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**Exercise 1** Suppose three planes given by the equations below intersect at a single point.

$$a_1x + a_2y + a_3z = 0$$

$$b_1x + b_2y + b_3z = 0$$

$$c_1x + c_2y + c_3z = 0$$

What can be said about the vectors  $\begin{bmatrix} a_1 \\ b_1 \\ c_1 \end{bmatrix}$ ,  $\begin{bmatrix} a_2 \\ b_2 \\ c_2 \end{bmatrix}$  and  $\begin{bmatrix} a_3 \\ b_3 \\ c_3 \end{bmatrix}$ ?

Select all that apply.

**Select All Correct Answers:**

1. Nothing can be deduced from the information given.
2. The three vectors are linearly independent.
3. The three vectors are linearly dependent.
4. The three vectors are pairwise orthogonal.
5. The first vector can be written as a linear combination of the other two.
6. The equation  $\alpha \begin{bmatrix} a_1 \\ b_1 \\ c_1 \end{bmatrix} + \beta \begin{bmatrix} a_2 \\ b_2 \\ c_2 \end{bmatrix} + \omega \begin{bmatrix} a_3 \\ b_3 \\ c_3 \end{bmatrix} = \mathbf{0}$  has only the trivial solution.