Answer on Question #63910 – Physics – Mechanics | Relativity

Question:

Given the following concurrent forces; 150 lbs at 30o above the OX axis, 100 lbs at 315o from OX, and 50 lbs at -45o from OX. Find the magnitude and direction of the resultant.

Answer:

$\overrightarrow{F_1} = 150\cos(30^0)\,\vec{\imath} + 150\sin(30^0)\,\vec{\jmath} = \left(75\sqrt{3}; 75\right);$

$\overrightarrow{F_2} = 100\cos(315^0)\,\vec{\imath} + 100\sin(315^0)\,\vec{\jmath} = \left(50\sqrt{2}; -50\sqrt{2}\right);$

$\overrightarrow{F_3} = 50\cos(-45^0)\,\vec{\imath} + 50\sin(-45^0)\,\vec{\jmath} = \left(25\sqrt{2}; -25\sqrt{2}\right);$

$\overrightarrow{F_{res}} = \overrightarrow{F_1} + \overrightarrow{F_2} + \overrightarrow{F_3} = 75(\sqrt{3} + \sqrt{2})\vec{\imath} + 75(1 - \sqrt{2})\vec{\jmath} = \left(50\sqrt{2}; -50\sqrt{2}\right);$

$\left|\overrightarrow{F_{res}}\right| \approx 238\ lbs.$