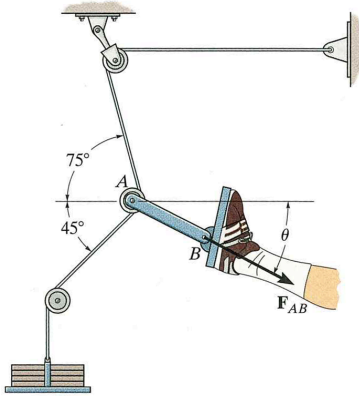


5. Determine the magnitude and direction of equilibrium force  $F_{AB}$  exerted along link  $AB$  by the patient using the tractive apparatus shown. The suspended mass is 10 kg. Neglect the size of the pulleys.

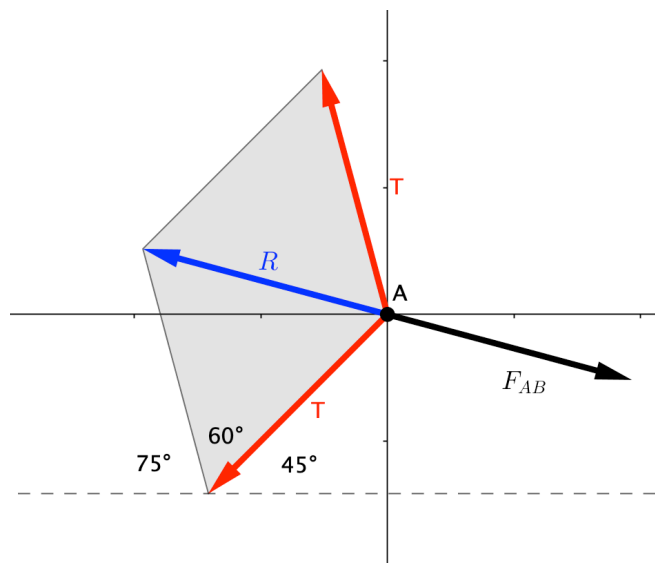


$$T = m g = 10 \text{ kg} (9.81 \text{ m/s}^2) = 98.1 \text{ N}$$

### SOLUTION

Analysis of the free body diagram of point  $A$  and the geometry of the problem will give a solution without a calculator.

$F_{AB}$  is equal and opposite to  $R$ , the sum of the two tensions acting on point  $A$ . The parallelogram



is made up of two equilateral triangles, so  $R = T$  and  $T$  acts  $15^\circ$  CW from the positive  $x$  axis.

$F_{AB} = 98.1 \text{ N @ } -15^\circ$