

Assignment 3

The Precision Scientific Instrument Company manufactures thermometers that are supposed to give readings of 0°C at the freezing point of water. Tests on a large sample of these thermometers reveal that at the freezing point of water, some give readings below 0°C (denoted by negative numbers) and some give readings above 0°C (denoted by positive numbers). Assume that the mean reading is 0°C and the standard deviation of the readings is 1.00°C . Also assume that the frequency distribution of errors closely resembles the normal distribution. A thermometer is randomly selected and tested. Find the temperature reading corresponding to the given information.

- 1) If 9% of the thermometers are rejected because they have readings that are too low, but all other thermometers are acceptable, find the temperature that separates the rejected thermometers from the others. 1) _____

Assume that X has a normal distribution, and find the indicated probability.

- 2) The mean is $\mu = 60.0$ and the standard deviation is $\sigma = 4.0$. Find the probability that X is less than 53.0. 2) _____

Find the indicated probability.

- 3) The volumes of soda in quart soda bottles are normally distributed with a mean of 32.3 oz and a standard deviation of 1.2 oz. What is the probability that the volume of soda in a randomly selected bottle will be less than 32 oz? 3) _____

Solve the problem.

4) A history teacher assigns letter grades on a test according to the following scheme:

4) _____

A: Top 10%

B: Scores below the top 10% and above the bottom 60%

C: Scores below the top 40% and above the bottom 20%

D: Scores below the top 80% and above the bottom 10%

F: Bottom 10%

Scores on the test are normally distributed with a mean of 69 and a standard deviation of 13.4. Find the numerical limits for each letter grade.

5) The weights of the fish in a certain lake are normally distributed with a mean of 12 lb and a standard deviation of 12. If 16 fish are randomly selected, what is the probability that the mean weight will be between 9.6 and 15.6 lb?

5) _____

Estimate the indicated probability by using the normal distribution as an approximation to the binomial distribution

6) Two percent of hair dryers produced in a certain plant are defective. Estimate the probability that of 10,000 randomly selected hair dryers, exactly 225 are defective.

6) _____

Use the given degree of confidence and sample data to construct a confidence interval for the population proportion p .

7) Of 132 adults selected randomly from one town, 33 of them smoke. Construct a 99% confidence interval for the true percentage of all adults in the town that smoke.

7) _____

Use the given degree of confidence and sample data to construct a confidence interval for the population mean μ . Assume that the population has a normal distribution.

- 8) The amounts (in ounces) of juice in eight randomly selected juice bottles are: 8) _____
15.0 15.9 15.3 15.3
15.5 15.9 15.9 15.0
Construct a 98 percent confidence interval for the mean amount of juice in all such bottles.

Use the given degree of confidence and sample data to find a confidence interval for the population standard deviation σ . Assume that the population has a normal distribution.

- 9) College students' annual earnings: 98% confidence; $n = 9$, $\bar{x} = \$3262$, $s = \$836$ 9) _____

Find the minimum sample size you should use to assure that your estimate of \hat{p} will be within the required margin of error around the population p .

- 10) Margin of error: 0.007; confidence level: 99%; from a prior study, \hat{p} is estimated by 0.238 10) _____