\quad LCD(4x, 6x) = 12x$

$2 \cdot \underline{2x}, \; 2 \cdot 3 \cdot \underline{x}$

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

$LCD = GCF \cdot rest$

$= \underline{2x} \cdot 2 \cdot 3$

$= 12x$

$$\frac{15x-9}{LCD} + \frac{-2}{LCD}$$

$$\frac{15x-11}{LCD}$$

$$\frac{15x-11}{12x}$$

(27) $\frac{7}{3x} + \frac{-4}{5x^2}$

$LCD(3x, 5x^2) = 15x^2$

Stack method

$$\begin{array}{r} 3x \\ x\ x\ 5 \\ \hline 3\ x\ x\ 5 \end{array} = 15x^2$$

$\frac{7}{3x} \cdot \frac{5x}{5x} + \frac{-4}{5x^2} \frac{3}{3}$

$\frac{35x}{LCD} + \frac{-12}{LCD}$

$\frac{35x-12}{15x^2}$

(28) $\frac{5}{x} + \frac{8}{1}$

$LCD(x, 1) = x$

$\frac{5}{x} + \frac{8}{1} \frac{x}{x}$

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

(29) $\frac{7}{1} + \frac{-4}{x-9}$ $\quad LCD(1, x-9) = x-9$

$$\frac{7}{1}\frac{(x-9)}{(x-9)} + \frac{-4}{x-9}$$

$$\frac{7x-63}{x-9} + \frac{-4}{x-9} = \frac{7x-67}{x-9}$$

(30) $\frac{x-1}{x-2} + \frac{-1(x^2+4x-4)}{x^2+4x-12}$

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

LCD $(x-2)(x+6)$

$$\frac{(x-1)}{(x-2)}\frac{(x+6)}{(x+6)} + \frac{-x^2-4x+4}{LCD}$$

$$\frac{x^2-1x+6x-6}{LCD} + \frac{-x^2-4x+4}{LCD} = \frac{\cancel{x-2}}{\cancel{(x-2)}(x+6)}$$

$$= \frac{1}{x+6}$$

(31) $\dfrac{x+2}{x-6} + \dfrac{-1(x^2+5x+14)}{x^2-2x-24}$

$\dfrac{x+2}{x-6} + \dfrac{-x^2-5x-14}{(x-6)(x+4)}$

LCD $(x-6)(x+4)$

$= \dfrac{(x+2)}{(x-6)}\dfrac{(x+4)}{(x+4)} + \dfrac{-x^2-5x-14}{LCD}$

$= \dfrac{x^2+2x+4x+8}{LCD} + \dfrac{-x^2-5x-14}{LCD}$

$= \dfrac{\cancel{x-6}}{(\cancel{x-6})(x+4)} = \dfrac{1}{x+4}$

(32) $\frac{x+2}{x-7} + \frac{-1(x^2+4x+13)}{x^2-4x-21}$

$= \frac{x+2}{x-7} + \frac{-1x^2-4x-13}{(x-7)(x+3)}$

LCD $(x-7)(x+3)$

$= \frac{(x+2)}{x-7} \cdot \frac{(x+3)}{(x+3)} + \frac{-1x^2-4x-13}{LCD}$

$= \frac{x^2+2x+3x+6}{LCD} + \frac{-x^2-4x-13}{LCD}$

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

(33) $\dfrac{x-4}{x^2+5x+6} + \dfrac{x-1}{x^2-4} \longrightarrow$ factors

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

LCD $\underline{(x+2)}(x+3)(x-2)$

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

$$\frac{x^2-4x-2x+8}{LCD} + \frac{x^2-1x+3x-3}{LCD}$$

$$\boxed{\frac{2x^2-4x+5}{(x+2)(x+3)(x-2)}}$$

$$\begin{array}{r|rrr} -2 & 2 & -4 & 5 \\ & & -4 & 16 \\ \hline & 2 & -8 & \boxed{21} \end{array}$$

$$\begin{array}{r|rrr} 2 & 2 & -4 & 5 \\ & & 4 & 0 \\ \hline & 2 & 0 & \boxed{5} \end{array}$$

$(x+2)$
$(x+3)$
$(x-2)$
not factors

$$\begin{array}{r|rrr} -3 & 2 & -4 & 5 \\ & & -6 & 30 \\ \hline \end{array}$$

(34) $\dfrac{x-4}{x^2+4x+3} + \dfrac{-1(x-1)}{x^2-9} \rightarrow$ DOTS

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

LCD $(x+1)\underline{(x+3)}(x-3)$

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

$$\frac{x^2-4x-3x+12}{LCD} + \frac{-x^2-1x+1}{LCD}$$

$$\frac{-7x+13}{LCD} = \boxed{\frac{-7x+13}{(x+1)(x+3)(x-3)}}$$

(35) $\dfrac{x-4}{x^2+3x+2} + \dfrac{x+3}{x^2-4}$ – DOTS

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

LCD $(x+1)(x+2)(x-2)$

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

$$\frac{x^2-4x-2x+8}{LCD} + \frac{x^2+3x+1x+3}{LCD}$$

$$\boxed{\frac{2x^2-2x+11}{(x+1)(x+2)(x-2)}}$$

$$\begin{array}{r|rrr} -1 & 2 & -2 & 11 \\ & & -2 & 4 \\ \hline & 2 & -4 & 15 \end{array}$$

$$\begin{array}{r|rrr} -2 & 2 & -2 & 11 \\ & & -4 & 12 \\ \hline & 2 & -6 & 23 \end{array}$$

$$\begin{array}{r|rrr} 2 & 2 & -2 & 11 \\ & & 4 & 4 \\ \hline & 2 & 2 & 15 \end{array}$$

$(x+1)(x+2)(x-2)$

(36) $\dfrac{-1(x-2)}{x^2-2x-8} + \dfrac{-1(x-1)}{x^2-4}$ — DOTS

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

LCD $(x-4)(x+2)(x-2)$

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

$$\frac{-x^2+2x+2x-4}{LCD} + \frac{-x^2+1x+4x-4}{LCD}$$

$$\boxed{\frac{-2x^2+9x-8}{(x-4)(x+2)(x-2)}}$$

4] -2 9 -8
-8 4
-2 1 | -4

2] -2 9 -8
-4
-2 5

-2] -2 9 -8
4 -26
-2 13 | -34

$(x-4), (x+2)$
$(x-2)$
not factors

(37) $\dfrac{x+5}{x^2+3x-4} + \dfrac{x+2}{x^2-1}$ — DOYS

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

LCD $\underline{(x-1)}(x+4)(x+1)$

$$\frac{(x+5)}{(x+4)\underline{(x-1)}}\cdot\frac{(x+1)}{(x+1)} + \frac{(x+2)}{(x-1)(x+1)}\cdot\frac{(x+4)}{(x+4)}$$

$$\frac{x^2+5x+1x+5}{\text{LCD}} + \frac{x^2+2x+4x+8}{\text{LCD}}$$

$$\boxed{\frac{2x^2+12x+13}{(x+4)(x-1)(x+1)}}$$

$$\begin{array}{r|rrr} 1 & 2 & 12 & 13 \\ & & 2 & 14 \\ \hline & 2 & 14 & \boxed{27} \end{array}$$

$$\begin{array}{r|rrr} -1 & 2 & 12 & 13 \\ & & -2 & -10 \\ \hline & 2 & 10 & \boxed{3} \end{array}$$

$$\begin{array}{r|rrr} -4 & 2 & 12 & 13 \\ & & -8 & -16 \\ \hline & 2 & 4 & \boxed{-3} \end{array}$$

$(x-1)(x+1)(x+4)$
not factors

(38) $\dfrac{x+1}{x^2+6x+9} + \dfrac{x-4}{x^2-9} \rightarrow$ pots

PST

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

LCD $\underline{(x+3)}(x+3)(x-3)$

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

$$\frac{x^2+1x-3x-3}{LCD} + \frac{x^2-4x+3x-12}{LCD}$$

$$\boxed{\frac{2x^2-3x-15}{(x+3)(x+3)(x-3)}}$$

$$\begin{array}{r|rrr} -3 & 2 & -3 & -15 \\ & & -6 & 27 \\ \hline & 2 & -9 & \boxed{12} \end{array}$$

$$\begin{array}{r|rrr} 3 & 2 & -3 & -15 \\ & & 6 & 9 \\ \hline & 2 & 3 & \boxed{6} \end{array}$$

$(x+3)$

$(x-3)$ not factors

(39) $\dfrac{3x-1}{x^2+2x-3} + \dfrac{-(x+4)}{x^2-9}$ → DOTS

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

LCD $(x+3)(x-1)(x-3)$

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

$\dfrac{3x^2-1x-9x+3}{LCD} + \dfrac{-x^2-4x+x+4}{LCD}$

$$\boxed{\dfrac{2x^2-13x+7}{(x+3)(x-1)(x-3)}}$$

$$\begin{array}{r|rrr} 1 & 2 & -13 & 7 \\ & & 2 & -11 \\ \hline & 2 & -11 & \boxed{-4} \end{array}$$

$$\begin{array}{r|rrr} 3 & 2 & -13 & 7 \\ & & 6 & -21 \\ \hline & 2 & -7 & \boxed{-14} \end{array}$$

$(x+3)$
$(x-3)$ not factors
$(x-1)$

$$\begin{array}{r|rrr} -3 & 2 & -13 & 7 \\ & & -6 & \cancel{57} \\ \hline & 2 & -19 & \boxed{64} \end{array}$$

(40) $\dfrac{3x-2}{x^2+2x-24} + \dfrac{-1(x-3)}{x^2-16}$ → DOYS

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

LCD $(\underline{x-4})(x+6)(x+4)$

$$\frac{(3x-2)}{(x+6)\underline{(x-4)}} \cdot \frac{(x+4)}{(x+4)} + \frac{(-x+3)}{(x+4)(x-4)} \cdot \frac{(x+6)}{(x+6)}$$

$$\frac{3x^2-2x+12x-8}{LCD} + \frac{-x^2+3x-6x+18}{LCD}$$

$$\boxed{\frac{2x^2+7x+10}{(x+6)(x-4)(x+4)}}$$

$$\begin{array}{r|rrr} -6 & 2 & 7 & 10 \\ & & -12 & 30 \\ \hline & 2 & -5 & \boxed{40} \end{array}$$

$(x+6), (x-4)$ $x+4$ not factors

$$\begin{array}{r|rrr} -4 & 2 & 7 & 10 \\ & & -8 & 4 \\ \hline & 2 & -1 & \boxed{14} \end{array} \qquad \begin{array}{r|rrr} 4 & 2 & 7 & 10 \\ & & 8 & 60 \\ \hline & 2 & 15 & \boxed{70} \end{array}$$

(41) $\dfrac{2}{x^2-5x+4} + \dfrac{-2}{x^2-4}$ — DOTS

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

LCD $(x-1)(x-4)(x-2)(x+2)$

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

$$\frac{2x^2-8}{LCD} + \frac{-2x^2+10x-8}{LCD}$$

$$\boxed{\frac{10x-16}{(x-1)(x-4)(x+2)(x-2)}} = \boxed{\frac{2(5x-8)}{(x-1)(x-4)(x+2)(x-2)}}$$

(42) $\dfrac{3}{x^2-7x+6} + \dfrac{-3}{x^2-9}$ — Dots

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

LCD $(x-1)(x-6)(x-3)(x+3)$

$$\frac{3}{(x-1)(x-6)} \cdot \frac{(x^2-9)}{(x^2-9)} + \frac{-3}{(x-3)(x+3)} \cdot \frac{(x^2-7x+6)}{(x^2-7x+6)}$$

$$\frac{3x^2-27}{\text{LCD}} + \frac{-3x^2+21x-18}{\text{LCD}}$$

$$\boxed{\frac{21x-45}{(x-1)(x-6)(x-3)(x+3)}} = \frac{3(7x-15)}{(x-1)(x-6)(x+3)(x-3)}$$

(43) $\frac{3}{1} + \frac{x}{x+2} + \frac{-2}{x^2-4}$ — DO 1s

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

LCD $(1, \underline{x+2}, (x-2)(x+2))$

$= \underline{(x+2)}(x-2)$

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

$$\frac{3x^2-12}{LCD} + \frac{x^2-2x}{LCD} + \frac{-2}{LCD}$$

$$\boxed{\frac{4x^2-2x-14}{(x-2)(x+2)}} = \frac{2(2x^2-1x-7)}{(x-2)(x+2)}$$

$x+2$
$x-2$ not factors

$$\begin{array}{r|rrr} 2 & 2 & -1 & -7 \\ & & 4 & 6 \\ \hline & 2 & 3 & \boxed{-1} \end{array}$$

$$\begin{array}{r|rrr} -2 & 2 & -1 & -7 \\ & & -4 & 16 \\ \hline & 2 & -5 & \boxed{3} \end{array}$$

(44) $\frac{2}{1} + \frac{x}{x-3} + \frac{-3}{x^2-9}$ → DOTS

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

LCD $\underline{(x-3)}(x+3)$

$$\frac{2}{1} \cdot \frac{(x^2-9)}{x^2-9} + \frac{x}{x-3}\frac{(x+3)}{(x+3)} + \frac{-3}{LCD}$$

$$\frac{2x^2-18}{LCD} + \frac{x^2-3x}{LCD} + \frac{-3}{LCD}$$

$$\boxed{\frac{3x^2-3x-21}{(x-3)(x+3)}} = \frac{3(x^2-1x-7)}{(x-3)(x+3)}$$

$$\begin{array}{r|rrr} 3 & 1 & -1 & -7 \\ & & 3 & 6 \\ \hline & 1 & 2 & \boxed{-1} \end{array}$$

$x-3$, $x+3$
not factors

$$\begin{array}{r|rrr} -3 & 1 & -1 & -7 \\ & & -3 & 12 \\ \hline & 1 & -4 & \boxed{5} \end{array}$$

45 $\frac{1}{x+1} + \frac{-x}{x-2} + \frac{x^2+2}{x^2-1x-2}$

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

LCD $(x+1)(x-2)$

$\frac{1}{x+1}\frac{(x-2)}{(x-2)} + \frac{-x}{(x-2)}\frac{(x+1)}{(x+1)} + \frac{x^2+2}{LCD}$

$\frac{x-2}{LCD} + \frac{-x^2-1x}{LCD} + \frac{x^2+2}{LCD}$

$\frac{0}{LCD} = \frac{0}{(x-2)(x+1)} = 0$

(46) $\frac{2}{x+3} + \frac{-x}{x-1} + \frac{x^2+2}{x^2+2x-3}$

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

LCD $(x+3)(x-1)$

$\frac{2}{(x+3)}\frac{(x-1)}{(x-1)} + \frac{-x}{(x-1)}\frac{(x+3)}{(x+3)} + \frac{x^2+2}{LCD}$

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

$\frac{-1x}{LCD} = \boxed{\frac{-1x}{(x+3)(x-1)}}$

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

DOTS $\quad -(x-1)$

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

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

LCD $\underline{(x-1)}(x+1)$

$$\frac{4x}{LCD} + \frac{-3x}{(x-1)}\frac{(x+1)}{(x+1)} + \frac{-4}{(x-1)}\cdot\frac{(x+1)}{(x+1)}$$

$$\frac{4x}{LCD} + \frac{-3x^2-3x}{LCD} + \frac{-4x-4}{LCD}$$

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

$x+1$ not $x-1$ factors

$$\begin{array}{r|rrr} -1 & -3 & -3 & -4 \\ & & 3 & 0 \\ \hline & -3 & 0 & -4 \end{array} \qquad \begin{array}{r|rrr} 1 & -3 & -3 & -4 \\ & & -3 & -6 \\ \hline & -3 & -6 & -10 \end{array}$$

(48) $\dfrac{5x}{1-2x} + \dfrac{-2x}{2x+1} + \dfrac{3}{4x^2-1}$ — DOTS

$-1(2x-1)$

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

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

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

LCD $(2x-1)(2x+1)$

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

$$\frac{-10x^2-5x}{LCD} + \frac{-4x^2+2x}{LCD} + \frac{3}{LCD}$$

$$\frac{-14x^2-3x+3}{LCD} = \boxed{\frac{-14x^2-3x+3}{(2x+1)(2x-1)}}$$

4 & cont

$$
\begin{array}{r|l}
 & -7x + 2 \quad r\,1 \\
\hline
2x+1 & -14x^2 - 3x + 3 \\
 & 14x^2 + 7x \\
\hline
 & 4x + 3 \\
 & -4x - 2 \\
\hline
 & 1
\end{array}
$$

$2x+1$ is not factor of $-14x^2-3x+3$

$$
\begin{array}{r|l}
 & -7x - 5 \quad r\,-2 \\
\hline
2x-1 & -14x^2 - 3x + 3 \\
 & 14x^2 - 7x \\
\hline
 & -10x + 3 \\
 & 10x - 5 \\
\hline
 & -2
\end{array}
$$

$2x-1$ is not factor of

$-14x^2-3x+3$

(49) $\dfrac{1}{x^2+5x+6} + \dfrac{-2}{x^2+3x+2} + \dfrac{1}{x^2-3x-4}$

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

$$LCD\,(x+2)(x+1)(x+3)(x-4)$$

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

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

$$\frac{x^2+1x-4x-4}{LCD} + \frac{-2(x^2+3x-4x-12)}{LCD} + \frac{x^2+2x+3x}{LCD}$$

$$\frac{x^2-3x-4}{LCD} + \frac{-2(x^2-1x-12)}{LCD} + \frac{x^2+5x+6}{LCD}$$

$$\frac{x^2-3x-4}{LCD} + \frac{-2x^2+2x+24}{LCD} + \frac{x^2+5x+6}{LCD}$$

$$\frac{4x+26}{LCD} = \boxed{\frac{4x+26}{(x+3)(x+2)(x+1)(x-4)}} = \frac{2(2x+13)}{LCD}$$

(50) $\dfrac{2}{x^2-5x+6} + \dfrac{-4}{x^2-2x-3} + \dfrac{2}{x^2+4x+3}$

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

LCD $(x-3)(x+1)(x-2)(x+3)$

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

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

$= \dfrac{2(x^2+1x+3x+3)}{LCD} + \dfrac{-4(x^2-2x+3x-6)}{LCD}$

$+ \dfrac{2(x^2-3x-2x+6)}{LCD}$

$= \dfrac{2(x^2+4x+3)}{LCD} + \dfrac{-4(x^2+1x-6)}{LCD} + \dfrac{2(x^2-5x+6)}{LCD}$

$= \dfrac{2x^2+8x+6}{LCD} + \dfrac{-4x^2-4x+24}{LCD} + \dfrac{2x^2-10x+12}{LCD}$

$\dfrac{-6x+42}{LCD} = \dfrac{-6(x-7)}{LCD} = \boxed{\dfrac{-6x+42}{(x+1)(x+3)(x+2)(x-3)}}$