I. A sample of 36 out of 25,000 baseball fans attending a game revealed average refreshment spending of $7.60. The population standard deviation was $2.10. The makers of Dud beer will not distribute their product to a ballpark unless it is possible that the average fan spends at least $8.00 on refreshments. Use the 5-step approach to hypothesis testing and a .01 level of significance to test whether this ballpark qualifies to receive Dud beer.

1. \( H_0 : \mu \geq 8.00 \) and \( H_1 : \mu < 8.00 \)
2. Type I error of .01 \( \rightarrow Z = \pm 2.33 \)
3. \( \bar{x} \) is the test statistic.
4. If \( z \) from the test statistic is beyond the critical value of \( z \), reject \( H_0 \).
5. Apply the decision rule.

\[
Z = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} = \frac{7.60 - 8.00}{\frac{2.10}{\sqrt{36}}} = \frac{-0.40}{0.35} = -1.14
\]

\( H_0 \) is accepted because -1.14 is not beyond -2.33. The mean could be \( \geq 8.00 \). Have a Dud beer.

II. A marketing test of chocolate flavored shaving cream revealed a favorable response from 35 of 50 test subjects. Test subjects were chosen at random from the company’s 1,200 employees. This product will be manufactured if at least 80% of the potential market like the product.

A. Using the 5-step approach to hypothesis testing and a .05 level of significance, determine whether the product will be manufactured.

1. \( H_0 : p \geq 80\% \) and \( H_1 : p < 80\% \)
2. Type I error is .05.
3. \( \bar{p} \) is the test statistic.
4. If \( z \) from the test statistic is beyond the critical value of \( z \), reject \( H_0 \).
5. Apply the decision rule.

\[
Z = \frac{\bar{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{0.7 - 0.8}{\sqrt{\frac{0.8(1-0.8)}{50}}} = -1.77
\]

Reject \( H_0 \) because -1.77 is beyond -1.645. The mean could not be 80% at the .05 level of significance. Too bad, chocolate flavored shaving cream will not be produced.

B. What are the pros and cons of using company employees to test this product?

Using company employees is convenient. Company employees have a vested interest in giving the survey adequate attention. On the other hand, some employees might be prejudice for or against the company.