

Show all work. Your answers must be fully justified.

Suppose that a manager of a customer service call center determines that the average length of a call is 6 minutes with a standard deviation of 3 minutes. The manager further determines that 25% of the calls are less than 2 minutes long.

1. If 100 calls are taken in one day, what is the probability that the average call length for that day was more than 6.5 minutes?

$$\begin{aligned}P(\bar{x} > 6.5) &= P\left(z > \frac{6.5 - 6}{\left(\frac{3}{\sqrt{100}}\right)}\right) \\&= P(z > 1.67) \\&= 0.0475 \\&= 4.75\%\end{aligned}$$

2. If 100 calls are taken in one day, what is the probability that fewer than 20 of them are less than 2 minutes long?

$$\begin{aligned}P\left(p < \frac{20}{100}\right) &= P\left(z < \frac{0.2 - 0.25}{\sqrt{\frac{(0.25)(0.75)}{100}}}\right) \\&= P(z < -1.15) \\&= 0.1251 \\&= 12.51\%\end{aligned}$$