CHAPTER 8 | QUESTION 1

A student commutes to University from his home in the suburbs. His travel time can be approximated by the normal distribution with a mean of 45 minutes and a standard deviation of 8 minutes.

a) What percentage of days will it take him 40 minutes or less to drive to work?

b) What percentage of days will take him 35 minutes or more to drive to work?

c) Some days there will be accidents or other delays, so the trip will take longer than usual. How long will the longest 10% of these trips take?

CHAPTER 8 | QUESTION 2

Monthly food expenditures for families of four in a large city average $420 with a standard deviation of $80. Assuming that the monthly food expenditures are normally distributed:

a) What percentage of these expenditures is less than $360.00?

b) What percentage of these expenditures is between $260.00 and $360.00?

c) What percentage of these expenditures is less than $250.00 or greater than $450.00?

d) What is the most ($) that the bottom $2/3^{rd}$ of the households would spend on food?

CHAPTER 8 | QUESTION 3

The distribution of IQ scores for high school graduates is normally distributed with mean μ = 104 and standard deviation σ = 16.

1. Find the probability a person chosen at random from this group has an IQ score above 146.08.

2. What fraction of the IQ scores would be between 97 and 126?

3. What is the 95th percentile of this normal distribution?

CHAPTER 8 | QUESTION 4

The finance department of a large organization is responsible for monitoring costs in other departments. Data collection reveals the number of photocopies made by one of the departments follows the normal distribution. The mean of the distribution is 380 copies per day with a standard deviation of 35. The cost per copy is estimated at 6 cents.

a) What is the probability that daily costs will be less than $21?

b) Determine the probability that daily costs incurred by this department will be between $24 and $26.

CHAPTER 8 | QUESTION 5

Researchers studying the effects of a new diet found that the weight loss over a one-month period by those on the diet was normally distributed with a mean of 3 kilograms and a standard deviation of 1 kilogram.

a) What proportion of the dieters lost more than 4 kilograms?

b) What proportion of the dieters gained weight?

c) If a dieter is selected at random, what is the probability that the dieter lost at most 2.5 kilograms?

CHAPTER 8 | QUESTIONS 6-20 · Multiple Choice

6. Which of the following is always true for all probability density functions of continuous random variables?

    a) The probability at any single point is zero.
    b) They contain an uncountable number of possible values.
    c) The total area under the density function f(x) equals 1.
    d) All of these choices are true.

7. The probability density function *f(x)* for a uniform random variable *X* defined over the interval [2, 10] is

    a) 0.125
    b) 8
    c) 6
    d) None of these choices.

8. If the random variable *X* has a uniform distribution between 40 and 50, then $P(35 \leq X \leq 45)$ is:

    a) 1.0
    b) 0.5
    c) 0.1
    d) undefined.

9. A standard normal distribution is a normal distribution with:

    a) a mean of zero and a standard deviation of one.
    b) a mean of one and a standard deviation of zero.
    c) a mean always larger than the standard deviation.
    d) None of these choices.

10. Which of the following is not a characteristic for a normal distribution?

    a) It is symmetrical.
    b) The mean is always zero.
    c) The mean, median, and mode are all equal.
    d) It is a bell-shaped distribution.

11. Given that Z is a standard normal random variable, a negative value (z) on its distribution would indicate:

    a) z is to the left of the mean.
    b) the standard deviation of this Z distribution is negative.
    c) the area between zero and the value z is negative.
    d) None of these choices.

12. Most values of a standard normal distribution lie between:

    a) 0 and 1
    b) - 3 and 3
    c) 0 and 3
    d) minus infinity and plus infinity

13. Suppose Bob's exam score was at the 80th percentile on an exam whose mean was 90. What was Bob's exam score?

    a) 76.81
    b) 72.00
    c) 80.00
    d) Cannot tell without more information.

14. If Z is a standard normal random variable, then P(-1.75 $\leq$ Z $\leq$ -1.25) is:

    a) 0.1056
    b) 0.0401
    c) 0.8543
    d) 0.0655

15. If Z is a standard normal random variable, then the value z for which P(-z $\leq$ Z $\leq$ z) equals 0.8764 is:

    a) 0.3764
    b) 1.54
    c) 3.08
    d) 1.16

16. If the continuous random variable X is uniformly distributed over the interval [15,25], then P(17 $\leq$ X $\leq$ 20) is:

    a) 0.20
    b) 0.40
    c) 0.25
    d) 0.30

17. Given that Z is a standard normal random variable, what is the value of Z if the area to the right of Z is 0.9066?

    a) 1.32
    b) −1.32
    c) 0.66
    d) -0.66

18. A larger standard deviation of a normal distribution indicates that the distribution becomes

    a) narrower and more peaked
    b) flatter and wider
    c) more skewed to the right
    d) more skewed to the left

19. My z-score on a test is -1.00. Which of the following correctly describes my score?

    a) One raw score point below the mean.
    b) One standard deviation below the mean.
    c) In the bottom 1% of the distribution.
    d) At the 10th percentile.

20. The amount of time you have to wait at a particular stoplight is uniformly distributed between zero and two minutes. Eighty percent of the time, the light will change before you have to wait how long?

    a) 30 seconds
    b) 24 seconds
    c) 90 seconds
    d) 96 seconds