

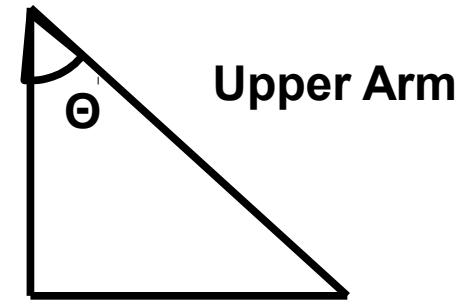
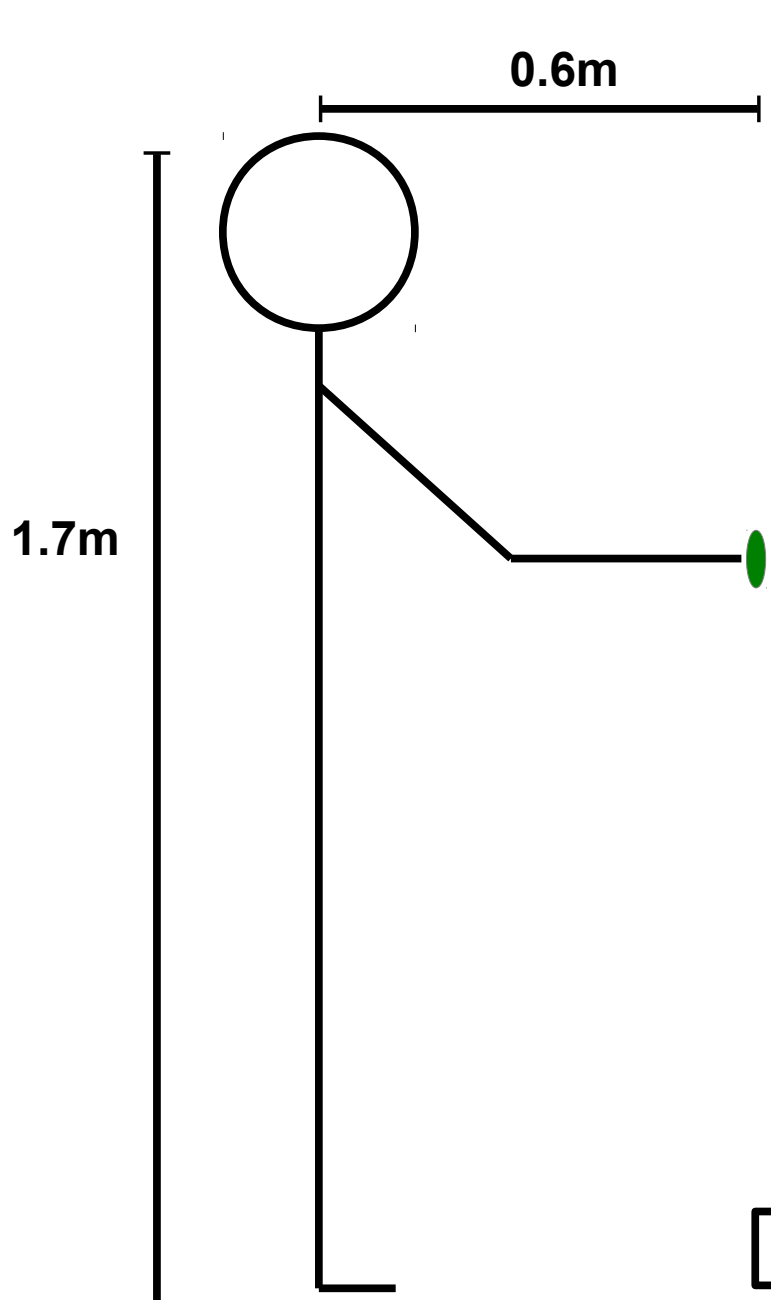
Example of angle calculation:

A person, 1.7m tall, is standing 0.6m from a door bell, When they reach out to ring the door bell, their hand and fore arm are parallel to the ground (and perpendicular to their torso). Knowing that the upper arm is $(0.186 \cdot \text{height})$ long and the fore arm (including the hand) is $(0.254 \cdot \text{height})$ long, calculate the angle between their upper arm and their torso when they ring the door bell.

see next slide for answer

Fore Arm (including hand) = $0.254 \cdot \text{height}$

Upper Arm = $0.186 \cdot \text{height}$



(Distance to button - Fore Arm)

Fore Arm = $0.254 \cdot 1.7\text{m} = 0.432\text{m}$

Upper Arm = $0.186 \cdot 1.7\text{m} = 0.316\text{m}$

$$\sin(\Theta) = (\text{Opposite}) / (\text{Hypotenuse})$$

$$\sin(\Theta) = (\text{Distance to button} - \text{Fore Arm}) / (\text{Upper Arm})$$

$$\Theta = \sin^{-1}((0.6\text{m} - 0.432\text{m}) / (0.316\text{m}))$$

$$\Theta = \sin^{-1}(0.168\text{m} / (0.316\text{m}))$$

$$\Theta = \sin^{-1}(0.532)$$

$$\Theta = 32.1^\circ$$