Answer on Question #58828 – Math – Analytic Geometry

Question

4)If two vectors are given as A= -11i+2j (m) and B= 3i+3j (m), determine the resultant vector R=3A-B/2, and also find its magnitude R and direction?

Solution

The resultant vector is

R = 3A − B/2 = $3(-11i + 2j) - 1/2 \cdot (3i + 3j)$ = -33i + 6j – 1.5i – 1.5j = -34.5i + 3.5j

Its magnitude: $|R| = \sqrt{(-34.5)^2 + (3.5)^2} = \sqrt{1202.5} \approx 34.68$

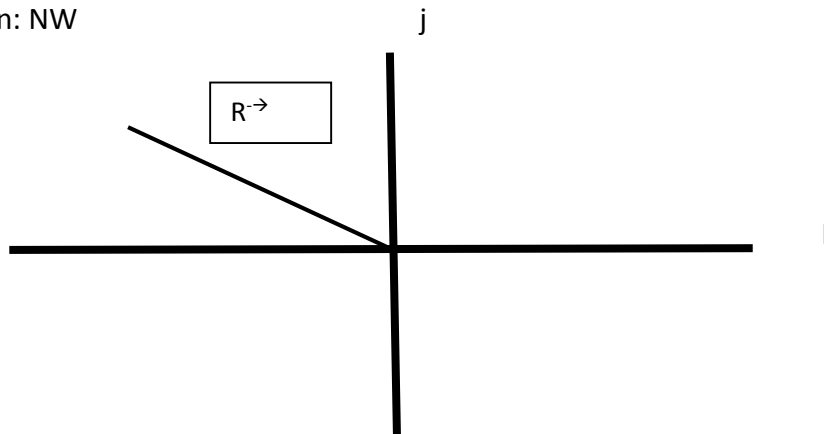Direction cosines of vector R are the cosines of the angles between the vector R and the two coordinate axes:

$$\cos(\alpha) = \frac{-34.5}{\sqrt{(-34.5)^2 + (3.5)^2}} \approx -0.995;$$

$$\alpha \approx 174.2°;$$

$$\cos(\beta) = \frac{3.5}{\sqrt{(-34.5)^2 + (3.5)^2}} \approx 0.101;$$

$$\beta \approx 84.21°.$$

Direction: NW

Answer: -34.5i + 3.5j; 34.68; NW.