

1. Z is a standard normal random variable.

a. Sketch the distribution of Z. Indicate the mean and the values corresponding to one, two, and three standard deviations above and below the mean on the axis below your sketch.

b. Find the following probabilities. For full credit, draw a normal curve with the area corresponding to the probability shaded.

$$P(Z < -1.44)$$

$$P(Z > -0.67)$$

$$P(-1.67 < Z < 2.44)$$

c. Find the Z-score such that the area under the standard normal curve to the right is 0.25. For full credit, draw a normal curve and shade the area given.

d. Find the Z-scores that separate the middle 94% of the distribution from the area in the tails of the standard normal distribution. For full credit, draw a normal curve and shade the area given.

2. Suppose a random variable X is normally distributed with a mean of 20 and a standard deviation of 4.

a. Sketch the distribution of X . Indicate the mean and the values corresponding to one, two, and three standard deviations above and below the mean on the axis below your sketch.

b. Find the probability that X is greater than 25. For full credit, draw a normal curve with the area corresponding to the probability shaded. Also, you should show your z-score computations.

c. Find the 90th percentile for X . For full credit, draw a normal curve and shade the area corresponding to the percentile.

d. Suppose that simple random samples of size 16 are taken from this population. What is the sampling distribution of \bar{X} ?

e. Suppose that the original distribution is right-skewed instead of normal. Suppose that simple random samples of size 16 are taken from this population. What is the sampling distribution of \bar{X} ?

3. Weights of white-tailed deer are normally distributed with a mean of 205 pounds and a standard deviation of 35 pounds.

a. If one white-tailed deer is selected, find the probability that its weight is between 180 and 230 pounds. Include a sketch of the graph and z-score calculations.

b. If nine white-tailed deer are selected, find the probability that the mean weight for the sample is between 180 and 230 pounds. Include a sketch of the graph and z-score calculations.

c. Find the weight that is at the 10th percentile.

4. Suppose a simple random sample of size 80 is chosen from a population whose size is 10,000 and whose population proportion with a specified characteristic is $p = 0.3$.

Sketch and describe the sampling distribution of the sample proportion \hat{p} . Assume that the sample size is less than 5% of the population size.

5. A July, 2011 poll found that 22% of U.S. adults smoke. Suppose that a sample of 400 U.S. adults is selected.

a. Sketch and describe the sampling distribution of the sample proportion \hat{p} . Assume that the sample size is less than 5% of the population size.

b. What is the probability that more than 28% of the people in the sample smoke? Include a sketch of the graph and z-score calculations.