

6.4 (cont'd)

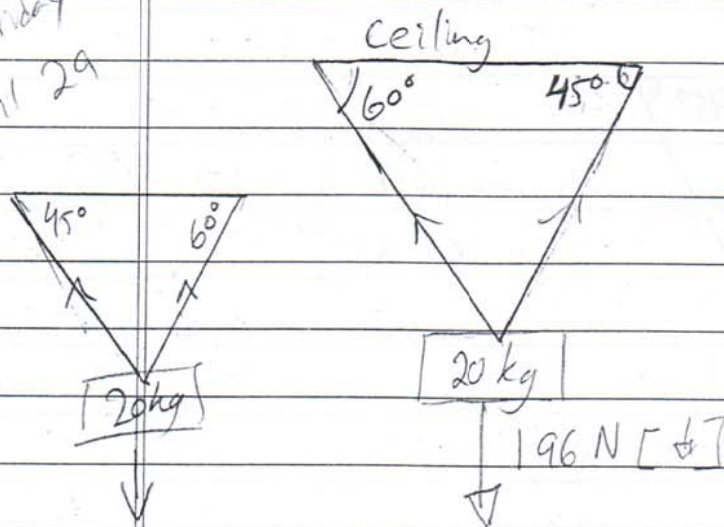
ΩW p. 343 #4

Date WA20(2011)

Example A mass of 20 kg is suspended from a ceiling by two lengths of rope that make angles of 60° and 45° with the ceiling.

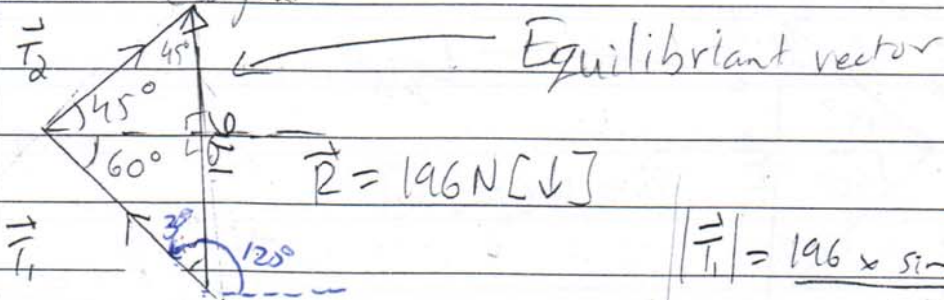
Determine the tension of each rope.

Calculus test
Friday
April 29



$$\begin{aligned} F &= mg \\ &= 20 \text{ kg} \times 9.8 \text{ m/s}^2 \\ &= 196 \text{ kgm/s}^2 \\ &= 196 \text{ N} \end{aligned}$$

Vector diagram



$$\frac{196}{\sin 105^\circ} = \frac{|\vec{T}_2|}{\sin 30^\circ} = \frac{|\vec{T}_1|}{\sin 45^\circ}$$

$$\begin{aligned} |\vec{T}_1| &= \frac{196 \times \sin 45^\circ}{\sin 105^\circ} \\ &= 143.5 \text{ N} \end{aligned}$$

$$|\vec{T}_2| = \frac{196 \times \sin 30^\circ}{\sin 105^\circ}$$

$$\vec{T}_1 = 14.5 \text{ N } 120^\circ \text{ to the horizontal} = 101.5 \text{ N}$$

$$\vec{T}_2 = 101.5 \text{ N } 45^\circ \text{ to the horizontal}$$