Risolvere i seguenti sistemi lineari:

1. $\begin{cases} -x + y + 5z = 0 \\ x - 4z = 1 \\ x + y + z = 3 \end{cases}$

2. $\begin{cases} 5x + y - 3z = 0 \\ 10x + 2y - 4z = 1 \\ 15x + 3y - 7z = 1 \end{cases}$

3. $\begin{cases} 3x + y + z = 0 \\ x + 2z = 1 \\ 2x + 4z = -2 \end{cases}$

4. $\begin{cases} 3x + y = 0 \\ x - 2z = 1 \\ -2x + 4z = -2 \end{cases}$

5. $\begin{cases} x + y = 0 \\ y - 4z = 1 \\ 2x - z = 3 \end{cases}$

6. $\begin{cases} 5x + 7z = 0 \\ y - 4z = 1 \\ 5x + y + 3z = 1 \end{cases}$

7. $\begin{cases} x - 3y + 2z = 0 \\ x - 4z = 3 \\ 2x - y = 3 \end{cases}$

8. $\begin{cases} x + 5y - 3z = 0 \\ x + 5y - 4z = 1 \\ 2x + 10y - 7z = 1 \end{cases}$

9. $\begin{cases} 3x - y = 0 \\ 6x - 2y = 0 \\ x - 3y - 2z = 3 \end{cases}$

10. $\begin{cases} y - 3z = 2 \\ x + 3z = 3 \\ x + y = 4 \end{cases}$

11. $\begin{cases} x + y + z = 2 \\ x + 3z = 3 \\ 3x + 2y + 5z = 7 \end{cases}$

12. $\begin{cases} x - y + 2z = 2 \\ 2x - 3z = 3 \\ -2y + 7z = 1 \end{cases}$

13. $\begin{cases} 3x - y = 0 \\ 9x - 3y + z = 0 \\ -6x + 2y - z = 0 \end{cases}$

14. $\begin{cases} 2x + 3y + 5z = 0 \\ x - 2z = 3 \\ 2x - y + z = 1 \end{cases}$

15. $\begin{cases} x + y - z = 2 \\ x + 2z = 3 \\ 2x + y + z = 1 \end{cases}$

16. $\begin{cases} x + y + 3z = 0 \\ y + 2z = 1 \\ 2x - z = -2 \end{cases}$

17. $\begin{cases} x - y + 2z = 0 \\ x - y + z = 1 \\ 4x - 4y + 5z = 3 \end{cases}$

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

19. $\begin{cases} x + 2y + 2z = 0 \\ x + y - z = 3 \\ 3x + 4y = 6 \end{cases}$

20. $\begin{cases} x - y - 2z = 0 \\ 4x - y - z = -3 \\ 6x - 3y - 5z = -3 \end{cases}$

21. $\begin{cases} 5x - z = 1 \\ x + y = 3 \\ 4x - y - z = 7 \end{cases}$

22. $\begin{cases} x + z = 0 \\ y + 4z = 1 \\ 2x - y - z = 3 \end{cases}$

23. $\begin{cases} -x + 3y + 2z = 1 \\ 2x - 6y + 2z = 0 \\ -3x + 9y = 1 \end{cases}$

24. $\begin{cases} 5x + 3y - z = 1 \\ 10x + 6y + 2z = 4 \\ -5x - 3y - 3z = -3 \end{cases}$

25. $\begin{cases} 2x - y + 3z = 2 \\ x + 3z = 3 \\ x - y = 2 \end{cases}$

26. $\begin{cases} -x + y + z = 1 \\ x + 3z = 3 \\ 2x + y + 6z = 6 \end{cases}$

27. $\begin{cases} 3x + y + z = 0 \\ x - y + z = 0 \\ 5x - y + 3z = 0 \end{cases}$

28. $\begin{cases} -x + y - 2z = 1 \\ x + y + 3z = 3 \\ x + y + 4z = 4 \end{cases}$

29. $\begin{cases} 2x - y - 2z = 1 \\ 4x - 2y + 2z = 1 \\ 2x - y - 8z = 2 \end{cases}$

30. $\begin{cases} y - 3z = 2 \\ x + 3z = 3 \\ x + 2y = 4 \end{cases}$

Risposte:

1. $\left\{\left(2, \dfrac{3}{4}, \dfrac{1}{4}\right)\right\}$ **2.** $\left\{\left(x, \dfrac{3}{2} - 5x, \dfrac{1}{2}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{3}{10} - \dfrac{y}{5}, y, \dfrac{1}{2}\right) : y \in \mathbf{R}\right\}$ **3.** $\emptyset$

4. $\left\{\left(x, -3x, -\dfrac{1}{2} + \dfrac{x}{2}\right) : x \in \mathbf{R}\right\} = \left\{\left(-\dfrac{y}{3}, y, -\dfrac{1}{2} - \dfrac{y}{6}\right) : y \in \mathbf{R}\right\} = \{(1 + 2z, -3 - 6z, z) : z \in \mathbf{R}\}$

5. $\left\{\left(\dfrac{11}{9}, -\dfrac{11}{9}, -\dfrac{5}{9}\right)\right\}$

6. $\left\{\left(x, 1 - \dfrac{20x}{7}, -\dfrac{5x}{7}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{7}{20} - \dfrac{7y}{20}, y, -\dfrac{1}{4} + \dfrac{y}{4}\right) : y \in \mathbf{R}\right\} = \left\{\left(-\dfrac{7z}{5}, 1 + 4z, z\right) : z \in \mathbf{R}\right\}$

7. $\left\{\left(\dfrac{5}{3}, \dfrac{1}{3}, -\dfrac{1}{3}\right)\right\}$ **8.** $\left\{\left(x, -\dfrac{3}{5} - \dfrac{x}{5}, -1\right) : x \in \mathbf{R}\right\} = \{(-3 - 5y, y, -1) : y \in \mathbf{R}\}$

9. $\left\{\left(x, 3x, -\dfrac{3}{2} - 4x\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{y}{3}, y, -\dfrac{3}{2} - \dfrac{4y}{3}\right) : y \in \mathbf{R}\right\} = \left\{\left(-\dfrac{3}{8} - \dfrac{z}{4}, -\dfrac{9}{8} - \dfrac{3z}{4}, z\right) : z \in \mathbf{R}\right\}$

10. $\emptyset$ **11.** $\left\{\left(x, 1 - \dfrac{2x}{3}, 1 - \dfrac{x}{3}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{3}{2} - \dfrac{3y}{2}, y, \dfrac{1}{2} + \dfrac{y}{2}\right) : y \in \mathbf{R}\right\} = \{(3 - 3z, -1 + 2z, z) : z \in \mathbf{R}\}$

12. $\left\{\left(x, -4 + \dfrac{7x}{3}, -1 + \dfrac{2x}{3}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{12}{7} + \dfrac{3y}{7}, y, \dfrac{1}{7} + \dfrac{2y}{7}\right) : y \in \mathbf{R}\right\} = \left\{\left(\dfrac{3}{2} + \dfrac{3z}{2}, -\dfrac{1}{2} + \dfrac{7z}{2}, z\right) : z \in \mathbf{R}\right\}$

13. $\{(x, 3x, 0) : x \in \mathbf{R}\} = \left\{\left(\dfrac{y}{3}, y, 0\right) : y \in \mathbf{R}\right\}$ **14.** $\left\{\left(\dfrac{5}{4}, \dfrac{5}{8}, -\dfrac{7}{8}\right)\right\}$ **15.** $\emptyset$ **16.** $\{(-1, 1, 0)\}$

17. $\{(x, -2 + x, -1) : x \in \mathbf{R}\} = \{2 + y, y, -1) : y \in \mathbf{R}\}$

18. $\left\{\left(x, -\dfrac{1}{14} + \dfrac{x}{2}, \dfrac{4}{7}\right) : x \in \mathbf{R}\right\} = \left\{\dfrac{1}{7} + 2y, y, \dfrac{4}{7}\right) : y \in \mathbf{R}\right\}$

19. $\left\{\left(x, \dfrac{3}{2} - \dfrac{3x}{4}, -\dfrac{3}{2} + \dfrac{x}{4}\right) : x \in \mathbf{R}\right\} = \left\{\left(2 - \dfrac{4y}{3}, y, -1 - \dfrac{y}{3}\right) : y \in \mathbf{R}\right\} = \{(6 + 4z, -3 - 3z, z) : z \in \mathbf{R}\}$

20. $\{(x, 6 + 7x, -3 - 3x) : x \in \mathbf{R}\} = \left\{\left(-\dfrac{6}{7} + \dfrac{y}{7}, y, -\dfrac{3}{7} - \dfrac{3y}{7}\right) : y \in \mathbf{R}\right\} = \left\{\left(-1 - \dfrac{z}{3}, -1 - \dfrac{7z}{3}, z\right) : z \in \mathbf{R}\right\}$

21. $\emptyset$ **22.** $\{(-4, -15, 4)\}$ **23.** $\left\{\left(x, \dfrac{1}{9} + \dfrac{x}{3}, \dfrac{1}{3}\right) : x \in \mathbf{R}\right\} = \left\{\left(-\dfrac{1}{3} + 3y, y, \dfrac{1}{3}\right) : y \in \mathbf{R}\right\}$

24. $\left\{\left(x, \dfrac{1}{2} - \dfrac{5x}{3}, \dfrac{1}{2}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{3}{10} - \dfrac{3y}{5}, y, \dfrac{1}{2}\right) : y \in \mathbf{R}\right\}$ **25.** $\emptyset$ **26.** $\{(0, 0, 1)\}$

27. $\{(x, -x, -2x) : x \in \mathbf{R}\} = \{(-y, y, 2y) : y \in \mathbf{R}\} = \left\{\left(-\dfrac{z}{2}, \dfrac{z}{2}, z\right) : z \in \mathbf{R}\right\}$ **28.** $\left\{\left(-\dfrac{3}{2}, \dfrac{3}{2}, 1\right)\right\}$

29. $\left\{\left(x, -\dfrac{2}{3} + 2x, -\dfrac{1}{6}\right) : x \in \mathbf{R}\right\} = \left\{\left(\dfrac{1}{3} + \dfrac{y}{2}, y, -\dfrac{1}{6}\right) : y \in \mathbf{R}\right\}$ **30.** $\{(6, -1, -1)\}$