

$$x^3 - 4x^2 - 11x + 30 = 0$$

$$1) (x-5)(x+3)(x-2) = 0 \quad \mathcal{L} = \{-3; 2; 5\}$$

$$(x+3)(x-3)(x+1)(x-7) = 0 \quad \mathcal{L} = \{-3; -1; 3; 7\}$$

$$2) \frac{\frac{2}{9} + \frac{4}{15}}{\frac{4}{3} - \frac{7}{10}} = \frac{\frac{10 + 12}{45}}{\frac{40 - 21}{30}} = \frac{\frac{22}{45}}{\frac{19}{30}} = \frac{22}{45} \cdot \frac{30}{19} = \frac{44}{57}$$

$$\frac{\frac{3x}{4y} - \frac{5}{3z}}{\frac{5x}{6yz} + \frac{3z}{2x}} \cdot \frac{\frac{9xz - 20y}{12yz}}{\frac{5x^2 + 9yz^2}{6xyz}} = \frac{9xz - 20y}{12yz} \cdot \frac{6xyz}{5x^2 + 9yz^2}$$
$$= \frac{9x^2z - 20xy}{10x^2 + 18yz^2}$$

$$3) \quad \frac{2}{5x} - \frac{3}{4} + \frac{5}{12} - \frac{7}{6} = \frac{4}{15x} - \frac{9}{10} \quad | \cdot \text{HN } 60x$$

$$\frac{2 \cdot 60x}{5x} - \frac{3 \cdot 60x}{4} + \frac{5 \cdot 60x}{12} - \frac{7 \cdot 60x}{6} = \frac{4 \cdot 60x}{15x} - \frac{9 \cdot 60x}{10}$$

$$2 \cdot 12 - 3 \cdot 15x + 5 \cdot 5x - 7 \cdot 10x = 4 \cdot 4 - 9 \cdot 6x$$

$$\rightarrow 24 - 45x + 25x - 70x = 16 - 54x \quad | -24$$

$$-36x = -8$$

$$x = \frac{8}{36} = \frac{2}{9} = 0,\overline{2}$$

$$4) a) \quad 3 - \frac{2x+3y}{\underbrace{x+y}_a} - \frac{\overbrace{(x+y)(x-y)}^{(x+y)(x-y)}}{\underbrace{(x+y)^2}_{a^2}} = \frac{3 \cdot (x+y)^2 - (2x+3y)(x+y) - (x^2-y^2)}{(x+y)^2}$$

$$\frac{3 \cdot (x^2 + 2xy + y^2) - [2x^2 + 5xy + 3y^2] - (x^2 - y^2)}{(x+y)^2}$$

$$\underline{3x^2} + \underline{6xy} + \underline{3y^2} - \underline{2x^2} - \underline{5xy} - \underline{3y^2} - \underline{x^2} + \underline{y^2}$$

$$\frac{\underline{xy} + \underline{y^2}}{(x+y)^2} = \frac{\cancel{y}(x+y)}{(x+y)^2} = \frac{\cancel{y}}{x+y}$$

$$\rightarrow 3 - \frac{2x+3y}{x+y} - \frac{x-y}{x+y} = \frac{\underline{3x+3y} - \underline{2x-3y} - \underline{x+y}}{x+y}$$

$$4) \quad a) \quad \frac{2u(\overline{u-v})}{(u+v)(\overline{u-v})} - \frac{u}{3} + \frac{1}{u} = \frac{6u^2 - 4u(u+v) + 3(u+v)}{3u(u+v)}$$

$$\frac{6u^2 - 4u^2 - 4uv + 3u + 3v}{3u \cdot (u+v)} = \frac{2u^2 - 4uv + 3u + 3v}{3u(u+v)}$$

$$5) \quad \frac{-\frac{0,5}{5} - \frac{1}{2xy}}{\frac{xy}{5} + 2 + \frac{5}{xy}} = \frac{\frac{-xy - 5}{10xy}}{\frac{(xy)^2 + 10xy + 25}{5xy}}$$

$$\xrightarrow{-xy-5} \frac{\overline{-(xy+5)}}{\overline{10xy}} \cdot \frac{\overline{5xy}}{\overline{(xy+5)^2}} = \frac{-1}{2(xy+5)}$$

$$b_2) \quad \frac{\frac{a}{3} + 2 + \frac{3}{a}}{\frac{1}{6} + \frac{1}{2a}} = \frac{\frac{a^2 + 6a + 9}{3a} \rightarrow (a+3)^2}{\frac{a+3}{6a}}$$

$$\frac{(a+3)^2}{3a} \cdot \frac{6a}{a+3} = 2 \cdot (a+3) = 2a + 6$$

$$\begin{aligned}
 & \sqrt[3]{x^4} \cdot \sqrt[5]{\sqrt{x^3} \cdot \frac{1}{x^4}} \cdot \frac{1}{(\sqrt{x^3})^4} \\
 & (x^4)^{1/3} \cdot ((x^3)^{1/2})^{1/5} (x^{-4})^{1/5} ((x^{-3})^{1/2})^4 \\
 & x^{4/3} \cdot x^{3/10} \cdot x^{-4/5} \cdot x^{-6} = x^{\frac{40+9-24-180}{30}} \\
 & x^{-\frac{155}{30}} = x^{-3\frac{1}{6}} = \frac{1}{\sqrt[6]{x^{31}}}
 \end{aligned}$$

$$\begin{aligned}
 & \sqrt[5]{\sqrt{x^3}} \cdot \sqrt{\sqrt[3]{x^4} \cdot x^3} \cdot \left(\frac{1}{\sqrt[3]{x^2}}\right)^2 \\
 & x^{3/10} \cdot x^{2/3} \cdot x^{3/2} \cdot x^{-4/3} \\
 & x^{\frac{18+40+40-80}{60}} = x^{68/60} = x^{17/15} = \sqrt[15]{x^{17}}
 \end{aligned}$$