Answer on Question #68525Physics / Other

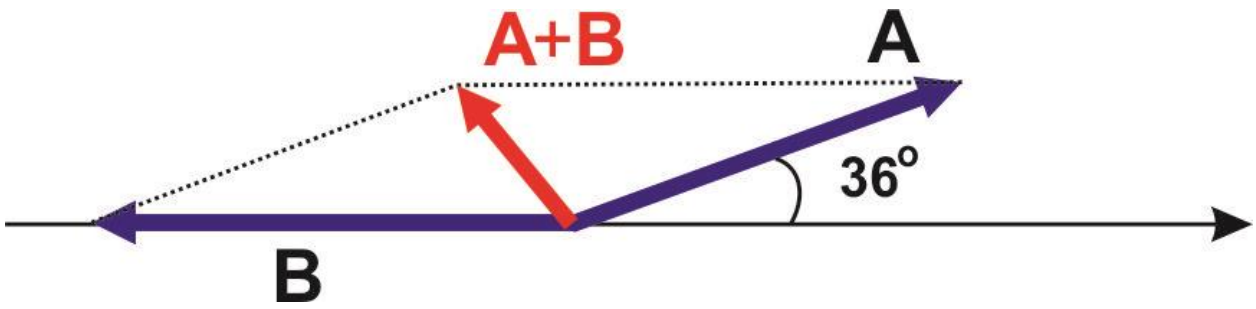
Two forces **A** and **B** are 6N at 36° to the positive x-axis and 7N along the negative x-axis respectively. Calculate:

1) magnitude of $\mathbf{A}+\mathbf{B}$ is?

2) the direction of $\mathbf{A}+\mathbf{B}$.

3) the magnitude of $\mathbf{A}-\mathbf{B}$.

Solution:



1) The magnitude of **A**+**B** is

$$|\mathbf{A}+\mathbf{B}| = \sqrt{(6\cos 36° - 7)^2 + (6\sin 36°)^2} = 4.1\text{N}$$

2) The direction of **A**+**B** is

$$(\mathbf{A}+\mathbf{B})_x = 6\cos 36° - 7$$

$$(\mathbf{A}+\mathbf{B})_y = 6\sin 36°$$

$$\tan\varphi = \frac{(\mathbf{A}+\mathbf{B})_y}{(\mathbf{A}+\mathbf{B})_x} = \frac{6\sin 36°}{6\cos 36° - 7} = -1.64, \qquad \varphi = \arctan(-1.64) = -58.6°$$

Vector **A**+**B** is directed at angle $\varphi = 58.6°$ to the negative x-axis.

3) The magnitude of **A**-**B** is

$$|\mathbf{A}-\mathbf{B}| = \sqrt{(6\cos 36° + 7)^2 + (6\sin 36°)^2} = 12.4\text{ N}$$

Answers:

1) $|\mathbf{A}+\mathbf{B}| = 4.1\text{N}$
2) $58.6°$ to the negative x-axis
3) $|\mathbf{A}-\mathbf{B}| = 12.4\text{ N}$

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