

Answer on Question#52769 - Math - Other

For the three vectors $a = (1,1,1)$, $b = (5,2,-6)$ and $c = (3,-7,5)$ show that $a \cdot b = a \cdot c$ and interpret the results.

Solution:

The dot product is given by

$$A \cdot B = A_x B_x + A_y B_y + A_z B_z$$

Therefore,

$$a \cdot b = 1 \cdot 5 + 1 \cdot 2 + 1 \cdot (-6) = 1$$

$$a \cdot c = 1 \cdot 3 + 1 \cdot (-7) + 1 \cdot 5 = 1$$

Also the dot product can be written in the following way

$$A \cdot B = |A| \cdot |B| \cos \varphi$$

$|B| \cos \varphi$ gives the projection of vector B on the vector A (φ – is the angle between vectors A and B). Therefore, vectors b and c have the same projection on the vector a .

Answer: vectors b and c have the same projection on the vector a .