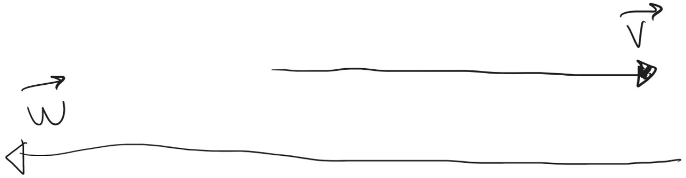
Dado o vetor v = (2,-1,-3), determinar o vetor paralelo a v que tenha sentido contrário ao de v e três vezes o módulo de v. (v é um vetor)



$$|\vec{v}| = \sqrt{2^2 + (-1)^2 + (-3)^2}$$

$$|\vec{v}| = \sqrt{4 + 1 + 9}$$

$$|\vec{v}| = \sqrt{14}$$

$$|\vec{w}| = 3\sqrt{14}$$

$$\vec{w} = (-6, 3, 9)$$

$$\vec{v} = -k \cdot \vec{w}$$

$$(2, -1, -3) = -k \cdot (w_x, w_y, w_z)$$

$$(2, -1, -3) = (-k \cdot w_x, -k \cdot w_y, -k \cdot w_z)$$

$$-k \cdot w_x = 2 \rightarrow k \cdot w_x = -2 \rightarrow w_x = -2/k \rightsquigarrow w_x = -6$$

$$-k \cdot w_y = -1 \rightarrow k \cdot w_y = 1 \rightarrow w_y = 1/k \rightsquigarrow w_y = 3$$

$$-k \cdot w_z = -3 \rightarrow k \cdot w_z = 3 \rightarrow w_z = 3/k \rightsquigarrow w_z = 9$$

$$|\vec{w}| = \sqrt{(w_x)^2 + (w_y)^2 + (w_z)^2}$$

$$(3\sqrt{14})^2 = \left(\sqrt{(-2/k)^2 + (1/k)^2 + (3/k)^2}\right)^2$$

$$9 \cdot 14 = \frac{4}{k^2} + \frac{1}{k^2} + \frac{9}{k^2}$$

$$9 \cdot 14 = \frac{14}{k^2} \rightarrow k^2 = \frac{\cancel{14}}{9 \cdot \cancel{14}}$$

$$\rightarrow k^2 = 1/9 \rightarrow \boxed{k = 1/3}$$