Chapter 8 FRAPPY!   Sample 1

Directions: Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

Members at a popular fitness club currently pay a $40 per month membership fee. The owner of the club wants to raise the fee to $50 but is concerned that some members will leave the gym if the fee increases. To investigate, the owner plans to survey a random sample of the club members and construct a 95% confidence interval for the proportion of all members who would quit if the fee was raised to $50.

(a) Explain the meaning of "95% confidence" in the context of the study.

If they did many samples with the same method, they would expect 95% of them to be within the interval of proportion who would quit.

(b) After the owner conducted the survey, he calculated the confidence interval to be 0.18 ± 0.075. Interpret this interval in the context of the study.

We are 95% confident that the interval from 0.105 to 0.255 includes the actual proportion of all members who would quit.

(c) According to the club's accountant, the fee increase will be worthwhile if fewer than 20% of the members quit. According to the interval from part (b), can the owner be confident that the fee increase will be worthwhile? Explain.

No, because not all of the interval is below 0.2, so it is possible that more than 20% would quit.

(d) One of the conditions for calculating the confidence interval in part (b) is that $n\hat{p} \geq 10$ and $n(1-\hat{p}) \geq 10$. Explain why it is necessary to check this condition.

This condition tells us that the sample has a distribution that is approximately normal, allowing us to perform calculations. If the distribution isn't approximately normal, we cannot calculate the z critical value.

Chapter 8 FRAPPY!   Sample 2

Directions: Show all your work. Indicate clearly the methods you use, because you will be scored on the correctness of your methods as well as on the accuracy and completeness of your results and explanations.

Members at a popular fitness club currently pay a $40 per month membership fee. The owner of the club wants to raise the fee to $50 but is concerned that some members will leave the gym if the fee increases. To investigate, the owner plans to survey a random sample of the club members and construct a 95% confidence interval for the proportion of all members who would quit if the fee was raised to $50.

(a) Explain the meaning of "95% confidence" in the context of the study.

We want to be 95% confident that the true proportion will be in between the interval we find. 95% of our values should be in our interval.

(b) After the owner conducted the survey, he calculated the confidence interval to be 0.18 ± 0.075. Interpret this interval in the context of the study.

We are 95% confident that the true mean proportion of the people who would quit is between 0.105 and 0.255.

(c) According to the club's accountant, the fee increase will be worthwhile if fewer than 20% of the members quit. According to the interval from part (b), can the owner be confident that the fee increase will be worthwhile? Explain.

Yes, the manager can be confident that the increase will be worthwhile because 0.20 is within the interval.

(d) One of the conditions for calculating the confidence interval in part (b) is that $n\hat{p} \geq 10$ and $n(1-\hat{p}) \geq 10$. Explain why it is necessary to check this condition.

It is necessary to check this condition in order to ensure normality in the distribution so that the calculations for the CI will be correct.