

1) 
$$\begin{cases} y = -\frac{1}{3}x + 2, \\ \frac{y}{2} + \frac{x}{6} = 1; \end{cases}$$

2) 
$$\begin{cases} \frac{x+y}{5} + \frac{y}{5} = -2, \\ \frac{2x-y}{3} - \frac{3x}{4} = \frac{3}{2}; \end{cases}$$

3) 
$$\begin{cases} \frac{2x+1}{5} - \frac{3y+2}{7} = 2y-x, \\ \frac{3x-1}{4} + \frac{7y+2}{6} = 2x-y; \end{cases}$$

4) 
$$\begin{cases} \frac{x+1}{3} - \frac{y+2}{4} = \frac{2(x-y)}{5}, \\ \frac{x-3}{4} - \frac{y-3}{3} = 2y-x; \end{cases}$$

5) 
$$\begin{cases} \frac{3x-2y}{5} + \frac{5x-3y}{3} = x+1, \\ \frac{2x-3y}{3} + \frac{4x-3y}{3} = y; \end{cases}$$

6) 
$$\begin{cases} \frac{2x-y+3}{3} - \frac{x-2y+3}{4} = 4, \\ \frac{3x-4y+3}{4} + \frac{4x-2y-9}{3} = 4; \end{cases}$$

7) 
$$\begin{cases} \frac{x\sqrt{2}}{\sqrt{2}-1} - \frac{y}{\sqrt{2}+1} = 5 - \sqrt{2}, \\ \frac{x}{\sqrt{2}+2} + \frac{y}{\sqrt{2}-2} = \frac{-8-\sqrt{2}}{2}. \end{cases}$$

[ 1) soustava má nekonečně mnoho řešení; 2)  $[-2; -4]$ ;  
3)  $[7; 4]$ ; 4)  $[11; 6]$ ; 5)  $[3; 2]$ ; 6)  $[7; 5]$ ; 7)  $[\sqrt{2}; 3]$ . ]

4.1.4 V  $\mathbb{R}^2$  řešte soustavy rovnic zavedením nových neznámých:

1) 
$$\begin{cases} 5(x-3) - 3(y+2) = 23, \\ 3(x-3) + 5(y+2) = 7; \end{cases}$$

2) 
$$\begin{cases} 3(2x+3y) + 2(2x-3y) = 43, \\ 8(2x+3y) - 3(2x-3y) = 73; \end{cases}$$

3) 
$$\begin{cases} \frac{1}{x} + \frac{1}{y} = 5, \\ \frac{3}{x} - \frac{5}{y} = -9; \end{cases}$$

4) 
$$\begin{cases} \frac{1}{x+y} + \frac{1}{x-y} = \frac{3}{2}, \\ \frac{1}{x+y} - \frac{1}{x-y} = \frac{1}{2}; \end{cases}$$

5) 
$$\begin{cases} \frac{1}{1-x+y} + \frac{1}{1-x-y} = \frac{2}{3}, \\ \frac{1}{1-x-y} - \frac{1}{1-x+y} = -\frac{4}{3}. \end{cases}$$

[ 1)  $[7; -3]$ ; 2)  $[4; 1]$ ; 3)  $[\frac{1}{2}; \frac{1}{3}]$ ; 4)  $[\frac{3}{2}; -\frac{1}{2}]$ ; 5)  $[2; 2]$ . ]

4.1.6 Řešte v  $\mathbb{R}^3$  soustavy rovnic:

$$1) \begin{cases} x + y = 28, \\ z + x = 30, \\ y + z = 32; \end{cases}$$

$$2) \begin{cases} x - y = \frac{1}{3}, \\ y - z = \frac{1}{6}, \\ x + z = \frac{4}{3}; \end{cases}$$

$$3) \begin{cases} x + 2y = \frac{7}{4}, \\ y + 3z = \frac{5}{2}, \\ z + 4x = \frac{11}{3}; \end{cases}$$

$$4) \begin{cases} x + 2y = 9, \\ y - 3z = -5, \\ 5z - x = 14; \end{cases}$$

$$5) \begin{cases} x + y = 13, \\ x - z = 5, \\ y - z = 2; \end{cases}$$

$$6) \begin{cases} 2x + y = 7, \\ y - 3z = -9, \\ 5z - x = 18; \end{cases}$$

$$7) \begin{cases} 2x + 3y = 11, \\ 3x + 2z = 13, \\ 3y + 4z = 29; \end{cases}$$

$$8) \begin{cases} x + y - z = 11, \\ x - y + z = 1, \\ y + z - x = 5; \end{cases}$$

$$9) \begin{cases} x - y - z = 5, \\ y - x - z = 1, \\ z - x - y = -15; \end{cases}$$

$$10) \begin{cases} 7x + 6y + 7z = 100, \\ x - 2y + z = 0, \\ 3x + y - 2z = 0; \end{cases}$$

$$11) \begin{cases} 3x + 2y + 3z = 110, \\ 5x + y - 4z = 0, \\ 2x - 3y + z = 0; \end{cases}$$

$$13) \begin{cases} 2x - 3y + 4z = 5, \\ 3x + 4y - 2z = 0, \\ -4x + 2y + 3z = 8; \end{cases}$$

$$15) \begin{cases} x + 2y + 3z = 0, \\ x - y + z = 0, \\ x + y - 2z = 0; \end{cases}$$

$$17) \begin{cases} z = 3x - y + 1, \\ 2z = 5,6x - 2,4y + 0,8, \\ 3z = 10x - 2y; \end{cases}$$

$$12) \begin{cases} x + 2y - 3z = -8, \\ -3x + y + 2z = 10, \\ 2x - 3y + 2z = 5; \end{cases}$$

$$14) \begin{cases} x + y - 2z = 0, \\ x - y - 8z = 0, \\ 3x + 5y + 4z = 4; \end{cases}$$

$$16) \begin{cases} x + y - z = 0, \\ 2x + y - z = 1, \\ 4x + 2y - 3z = 0; \end{cases}$$

$$18) \begin{cases} \frac{x}{5} - \frac{y}{4} - \frac{z}{10} = 0, \\ -0,2x + 0,6z = 1, \\ x - y - z = -1. \end{cases}$$

[ 1) [13; 15; 17]; 2)  $\left[\frac{11}{12}; \frac{7}{12}; \frac{5}{12}\right]$ ; 3)  $\left[\frac{3}{4}; \frac{1}{2}; \frac{2}{3}\right]$ ; 4) [1; 4; 3];  
 5) [8; 5; 3]; 6) [2; 3; 4]; 7) [1; 3; 5]; 8) [6; 8; 3]; 9) [7; 5; -3];  
 10) [3; 5; 7]; 11) [11; 13; 17]; 12) [3; 5; 7]; 13) [0; 1; 2];

4.1.7 Řešte v  $\mathbb{R}^3$  soustavy rovnic:

$$1) \begin{cases} \frac{x}{2} + \frac{y}{3} + \frac{z}{4} = 1, \\ \frac{x}{3} + \frac{y}{4} + \frac{z}{5} = 1, \\ \frac{x}{4} + \frac{y}{5} + \frac{z}{6} = 1; \end{cases}$$

$$2) \begin{cases} 2x - \frac{y+z}{7} = \frac{11}{12}, \\ 3y - \frac{x+z}{9} = \frac{11}{12}, \\ 4z - \frac{x+y}{2} = \frac{7}{12}; \end{cases}$$

$$3) \begin{cases} \frac{2x+6}{3x-5y} = \frac{3}{2}, \\ \frac{x}{x+3y} = \frac{3}{5}, \\ \frac{x+z}{y+3z} = \frac{3}{4}. \end{cases}$$

[ 1) [12; -60; 60]; 2)  $\left[\frac{1}{2}; \frac{1}{3}; \frac{1}{4}\right]$ ; 3)  $\left[\frac{36}{5}; \frac{8}{5}; \frac{24}{5}\right]$ . ]

4.1.8 Řešte v  $\mathbb{R}^3$  soustavy rovnic zavedením nových neznámých:

$$1) \begin{cases} \frac{4}{x} - \frac{3}{y} = 1, \\ \frac{2}{x} + \frac{3}{z} = 4, \\ \frac{3}{y} - \frac{1}{z} = 0; \end{cases}$$

$$2) \begin{cases} \frac{1}{x} - \frac{1}{y} - \frac{4}{z} = -5, \\ \frac{2}{x} + \frac{2}{y} - \frac{12}{z} = 18, \\ \frac{1}{z} - \frac{3}{x} + \frac{2}{y} = -4; \end{cases}$$

$$3) \begin{cases} \frac{6}{x+y} + \frac{5}{y+3z} = 2, \\ \frac{15}{x+y} - \frac{4}{x-2z} = \frac{1}{2}, \\ \frac{10}{y+3z} - \frac{7}{x-2z} = -\frac{3}{2}; \end{cases}$$

$$4) \begin{cases} \frac{3}{x+y} + \frac{2}{x-z} = 2, \\ \frac{6}{x+y} + \frac{1}{y+z} = 3, \\ \frac{4}{x-z} - \frac{3}{y+z} = -1. \end{cases}$$

[ 1) [2; 3; 1]; 2)  $\left[\frac{1}{7}; \frac{1}{8}; 1\right]$ ; 3) [4; 2; 1]; 4) [2; 1; 0]. ]