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

