## Answer on Question #44472 - Physics - Other

The resultant of two vectors at an angle 150 degree is 10 units and is perpendicular to one vector. The magnitude of smaller vector is

- (1) 10 units
- (2) 10 under root 3 unit
- (3) 10 under root 2 unit
- (4) 5 under root 3 unit

## Solution:

We can draw the resultant vector from the origin along the +x - axis.

One of the vector is perpendicular to the resultant, so mark vector  $\vec{a}$  from the origin along the +y axis.

From the diagram, we can tell the other vector  $\vec{b}$  at 150° clockwise from  $\vec{a}$  (ie. 60° clockwise from the +x axis.).

You can draw a vector addition triangle for  $\vec{a} + \vec{b} = \vec{r}$ , but it is easier to explain using components.

In the x direction:

$$b \cdot \cos 60^{\circ} = 10$$
  
Since  $\cos 60^{\circ} = \frac{1}{2}$ 
$$b = \frac{10}{\frac{1}{2}} = 20$$

In the y direction:

$$a = b \cdot \sin 60^{\circ}$$
  
Since  $\sin 60^{\circ} = \frac{\sqrt{3}}{2}$ 
$$a = \frac{20\sqrt{3}}{2} = 10\sqrt{3}$$

 $10\sqrt{3}$  is smaller than 20. So the answer is therefore  $10\sqrt{3}$  unit. Answer: (2) 10 under root 3 unit

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