Exercise 28

Do the lines $(x, y, z) = (t + 4, 4t + 5, t - 2)$ and $(x, y, z) = (2s + 3, s + 1, 2s - 3)$ intersect?

Solution

The lines will intersect if their components are equal for some values of t and s. Setting $t = -1$ and $s = 0$ results in

$$x = 3 \quad \text{and} \quad y = 1 \quad \text{and} \quad z = -3$$

for both lines. Therefore, the point $(3, 1, -3)$ is where the lines intersect.