**Normal Distribution Exercises**

1. For a normal probability distribution N(0,1) find the 1, 2 and 3 quartile (0.25, 0.5 and 0.75), and the 0.95, 0.957, 0.99 and 0.999 percentiles.
2. Use the following information to answer the next two exercises: The patient recovery time from a particular surgical procedure is normally distributed with a mean of 5.3 days and a standard deviation of 2.1 days.
   1. What is the median recovery time?
   2. What is the z-score for a patient who takes ten days to recover?
3. The heights of the 430 National Basketball Association players were listed on team rosters at the start of the 2005–2006 season. The heights of basketball players have an approximate normal distribution with mean, µ = 79 inches and a standard deviation, σ = 3.89 inches. For each of the following heights, calculate the z-score and interpret it using complete sentences.
   1. 77 inches
   2. 85 inches
   3. If an NBA player reported his height had a z-score of 3.5, would you believe him? Explain your answer.
4. Kyle’s doctor told him that the z-score for his systolic blood pressure is 1.75. Which of the following is the best interpretation of this standardized score? The systolic blood pressure (given in millimeters) of males has an approximately normal distribution with mean μ=125 and standard deviation σ=14. If X= a systolic blood pressure score then X∼N(125,14).
   1. Which answer(s) is/are correct?
      1. Kyle’s systolic blood pressure is 175.
      2. Kyle’s systolic blood pressure is 1.75 times the average blood pressure of men his age.
      3. Kyle’s systolic blood pressure is 1.75 above the average systolic blood pressure of men his age.
      4. Kyles’s systolic blood pressure is 1.75 standard deviations above the average systolic blood pressure for men.
   2. Calculate Kyle’s blood pressure.
5. Some normal distribution has a mean of 34 and a standard deviation of 4. What is the probability of a random data point x falling between 21 and 45?
6. In a test we got a scored 85. If the test scores were normally distributed, with a mean of 78 and a standard deviation of 5, what proportion of the class would likely score better than we did?

**Central Limit Theorem Exercises**

1. Suppose the population mean for the SAT score is 550 with a standard deviation of 75. Find the mean and standard deviation of the sample means for the following samples of sizes:

a. n =50

b. n = 200

c. n = 800

d. n =3,200

1. The average GPA scored by a class is 4.91 and standard deviation is 0.72. For a sample of 20 students, find the z-score that the average is above 5.
2. The average score of a subject is 2.89 for the whole class, with a standard deviation of 0.63. If a sample of 25 students is being taken, then find the probability of getting the average of this sample to be more than 3.
3. In a survey of a company, mean salary of employees is 29,321 dollars with SD of 2,120 dollars. Consider the sample of 100 employees and find the probability their mean salary will be less than 29,000 dollars?
4. A large freight elevator can transport a maximum of 9800 pounds. Suppose a load of cargo containing 49 boxes must be transported via the elevator. Experience has shown that the weight of boxes of this type of cargo follows a distribution with mean μ = 205 pounds and standard deviation σ = 15 pounds. Based on this information, what is the probability that all 49 boxes can be safely loaded onto the freight elevator and transported?
5. The amount of regular unleaded gasoline purchased every week at a gas station near UCLA follows the normal distribution with mean 50,000 gallons and standard deviation 10,000 gallons. The starting supply of gasoline is 74,000 gallons stored in the tank, and there is a scheduled weekly delivery of 47,000 gallons.
   1. Find the probability that, after 11 weeks, the supply of gasoline will be below 20,000 gallons.
   2. How much should the weekly delivery be so that after 11 weeks the probability that the supply is below 20,000 gallons is only 0.5%?