Answer on Question#55608 - Physics / Mechanics | Relativity

The resultant of vectors A and B and is perpendicular to A and has the magnitude 24 units. If the sum of magnitudes of A and B is 32 units, then their individual values may be

Solution

$\vec{A} + \vec{B}$ is perpendicular to $\vec{A}$ so we have right-angled triangle. Now use Pythagoras' theorem:

$(\vec{B})^2 = (\vec{A})^2 + (\vec{A} + \vec{B})^2$, and consider $(\vec{A})^2 = |A|^2$, $|\vec{A} + \vec{B}| = 24$, $|A| + |B| = 32$:

$|B|^2 = (32 - |B|)^2 + 24^2 \rightarrow |B| = 25, |A| = 32 - 25 = 7$.

Answer: $|B| = 25, |A| = 7$