Assignment: Z-distribution

1. A normal distribution with a mean of 25 and standard deviation of 5. What is the corresponding Z score for a case having a value of 10?

2. Consider a normal distribution with a mean of 25 and standard deviation of 4. Approximately, what proportion of the area lies between values of 17 and 33.

3. Consider a normal distribution with a mean of 10 and standard deviation of 25. What's the Z score for the value of 35?

4. For a standard normal distribution, what's the probability of getting a positive number?

5. For a normal distribution with a mean of 16 and standard deviation of 2, what's the probability of getting a number greater than 20?

6. Find the area under the standard normal distribution curve to the right of z = 1.5.

7. Find the area under the standard normal distribution curve to the l eft of z = -1.75.

8. Find the area under the standard normal distribution curve between z =-2.79 and z= 1.71

9. Fifty students took an Introduction to Chemistry exam. Assume that their scores formed a normal distribution with a mean of 80 and standard deviation of 4. The professor decided to adjust the scores by creating z scores. Only the first 2.5% of students got an A. What are the cutoff marks to get grade A?

10. If X is a normal random variable with mean μ = 3 and variance σ^2 = 16, find

(a) $P\{X < 11\}$; **(b)** $P\{X > -1\}$; and **(c)** $P\{2 < X < 7\}$

11. The lifetime of a color television picture tube is a normal random variable with mean 8.2 years and standard deviation 1.4 years. What percentage of such tubes lasts **(a)** more than 10 years; **(b)** less than 5 years; **(c)** between 5 and 10 years

12. A four-year college will accept any student ranked in the top 60 percent on a national examination. If the test score is normally distributed with a mean of 500 and a standard deviation of 100, what is the cutoff score for acceptance?

13. A bank finds that the balances for its customers in their savings accounts are normally distributed with a mean of $500 and a standard deviation of $50. What is probability that a randomly selected account has a balance more than $600?

14. The lifetime of a certain brand of tires is normally distributed. The average lifetime of a tire is 50,000 miles with a lifetime standard deviation of 8,400 miles. What is the probability that a randomly selected tire will last beyond 55,000 miles?

15. The life of a brand of battery is normally distributed with a mean of 62 hours and a standard deviation of 6 hours. What is the probability that a single randomly chosen battery will last from 55 to 65 hours?

16. If X is a normally distributed random variable with a mean of 6 and a variance of 4, what is the probability that X is greater than 10?

17. The diameters of ball bearings manufactured by a particular machine are normally distributed with a mean of 2 cm and a standard deviation of 0.02 cm. If a ball bearing is selected at random, find the 70^{th} percentile for the distribution ball bearing diameters.

18. The average score on one of your statistics examinations was 75 with a standard deviation of 10. If your corresponding *z* score was 2, what would be your corresponding raw score and percentile rank (approximate)?

19. Data from the National Oceanic and Atmospheric Administration indicate that the yearly precipitation in Los Angeles is a normal random variable with a mean of 12.08 inches and a standard deviation of 3.1 inches.

    (a) Find the probability that the total precipitation during the next 2 years will exceed 25 inches.

    (b) Find the probability that next year's precipitation will exceed that of the following year by more than 3 inches.

Assume that the precipitation totals for the next 2 years are independent.