Exercise 27

Determine whether the lines $x = 3t + 2$, $y = t - 1$, $z = 6t + 1$, and $x = 3s - 1$, $y = s - 2$, $z = s$ intersect.

Solution

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

$$x = 2 \quad \text{and} \quad y = -1 \quad \text{and} \quad z = 1$$

for both lines. Therefore, the point $(2, -1, 1)$ is where the lines intersect.