Answer on Question #57667, Physics / Mechanics | Relativity

A vector velocity v has components v_x = 20 m/s and v_y = -31 m/s. Find the magnitude and the direction of the vector. Give the angle with respect to the horizontal positive x- axis.

Solution:

The magnitude is

$$|v| = \sqrt{v_x^2 + v_y^2} = \sqrt{20^2 + (-31)^2} = \sqrt{1361} = \mathbf{36.89}$$

To find direction the following formula can be used:

$$\tan\theta = \frac{v_y}{v_x} = \frac{-31}{20} = -1.55$$

$$\theta = \tan^{-1}(-1.55) = \mathbf{-57.17}^\circ = \mathbf{302.83}^\circ$$