Exercise 25

Find two nonparallel vectors both orthogonal to $(1, 1, 1)$.

Solution

Two vectors are orthogonal if their dot product is zero.

$$(1, 1, 1) \cdot (x, y, z) = x + y + z = 0$$

Choose any two vectors whose components sum to zero and are linearly independent (that is, one is not a constant multiple of the other).

$$\mathbf{v}_1 = (1, 2, -3)$$
$$\mathbf{v}_2 = (0, -1, 1)$$