

Operations with Rational Expressions ws #1, pg. 1 of 1

① $\frac{6k}{3k^2-3k-6} + \frac{4}{3k}$ LCD: $3k(k+1)(k-2)$

$$\frac{6k(k+1)(k-2)}{3(k+1)(k-2)} + \frac{4(k^2-k-2)}{3(k+1)(k-2)}$$

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

$$\frac{6k^2 + 4k^2 - 4k - 8}{LCD}$$

$$\boxed{\frac{10k^2 - 4k - 8}{3k(k+1)(k-2)}; k \neq 0, -1, 2}$$

② $\frac{3}{2p-1} + \frac{4}{p+2}$ LCD: $2p(2p-1)(p+2)$

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

$$\frac{3p+6+8p-4}{LCD}$$

$$\boxed{\frac{11p+2}{(2p-1)(p+2)}; p \neq \frac{1}{2}, -2}$$

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

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

$$\frac{3x-3-3x-6}{LCD}$$

$$\boxed{-\frac{9}{(x+2)(x-1)}; x \neq -2, 1}$$

④ $\frac{6}{p-5} - \frac{3p}{p-1}$ LCD: $(p-5)(p-1)$

$$\frac{6(p-1) - 3p(p-5)}{LCD}$$

$$\frac{6p-6-3p^2+15p}{LCD}$$

$$\boxed{\frac{-3p^2+21p-6}{(p-5)(p-1)}; p \neq 5, 1}$$

⑤ $\frac{n+2}{n-6} + \frac{6}{n-2}$ LCD: $(n-6)(n-2)$

$$\frac{(n+2)(n-2) + 6(n-6)}{LCD}$$

$$\frac{n^2-4+6n-36}{LCD}$$

$$\boxed{\frac{n^2+6n-40}{(n-6)(n-2)}; n \neq 6, 2}$$

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

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

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

$$\boxed{-\frac{15}{(x+6)(x+1)}; x \neq -6, -1}$$

⑦ $\frac{5n}{2} - \frac{n+5}{2n^2+6n-8}$ LCD: $2(n-3)(n+6)$

$$\frac{5n(n-3)(n+6) - (n+5)}{2(n-3)(n+6)}$$

$$\frac{5n^3 + 15n^2 - 90n - 1n - 5}{2(n-3)(n+6)}$$

$$\frac{5n^3 + 15n^2 - 91n - 5}{2(n-3)(n+6)}; n \neq 6, -9$$

⑧ $\frac{1}{n+5} - \frac{5n}{3}$ LCD: $3(n+1)$

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

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

$$\frac{-5n^2 - 5n + 3}{3(n+1)}; n \neq -5, -1$$

⑨ $\frac{n-4}{n^2-n-6} + \frac{5}{6}$ LCD: $6(n+2)(n-3)$

$$\frac{6(n-4) + 5(n^2-n-6)}{6(n+2)(n-3)}$$

$$\frac{6n - 24 + 5n^2 - 5n - 30}{6(n+2)(n-3)}$$

$$\frac{5n^2 + n - 54}{6(n+2)(n-3)}; n \neq -2, 3$$

⑩ $\frac{5x+2}{x-4} - \frac{2}{x-3}$ LCD: $(x-4)(x-3)$

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

$$\frac{5x^2 - 15x + 2x - 8}{(x-4)(x-3)}$$

$$\frac{5x^2 - 13x - 8}{(x-4)(x-3)}; x \neq 4, 3$$

⑪ $\frac{3}{p-4} - \frac{5}{2p-6}$ LCD: $2(p-4)(p-3)$

$$\frac{3(2)(p-3) - 5(p-4)}{2(p-4)(p-3)}$$

$$\frac{6p - 18 - 5p + 20}{2(p-4)(p-3)}$$

$$\frac{p+2}{2(p-4)(p-3)}; p \neq 4, 3$$

⑫ $\frac{x+6}{3x^2-3x-20} - \frac{5}{3}$ LCD: $3(x+4)(x-5)$

$$\frac{x+6 - 5(x^2-x-20)}{3(x+4)(x-5)}$$

$$\frac{x+6 - 5x^2 + 5x + 100}{3(x+4)(x-5)}$$

$$\frac{-5x^2 + 6x + 106}{3(x+4)(x-5)}; x \neq -4, 5$$

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$$\textcircled{3} \frac{m^2+14m+49}{70+3m-m^2} \cdot \frac{m^2-17m+70}{m-5}$$

$$-1(m^2-3m-70)$$

$$\frac{(m+7)(m+7) \cdot (m-7)(m-10)}{-1(m+7)(m-10)(m-5)}$$

$$\boxed{-\frac{m^2-49}{m-5}; m \neq -7, 10, 5}$$

$$\textcircled{14} \frac{8n^3-24n^2}{8n+80} \div \frac{7}{8n+80}$$

$$\frac{8n^2(n-3) \cdot 8(n+10)}{8(n+10) \cdot 7}$$

$$\boxed{\frac{8n^3-24n^2}{7}; n \neq -10}$$

$$\textcircled{5} \frac{8n-64}{4n-32} \div \frac{1}{4n-16}$$

$$\textcircled{16} \frac{x^2+3x-70}{x-7} \cdot \frac{2x+20}{x^2+9x+18}$$

$$\frac{8(n-8) \cdot 4(n-4)}{4(n-8) \cdot 1}$$

$$\frac{(x-7)(x+10) \cdot (x+3)(x+6)}{(x-7) \cdot 2(x+10)}$$

$$\boxed{\frac{x^2+9x+18}{2}; x \neq 7, -3, -6, -10}$$

$$\textcircled{7} \frac{6n+36}{20n-20} \cdot \frac{12n^2-12n}{n+6}$$

$$\textcircled{18} \frac{x^2+12x+32}{4x+16} \cdot \frac{20x+16}{10x+8}$$

$$\frac{6(n+6) \cdot \frac{3}{12n(n-1)}}{\frac{20(n-1) \cdot (n+6)}{5}}$$

$$\frac{(x+4)(x+8) \cdot 4(5x+4)}{4(x+4) \cdot 2(5x+4)}$$

$$\boxed{\frac{18n}{5}; n \neq 1, -6}$$

$$\boxed{\frac{x+8}{2}; x \neq -4, -\frac{4}{5}}$$

$$1) \frac{n^2 + 16n + 64}{4n^2 + 32n} \div \frac{10n + 20}{10}$$

$$\frac{(n+8)(n+8) \cdot \cancel{10}}{4n(n+8) \cdot \cancel{10}(n+2)}$$

$$\boxed{\frac{n+8}{4n(n+2)}; n \neq 0, -8, -2}$$

$$20) \frac{k^2 + 6k - 40}{2k^2 - 8k} \cdot \frac{k^2 + 14k + 49}{k^2 + 17k + 70}$$

$$\frac{(k-4)(k+10) \cdot (k+7)(k+7)}{2k(k-4) \cdot (k+7)(k+10)}$$

$$\boxed{\frac{k+7}{2k}; k \neq 0, 4, -7, -10}$$

$$1) \frac{\cancel{7k+21}}{2k^3 + 10k^2} \cdot \frac{9}{\cancel{7k+21}}$$

$$\boxed{\frac{9}{2k^2(k+5)}; k \neq 0, -5, -3}$$

$$22) \frac{12x+4}{2|x+7|} \div \frac{6x-30}{7x-35}$$

$$\frac{4(\cancel{3x+1}) \cdot \cancel{7(x-5)}}{\cancel{7(3x+1)} \cdot \cancel{6(x-5)}}$$

$$\boxed{\frac{2}{3}; x \neq -\frac{1}{3}, 5}$$

$$3) \frac{p^2 - 8p - 9}{p^2 - 6p - 27} \cdot \frac{2p+10}{2p+2}$$

$$\frac{(p+1)(p-9) \cdot \cancel{2}(p+5)}{(p+3)(p-9) \cdot \cancel{2}(p+1)}$$

$$\boxed{\frac{p+5}{p+3}; p \neq -3, 9, -1}$$

$$24) \frac{10r^2 - 10r}{r^2 - 11r + 10} \cdot \frac{10r^2 - 30r}{r^2 + 2r - 15}$$

$$\frac{10r(r-1) \cdot (r-3)(r+5)}{(r-1)(r-10) \cdot 10r(r-3)}$$

$$\boxed{\frac{r+5}{r-10}; r \neq 1, 10, 0, 3, -5}$$