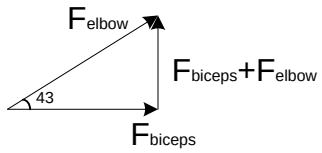
Answer on question #83014, Physics Mechanics

A patient in therapy has a forearm that weighs 20.5 N and that lifts a 112.0-N weight. These two forces have direction vertically downward. The only other significant forces in his forearm come from the biceps muscle (which acts perpendicularly to the forearm) and the force at the elbow. if the biceps produces a pull of 232 N when the forearm is raised 43 degree above the horizontal, find the magnitude and direction of the force that the elbow exerts on the forearm. (The sum of the elbow force and the biceps force must balance the weight of the arm and the weight it is carrying, so their vector sum must be 132.5 N, upward.)

Solution



If $F_{biceps} = 232\ N$ and $F_{biceps} + F_{elbow} = 132.5\ N$

$F_{elbow} = 267.17\ N$

The magnitude and direction of the force is $267.17\ N\ and\ \Theta = 43^{\circ}$