Answer on Question #47017, Physics, Mechanics | Kinematics | Dynamics

Question:

Dear expert, please provide an answer to the question below within 12 hours.

Two forces are of magnitude 450N and 240N respectively . Determine

{a} the maximum magnitude of the resultant force

{b} the minimum magnitude of the resultant

{c}the resultant force when the forces act at right angles to each other.

{d} Use scaled vector diagram to determine the resultant of [c] above and compare your results

Answer:

We have 2 vectors $\overrightarrow{F_1}$ and $\overrightarrow{F_2}$ and their resultant force $\vec{F}$. Magnitude of $\vec{F}$ equals:

$$c = \sqrt{a^2 + b^2 + 2ab\cos\alpha}$$

where α – angle between $\overrightarrow{F_1}$ and $\overrightarrow{F_2}$.

a) F is maximum if $\cos\alpha = 1$:

$$F = F_1 + F_2 = 450 + 240 = 690\ N$$

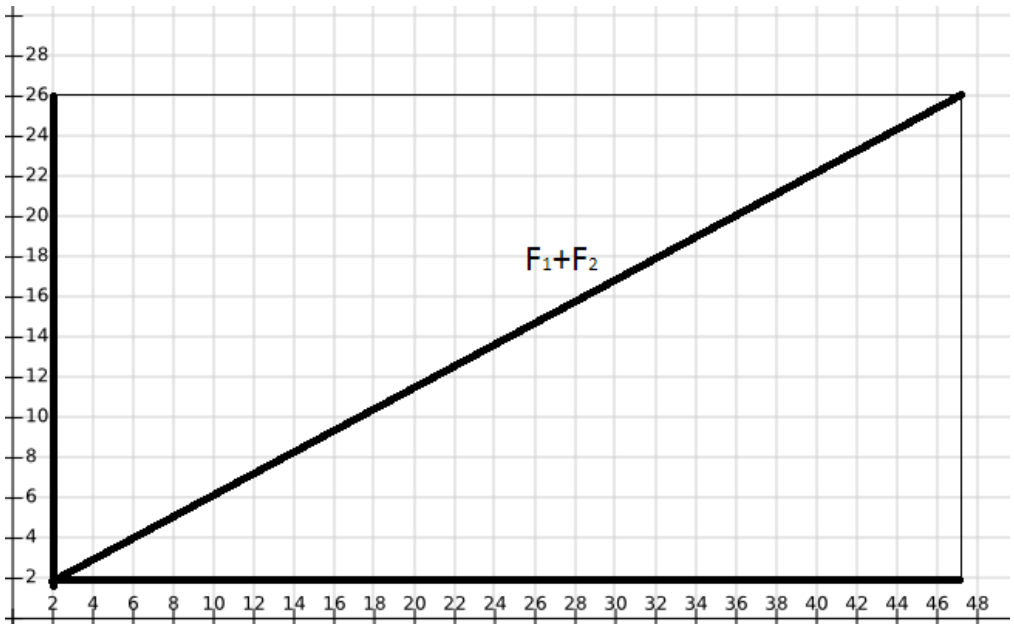
b) F is maximum if $\cos\alpha = -1$:

$$F = F_1 - F_2 = 450 - 240 = 210\ N$$

c) when the forces act at right angles to each other $\cos\alpha = 0$:

$$F = \sqrt{F_1^2 + F_2^2} = \sqrt{450^2 + 240^2} = 510\ N$$

d)



Length of $F_1 + F_2$ around 51 units, therefore:

$$F_1 + F_2 \cong 510\ N$$