## 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 $\overrightarrow{\mathrm{b}}$ at $150^{\circ}$ clockwise from $\overrightarrow{\mathrm{a}}$ (ie. $60^{\circ}$ 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:

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

In the $y$ direction:

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

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

