

1. Complete the following

<p>If $E(X)=\mu$, $St Dev(X)=\sigma$, and $X \sim N(\mu, \sigma)$, then</p> <p>$\bar{X} \sim$</p>	<p>If sampling from a population with true proportion p, then</p> <p>$E(\hat{p}) =$ $St Dev(\hat{p}) =$</p>
<p>If $E(X)=\mu$, $St Dev(X)=\sigma$, and the distribution of X is non-normal but $n \geq 30$, then</p> <p>$\bar{X} \sim$</p>	<p>If $np \geq 10$ and $nq \geq 10$, then</p> <p>$\hat{p} \sim$</p>

2. We know that the distribution cholesterol for all adults is normally distributed, with a standard deviation of 9. We are interested in estimating the mean cholesterol level of smokers. We take a random sample of smokers, measure the cholesterol levels, and obtain the following data:

216 238 216 221 223 230

- State the parameter of interest

- Calculate the point estimate of the true parameter

- Calculate a 95% confidence interval for the true mean cholesterol level of smokers

- Interpret your confidence interval

- We are interested in determining whether the mean cholesterol level of smokers is different than that of non-smokers. We know that the mean cholesterol level of non-smokers is 208. Conduct the appropriate hypothesis test using the confidence interval you previously obtained:

I. State the null and alternative hypotheses

II. Make a decision

III. Interpret your decision in the context of the problem

For the following, assume that in reality the true mean cholesterol level of smokers is 220.

- For samples of size 6, describe the probability distribution of the sample mean

- What is the probability of obtaining the sample mean you did obtain, or higher?

- What is the value of the sample mean such that 2.5% of sample means will be above this value?

3. We are interested in determining the proportion of smokers with heart disease. We take a random sample of 180 smokers, and find that 13 of them have heart disease.

- State the parameter of interest

- Calculate the point estimate of the true parameter

- Calculate a 99% confidence interval for the true proportion of smokers with heart disease

- Interpret your confidence interval

- We are interested in determining whether the proportion of smokers with heart disease is different than the proportion of non-smokers with heart disease. We know that 4% of non-smokers have heart disease. Conduct the appropriate hypothesis test using the confidence interval you previously obtained:

I. State the null and alternative hypotheses

- Interpret your confidence interval

- We are interested in determining whether the mean hours worked per week by Canadians is different than that of US residents. We know that the mean hours worked for US residents is 35.8 hours. Conduct the appropriate hypothesis test using the confidence interval you previously obtained:

I. State the null and alternative hypotheses

II. Make a decision

III. Interpret your decision in the context of the problem

For the following, assume that in reality the true mean hours worked per week by Canadians is 36.0 hours.

- For samples of size 32, describe the probability distribution of the sample mean

- What is the probability of obtaining the sample mean you did obtain, or higher?

- What is the value of the sample mean such that 1% of sample means will be above this value?

5. We would like to know the true proportion of voters who currently support proposition B. We take a sample of 79 voters, and find that 31.6% of them support proposition B.

- State the parameter of interest

- Identify the point estimate of the true parameter

- Calculate a 90% confidence interval for the true proportion of voters who currently support proposition B.

- Interpret your confidence interval

- We are interested in determining whether the proportion of voters who support proposition B has changed since 2008, when 44% of voters supported proposition B. Conduct the appropriate hypothesis test using the confidence interval you previously obtained:

I. State the null and alternative hypotheses

II. Make a decision

III. Interpret your decision in the context of the problem

For the following, assume that in reality the 34% of voters currently support proposition B.

- Verify that the distribution of the sample proportion is approximately normal

- Describe the probability distribution of the sample proportion

- What is the probability of obtaining the sample proportion you did obtain, or lower?

- What is the value of the sample proportion such that 10% of sample proportions will be below this value?