

Note: You must show the details of the work to receive credit. Simply providing the final answer [from a calculator] will get **ZERO** points.

Formulae:

- (i) If the sample is from a normal distribution, then the sampling distribution of \bar{X}_n is normal $N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$ regardless of the sample size.
- (ii) If n is large ($n \geq 30$), according to the Central Limit Theorem (CLT), the sampling distribution of \bar{X}_n is *approximately* normal $N\left(\mu, \frac{\sigma}{\sqrt{n}}\right)$ regardless of the population distribution.

1. The measured glucose level, in mg/dl, one hour after having a sugary drink has a normal distribution with mean 125 and standard deviation 14.

(a) (3 points) If a single glucose measurement is made, what is the probability that the glucose level in that measurement is above 132?

(b) (3 points) If a random sample of 16 glucose measurements is taken, what is the probability that the average of those 16 measurements is above 132?

2. The length of time a particular brand of battery lasts (called the lifetime of the battery) has population mean $\mu = 65$ days and population standard deviation $\sigma = 20$ days.

(a) (3 points) If a random sample of 60 batteries of that brand is taken, what the probability that the sample average lifetime is at most 72 days.

(b) (1 point) If the sample size was 15 (instead of 60), could we have done the computation in part a? Explain.