21-S-2-3-AG-050

The human body is a complex web of muscle and bone connections that work in tandem to make you move. The knee is one such connection that is very prone to breaking. Given $F_Q = F\ Newtons$, $\theta_1 = X\ degrees$, and $\theta_2 = Y\ degrees$, what is the magnitude of the resultant force?

ANSWER:

First, we find the x and y components of the resultant force.

$$\sum F_x = F_Q(\cos(\theta_1) + \cos(\theta_2))$$

$$\sum F_y = F_Q(\sin(\theta_1) - \sin(\theta_2))$$

Then use the Pythagorean theorem.

$$F_r = \sqrt{{F_x}^2 + {F_y}^2}$$