2. (a) If it were not leaning (the ideal case), its center of mass would be directly above the center of its base – that is, 3.5 m from the edge. Thus, to move the center of mass from that ideal location to a point directly over the bottom edge requires moving the center of the tower 3.5 m horizontally. Measured at the top, this would correspond to a displacement of twice as much: 7.0 m. Now, the top of the tower is already displaced (according to the problem) by 4.5 m, so what is needed to put it on the verge of toppling is an additional shift of $7.0 - 4.5 = 2.5$ m.

   (b) The angle measured from vertical is $\tan^{-1}(7.0/55) = 7.3^\circ$.