

- (a) Let W be the weight of an individual person. We are told that $W \sim N(180, 30^2)$, and we wish to know $P(W > 250)$. This is just a standard normal probability calculation problem (note that since we are told that weights are normally distributed, there is no use of a continuity correction here):

$$\begin{aligned} P(W > 250) &= P\left(Z > \frac{250 - 180}{30}\right) \\ &= P(Z > 2.33) \\ &= 1 - .992 \\ &= .0098. \end{aligned}$$

- (b) The first thing we need to realize is that a statement about the total weight is equivalent to a statement about the sample mean; specifically, the total weight of 10 people being greater than 2500 pounds is equivalent to the sample mean of the weights \bar{W} being greater than 250 pounds. Now we have a probability statement about the sample mean, and the Central Limit Theorem is appropriate. Since the weights themselves are normally distributed the Central Limit Theorem holds exactly in this case, but more generally this would be an approximate calculation:

$$\begin{aligned} P(\bar{W} > 250) &= P\left(Z > \frac{250 - 180}{30/\sqrt{10}}\right) \\ &= P(Z > 7.37) \\ &\approx 0. \end{aligned}$$