

75. (a) The axis of rotation is at the bottom right edge of the rod along the ground, a horizontal distance of $d_3 + d_2 + d_1/2$ from the middle of the table assembly (mass $m = 90$ kg). The linebacker's center of mass at that critical moment was a horizontal distance of $d_4 + d_5$ from the axis of rotation. For the clockwise torque caused by the linebacker (mass M) to overcome the counterclockwise torque of the table assembly, we require (using Eq. 11-33)

$$Mg(d_4 + d_5) > mg\left(d_3 + d_2 + \frac{d_1}{2}\right) .$$

With the values given in the problem, we do indeed find the inequality is satisfied.

- (b) Replacing our inequality with an equality and solving for M , we obtain

$$M = m \frac{d_3 + d_2 + \frac{1}{2}d_1}{d_4 + d_5} = 114 \text{ kg} .$$