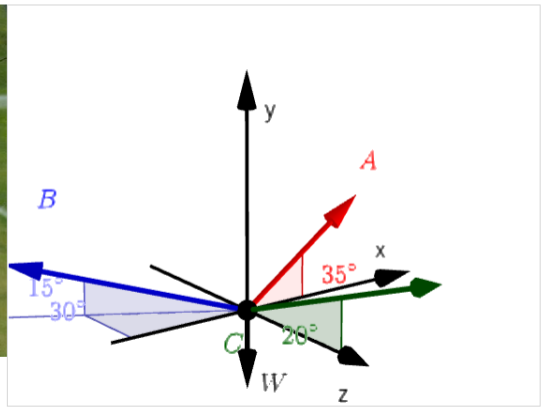
Name: _____ **Section:** _____

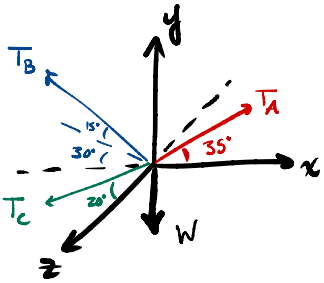
AEM 2011 Quiz #2
Tuesday, January 31, 2023

A non-communicating calculator is allowed. Full credit will only be given if all steps used are clearly communicated (free body diagrams, algebra, etc).

The skycam at Stanford University Stadium has a mass of $10kg$ and is supported by three cables as shown. Assuming that it is currently in equilibrium, find the tension in each of the three supporting cables.



FBD



$W = 10(9.81)$
$= 98.1N$

Force Sum

$\Sigma F_x = T_A \cos 35° - T_B \cos 15° \cos 30°$

$\Rightarrow T_A = 1.0212 T_B \quad (1)$

$\Sigma F_z = T_C \cos 20° - T_B \cos 15° \sin 30°$

$\Rightarrow T_B = 1.9457 T_C \quad (2)$

from (1) + (2)

$T_A = 1.9869 T_C \quad (3)$

$\Sigma F_y = T_A \sin 35° + T_B \sin 15° + T_C \sin 20° - W$

plug in (2) → (3)

$1.9853 T_C = W$

$\Rightarrow$

$T_C = 49.41N$
$T_B = 96.14N$
$T_A = 98.18N$