Answer on Question # 52238 – Math – Vector Calculus

Task:

1.What type of vector is w+(-w)=0

a.null vector

b.scalar vector

c.vector

d.magnitude

Answer: a.null vector

2 A scalar quantity has ---- only.

a.direction

b.magnitude

c.force

d.vector

Answer: b.magnitude

3. Find the angle between U =4i - 2j + 4k and V = 3i - 6j - 2k .

a.68^0

b.67^0

c.58^0

d.69^0

Answer: b.67^0

$$\cos\alpha = \frac{U \cdot V}{|U| \cdot |V|} = \frac{4 \cdot 3 + (-2) \cdot (-6) + 4 \cdot (-2)}{\sqrt{4^2 + (-2)^2 + 4^2}\sqrt{3^2 + (-6)^2 + (-2)^2}} = \frac{16}{42} = \frac{8}{21} \Rightarrow \alpha = \arccos\frac{8}{21} \approx 67^0$$

4 A ..... is such that it can slide along its line of action.

a.vector

b.null vector

c.motion

d.line vector

Answer: a.vector

5 If U = I + 3j - 2k and V = 4i - 2j - 4k are vectors, find |3U + V|

a.10

b.14

c.4

d.11

Answer: b.14

<center>**Method 1**</center>

3U+V= 3(i + 3j - 2k)+ 4i - 2j - 4k = 3i + 9j - 6k+ 4i - 2j - 4k=7i+7j-10k

$|3U + V| = \sqrt{7^2 + 7^2 + (-10)^2} = \sqrt{198} \approx 14.07$

<center>**Method 2**</center>

$$(3U + V) \cdot (3U + V) = (3U + V)^2 = 9U^2 + 2 \cdot 3U \cdot V + V^2 =$$
$$= 9\big(1 \cdot 1 + 3 \cdot 3 + (-2) \cdot (-2)\big) + 6\big(1 \cdot 4 + 3 \cdot (-2) + (-2) \cdot (-4)\big) +$$
$$+\big(4 \cdot 4 + (-2) \cdot (-2) + (-4) \cdot (-4)\big) = 9(1 + 9 + 4) + 6(4 - 6 + 8) + (16 + 4 + 16) =$$
$$= 9 \cdot 14 + 6 \cdot 6 + 36 = 198$$

$|3U + V| = \sqrt{(3U + V)^2} = \sqrt{198} \approx 14.07$