

1. Find all solutions of the system of linear equations

$$x + 3y + 5z = 1$$

$$2x + 4y + 6z = 2$$

$$3x + 5y + 7z = 3$$

**Solution.** Eliminating variables, we get

$$\begin{array}{rcl} x + 3y + 5z = 1 & & x + 3y + 5z = 1 \\ 2x + 4y + 6z = 2 & \longrightarrow & -2y - 4z = 0 \\ 3x + 5y + 7z = 3 & & -4y - 8z = 0 \end{array}$$

$$\begin{array}{rcl} & x + 3y + 5z = 1 & x + -z = 1 \\ \longrightarrow & y + 2z = 0 & \longrightarrow y + 2z = 0 \\ & -4y - 8z = 0 & 0 = 0 \end{array}$$

from which  $z = t$ ,  $x = z + 1 = t + 1$ ,  $y = -2z = -2t$ , where  $t$  can be any number.

**Answer.** The solutions are  $x = t + 1$ ,  $y = -2t$ ,  $z = t$ , where  $t$  can be any number.