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① $\frac{7}{15x^2}$ and $\frac{13}{24x}$

$3 \cdot 5 \cdot x \cdot x$ $\quad 3 \cdot 8 \cdot x$

$3 \cdot 5 \cdot 8 \cdot x \cdot x = 120x^2$

LCD $= 120x^2$

③ $\frac{8}{15x^2}$ and $\frac{5}{6x^5}$

$3 \cdot 5 \cdot x \cdot x$ $\quad 2 \cdot 3 \cdot x \cdot x \cdot x \cdot x \cdot x$ $\quad 30x^5$

$2 \cdot 3 \cdot 5 \cdot x \cdot x \cdot x \cdot x \cdot x =$

LCD $= 30x^5$

⑤ $\frac{4}{x-3}$ and $\frac{7}{x+1}$

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

⑦ $\frac{5}{7(y+2)}$ and $\frac{10}{y}$

LCD $= 7y(y+2)$

⑨ $\frac{17}{x+4}$ and $\frac{18}{x^2-16}$

$x+4$ and $(x-4)(x+4)$

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

⑪ $\frac{8}{y^2-9}$ and $\frac{14}{y(y+3)}$

$y^2-9 = (y-3)(y+3)$ and $y(y+3)$

LCD $= y(y-3)(y+3)$

⑬ $\frac{7}{y^2-1}$ and $\frac{4}{y^2-2y+1}$

$y^2-1 = (y-1)(y+1)$ and y^2-2y+1

$= (y-1)(y-1)$

LCD $= (y-1)(y-1)(y+1)$

⑮ $\frac{3}{x^2-x-20}$ and $\frac{x}{2x^2+7x-4}$

$x^2-x-20 = (x-5)(x+4)$

$2x^2+7x-4 = (2x-1)(x+4)$

LCD $= (x-5)(2x-1)(x+4)$

8.4

(17) $\frac{3}{x} + \frac{5}{x^2}$

$= \left(\frac{x}{x}\right)\frac{3}{x} + \frac{5}{x^2}$

$= \boxed{\frac{3x+5}{x^2}}$

(19) $\frac{2}{9x} + \frac{11}{6x}$

$3 \cdot 3x$
$2 \cdot 3x$
$LCD = 2 \cdot 3 \cdot 3 \cdot x$
$= 18x$

$= \frac{2}{2}\left(\frac{2}{9x}\right) + \frac{11}{6x}\left(\frac{3}{3}\right)$

$= \boxed{\frac{37}{18x}}$

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

$= \frac{2x}{2x}\left(\frac{4}{x}\right) + \frac{7}{2x^2}$

$= \boxed{\frac{8x+7}{2x^2}}$

(23) $6 + \frac{1}{x}$

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

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

(25) $\frac{2}{x} + 9$

$= \frac{2}{x} + \frac{9}{1}\left(\frac{x}{x}\right)$

$= \boxed{\frac{2+9x}{x}}$

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

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

$= \frac{x-1+2x+4}{6}$

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

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

$= \boxed{\frac{x+1}{2}}$

(29) $\frac{4}{x} + \frac{3}{x-5}$ $\quad LCD = x(x-5)$

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

$\frac{4x-20+3x}{x(x-5)}$

$= \boxed{\frac{7x-20}{x(x-5)}}$

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

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

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

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

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

(33) $\frac{2}{y+5} + \frac{3}{4y}$ LCD $= 4y(y+5)$

$= \frac{2(4y)}{(4y)(y+5)} + \frac{3(y+5)}{4y(y+5)}$

$= \frac{8y+3y+15}{4y(y+5)}$

$= \boxed{\frac{11y+15}{4y(y+5)}}$

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

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

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

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

(37) $\frac{7}{x+5} - \frac{4}{x-5}$

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

$\frac{7x-35-4x-20}{(x-5)(x+5)}$

$= \boxed{\frac{3x-55}{(x-5)(x+5)}}$

(39) $\frac{2x}{x^2-16} + \frac{x}{x-4}$

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

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

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

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

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

p3

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(41) $\frac{5y}{y^2-9} - \frac{4}{y+3}$

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

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

$= \frac{5y-4y+12}{(y-3)(y+3)}$

$= \boxed{\frac{y+12}{(y-3)(y+3)}}$

(43) $\frac{7}{x-1} - \frac{3}{(x-1)^2}$

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

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

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

(45) $\frac{3y}{4y-20} + \frac{9y}{6y-30}$

$= \frac{3y}{2(y-5)} + \frac{9y}{6(y-5)}$

$= \frac{3(3y)}{3\cdot 2(y-5)} + \frac{9}{6(y-5)}$

$= \frac{9y+9}{6(y-5)}$

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

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

(47) $\frac{y+4}{y} - \frac{y}{y+4}$ LCD: $y(y+4)$

$\frac{(y+4)(y+4)}{y(y+4)} - \frac{y(y)}{y(y+4)}$

$= \frac{y^2+8y+16-y^2}{y(y+4)}$

$= \frac{8y+16}{y(y+4)}$

$= \boxed{\frac{8(y+2)}{y(y+4)}}$

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(49) $\dfrac{2x+9}{x^2-7x+12} - \dfrac{2}{x-3}$

$\dfrac{2x+9}{(x-4)(x-3)} - \dfrac{2}{x-3}$

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

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

$= \boxed{\dfrac{17}{(x-4)(x-3)}}$

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

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

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

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

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

(53) $\dfrac{3x}{x^2+3x-10} - \dfrac{2x}{x^2+x-6}$

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

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

$= \dfrac{3x^2+9x-2x^2-10x}{(x-2)(x+3)(x+5)}$

$= \dfrac{x^2-x}{(x-2)(x+3)(x+5)} = \dfrac{x(x-1)}{(x-2)(x+3)(x+5)}$ (p5)

(55) $\dfrac{y}{y^2+2y+1} + \dfrac{4}{y^2+5y+4}$

$\dfrac{y}{(y+1)(y+1)} + \dfrac{4}{(y+1)(y+4)}$

$\dfrac{y(y+4)}{(y+1)(y+1)(y+4)} + \dfrac{4(y+1)}{(y+1)(y+1)(y+4)}$

$= \dfrac{y^2+4y+4y+4}{(y+1)(y+1)(y+4)}$

$= \dfrac{y^2+8y+4}{(y+4)(y+1)(y+1)}$

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(57) $\dfrac{x-5}{x+3} + \dfrac{x+3}{x-5}$

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

$= \dfrac{x^2-10x+25+x^2+6x+9}{(x-5)(x+3)}$

$= \dfrac{2x^2-4x+34}{(x-5)(x+3)}$

$= \boxed{\dfrac{2(x^2-2x+17)}{(x-5)(x+3)}}$

(59) $\dfrac{5}{5y^2-5y} - \dfrac{3}{2y-2}$

$= \dfrac{5}{5y(y-1)} - \dfrac{3}{2(y-1)}$

$= \left(\dfrac{2}{2}\right)\left(\dfrac{5}{5y(y-1)}\right) - \left(\dfrac{5y}{5y}\right)\left(\dfrac{3}{2(y-1)}\right)$

$= \dfrac{10-15y}{10y(y-1)}$

$= \dfrac{5(5-3y)}{5\cdot 2y(y-1)}$

$= \dfrac{5-3y}{2y(y-1)}$

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

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

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

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

(63) $\dfrac{y^2-39}{y^2+3y-10} - \dfrac{y-7}{y-2}$

$= \dfrac{y^2-39}{(y-2)(y+5)} - \dfrac{(y-7)(y+5)}{(y-2)(y+5)}$

$= \dfrac{y^2-39-(y^2-2y-35)}{(y-2)(y+35)}$

$= \dfrac{-4+2y}{(y-2)(y+5)}$

$= \dfrac{2(y-2)}{(y-2)(y+5)}$

$= \boxed{\dfrac{2}{y+5}}$

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(65) $4 + \frac{1}{x-3}$

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

$= \frac{4x-12+1}{x-3}$

$= \boxed{\frac{4x-11}{x-3}}$

(67) $3 - \frac{3y}{y+1}$

$= \frac{3(y+1)}{(y+1)} - \frac{3y}{(y+1)}$

$= \frac{3y+3-3y}{y+1}$

$= \boxed{\frac{3}{y+1}}$

(69) $\frac{9x+3}{x^2+x-6} + \frac{x}{3-x}$

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

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

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

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

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

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

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

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

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

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

(73) $\frac{y+3}{5y^2} - \frac{y-5}{15y}$

$\frac{3(y+3)}{3\cdot 5y^2} - \frac{(y-5)(y)}{15y(y)}$

$= \frac{3y+9-(y^2-5y)}{15y^2}$

$\frac{3y+9-y^2+5y}{15y^2} = \boxed{\frac{-y^2+8y+9}{15y^2}}$

(77)

(73) Continued

$$= \frac{-3y^2+18y+9}{15y^2}$$

$$= -\frac{3y^2-18y-9}{15y^2}$$

$$= -\frac{3(y^2-6y-3)}{3\cdot 5y^2}$$

$$= -\frac{y^2-6y-3}{5y^2}$$

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

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

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

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

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

$$= \boxed{\frac{x^2-2x-6}{3(x+2)(x-2)}}$$

(77) $\dfrac{y}{y^2-1} + \dfrac{2y}{y-y^2}$

$$= \frac{y}{(y-1)(y+1)} + \frac{2y}{y(1-y)}$$

$$= \frac{y}{(y-1)(y+1)} - \frac{2y}{y(y-1)}$$

$$= \frac{y\cdot y}{y(y-1)(y+1)} - \frac{2y(y+1)}{y(y-1)(y+1)}$$

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

(79) $\dfrac{x-1}{x} + \dfrac{y+1}{y}$

$$\frac{y(x-1)}{xy} + \frac{x(y+1)}{xy}$$

$$\frac{xy-y+xy+x}{xy}$$

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

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(81) $\frac{3x}{x^2-y^2} - \frac{2}{y-x}$

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

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

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

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

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

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

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

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

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