Answer on Question #40301, Math, Linear Algebra

Find a basis of the subspace of R3 of the solution of the equation X + Y + Z = 0.

## Solution.

To find basis, we need to convert this equation in to a vector equation.

Solve the equation for *x*.

$$x = -y - z.$$

Now let y and z be parameters.

Letting y = s and z = t, we find that any vector (x, y, z) that lies in the plane can be written as vector equation

$$(x, y, z) = (-s - t, s, t)$$

for all s and t.

Separating the parameters, we find that

$$(x, y, z) = s(-1, 1, 0) + t(-1, 0, 1)$$

for all *s* and *t*.

Therefore, the set  $\{(-1,1,0), (-1,0,1)\}$  is a basis for the plane X + Y + Z = 0.

Answer:  $\{(-1,1,0), (-1,0,1)\}$