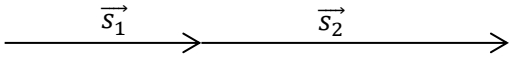
Answer on Question#79053 - Physics - Other

Hearing rattles from a snake; you make two rapid displacements of magnitude 1.8 meters and 2.4 meters. In sketches (roughly to scale) show how two displacements might add up to give a resultant of magnitude (a) 4.2m (b) 0.6m; (c) 3.0m

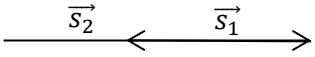
Solution:

Lets denote displacement vector of 1.8 m by $\overrightarrow{s_1}$ and displacement vector of 2.4 m as $\overrightarrow{s_2}$.

(a) Since $|\overrightarrow{s_1}| + |\overrightarrow{s_2}| = 1.8\ \text{m} + 2.4\ \text{m} = 4.2\ \text{m}$, vector $\overrightarrow{s_1}$ and $\overrightarrow{s_2}$ must be aligned as showed in the picture below



(b) Since $|\overrightarrow{s_2}| - |\overrightarrow{s_1}| = 2.4\ \text{m} - 1.8\ \text{m} = 0.6\ \text{m}$, vector $\overrightarrow{s_1}$ and $\overrightarrow{s_2}$ must be aligned as showed in the picture below



(c) Since $\sqrt{|\overrightarrow{s_2}|^2 + |\overrightarrow{s_1}|^2} = \sqrt{(1.8\ \text{m})^2 + (2.4\ \text{m})^2} = 3.0\ \text{m}$, vector $\overrightarrow{s_1}$ and $\overrightarrow{s_2}$ must be aligned as showed in the picture below