

Answer on Question #81101 Physics / Classical Mechanics

Vector **A** with arrow has a negative x component 2.70 units in length and a positive y component 1.82 units in length.

(a) Determine an expression for **A** with arrow in unit-vector notation.

(b) Determine the magnitude and direction of **A** with arrow.

(c) What vector **B** with arrow when added to vector **A** with arrow, gives a resultant vector with no x component and a negative y component 3.88 units in length?

Solution:

$$(a) \mathbf{A} = (-2.70, 1.82) = -2.70\hat{i} + 1.82\hat{j}$$

$$(b) |\mathbf{A}| = \sqrt{A_x^2 + A_y^2} = \sqrt{(-2.70)^2 + 1.82^2} = 3.26, \tan \theta = \frac{A_y}{A_x} = \frac{1.82}{-2.70} = -0.674, \theta = 146^\circ$$

$$(c) \mathbf{A} + \mathbf{B} = (0, -3.88) = -3.88\hat{j}, \mathbf{B} = -3.88\hat{j} - (-2.70\hat{i} + 1.82\hat{j}) = 2.70\hat{i} - 5.70\hat{j}$$

Answer:

$$(a) -2.70\hat{i} + 1.82\hat{j}$$

$$(b) 3.26, 146^\circ$$

$$(c) 2.70\hat{i} - 5.70\hat{j}$$

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