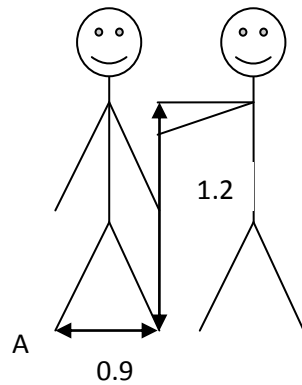


assuming no sliding and that the shoulder is 1.2m from the feet, what force is required to topple a 70 kg person standing with his feet spread 0.9 m? and can i have an explanation for the answer?

Solution

Make sketch:



Assuming that the toppling force is horizontal and applied from the side.

Weight of the person is:

$$W = m * g = 70 \text{ kg} * 9.81 \text{ N/kg} = 686.7 \text{ N}$$

For point A: The torque caused by weight is:

$$\tau_W = W * l_W$$

Where l_W is :

$$l_W = 0.9/2 = 0.45 \text{ m}$$

The torque caused by your force is:

$$\tau_F = F * l_F$$

Where

$$l_F = 1.2 \text{ m}$$

So force required to topple person is:

$$\tau_F = \tau_W$$

$$F * l_F = W * l_W$$

$$F = W * l_W / l_F$$

Calculating:

$$F = 686.7 * 0.45 / 1.2 = \mathbf{257.5 \text{ N}}$$

Answer: **257.5 N**