Question One (5-Points)
Write **True** if the statement is true or **False** if not:

1. A 95 percent confidence interval estimate will have a margin of error that is approximately \( \pm 95 \) percent of the size of the population mean. **False**
2. Increasing the sample size will result in a point estimate that is closer to the true population value. **False**
3. In estimating a population proportion, the factors that are needed to determine the required sample size are the confidence level, the margin of error and some idea of what the population proportion is. **True**
4. The margin of error is the critical value times the standard error of the sampling distribution. **True**
5. In estimating a population mean, increasing the confidence level will result in a higher margin of error for a given sample size. **True**

Question Two (5-Points)
The proportion of parts in an inventory that are outdated and no longer useful is thought to be 0.22. To check this, a random sample of \( n = 150 \) parts is selected and 30 are found to be outdated. Based upon this information,

1. Find 98% confidence interval for the true proportion.

2. A pilot sample of size 150 parts reveals that 30 are found to be outdated. Using the information, determine how many **more** items must be sampled to obtain a confidence interval estimate for the population proportion if the confidence level is 90% and margin of error \( \pm 0.03 \).

1. \[ 1 - \alpha = 0.98 \Rightarrow Z_{\frac{\alpha}{2}} = Z_{0.01} = 2.33, \frac{p}{n} = \frac{30}{150} = 0.20 \]

2. A 98% C.I. for \( P \) is: \[ \bar{p} \pm Z_{\frac{\alpha}{2}} \sqrt{\frac{p(1-p)}{n}} \]

\[ \Rightarrow 0.20 \pm (2.33) \sqrt{\frac{(0.22)(1-0.22)}{150}} \Rightarrow 0.20 \pm 0.0788 \Rightarrow 0.1212 \ldots \ldots \ldots 0.2788 \]

2. \[ 1 - \alpha = 0.90 \Rightarrow Z_{\frac{\alpha}{2}} = Z_{0.05} = 1.645 \]

\[ Z_{\frac{\alpha}{2}} \frac{p(1-p)}{n} = \frac{(1.645)^2 (0.2)(0.8)}{(0.03)^2} = 481.07 \approx 482 \]

The number of additional items = 482 - 150 = 332