38. The mean of any uniform probability distribution is
A) \( \frac{b - a}{2} \)
B) \( \frac{a + b}{2} \)
C) \( \frac{\sum x}{\eta} \)
D) \( n \pi \)
Answer: B

44. Which of the following is NOT true regarding the normal distribution?
A) Mean, median and mode are all equal
B) It has a single peak
C) It is symmetrical
D) The points of the curve meet the X-axis at \( z = -3 \) and \( z = 3 \)
Answer: D

46. For a standard normal distribution, what is the probability that \( z \) is greater than 1.75?
A) 0.0401
B) 0.0459
C) 0.4599
D) 0.9599
Answer: A

47. What is the area under the normal curve between \( z = 0.0 \) and \( z = 1.79 \)?
A) 0.4633
B) 0.0367
C) 0.9599
D) 0.0401
Answer: A

48. What is the area under the normal curve between \( z = -1.0 \) and \( z = -2.0 \)?
A) 0.0228
B) 0.3413
C) 0.1359
D) 0.4772
Answer: C

49. What is the area under the normal curve between \( z = 0.0 \) and \( z = 2.0 \)?
A) 1.0000
B) 0.7408
C) 0.1359
D) 0.4772
Answer: D

50. The mean amount spent by a family of four on food per month is $500 with a standard deviation of $75. Assuming that the food costs are normally distributed, what is the probability that a family spends less than $410 per month?
52. What is the proportion of the total area under the normal curve within plus and minus two standard deviations of the mean?
   A) 68%
   B) 99.7%
   C) 34%
   D) 95%
   Answer: D

53. The mean score of a college entrance test is 500; the standard deviation is 75. The scores are normally distributed. What percent of the students scored below 320?
   A) About 50.82%
   B) About 34.13%
   C) About 7.86%
   D) About 0.82%
   Answer: D

54. The mean of a normally distributed group of weekly incomes of a large group of executives is $1,000 and the standard deviation is $100. What is the z-score for an income of $1,100?
   A) 1.00
   B) 2.00
   C) 1.683
   D) -0.90
   Answer: A

55. A new extended-life light bulb has an average service life of 750 hours, with a standard deviation of 50 hours. If the service life of these light bulbs approximates a normal distribution, about what percent of the distribution will be between 600 hours and 900 hours?
   A) 95%
   B) 68%
   C) 34%
   D) 99.7%
   Answer: D

56. A study of a company's practice regarding the payment of invoices revealed that an invoice was paid an average of 20 days after it was received. The standard deviation equaled five days. Assuming that the distribution is normal, what percent of the invoices were paid within 15 days of receipt?
   A) 15.87%
   B) 37.91%
   C) 34.13%
   D) 86.74%
   Answer: A

57. An accelerated life test on a large number of type-D alkaline batteries revealed that the mean life for a particular use before they failed is 19.0 hours. The distribution of the lives approximated a normal
distribution. The standard deviation of the distribution was 1.2 hours. About 95.44 percent of the batteries failed between what two values?
A) 8.9 and 18.9
B) 12.2 and 14.2
C) 14.1 and 22.1
D) 16.6 and 21.4
Answer: D

58. The mean of a normal distribution is 400 pounds. The standard deviation is 10 pounds. What is the area between 415 pounds and the mean of 400 pounds?
A) 0.5000
B) 0.1932
C) 0.4332
D) 0.3413
Answer: C

60. Which of the following is true in a normal distribution?
A) Mean equals the mode and the median
B) Mode equals the median
C) Mean divides the distribution into two equal parts
D) All of the above are correct
Answer: D

61. Tables of normal distribution probabilities are found in many statistics books. These probabilities are calculated from a normal distribution with
A) a mean of 1 and a standard deviation of 1
B) a mean of 100 and a standard deviation of 15
C) a mean of 0 and a standard deviation of 15
D) a mean of 0 and a standard deviation of 1
Answer: D

62. Two normal distributions are compared. One has a mean of 10 and a standard deviation of 10. The second normal distribution has a mean of 10 and a standard deviation of 2. Which of the following is true?
A) the locations of the distributions are different
B) the distributions are from two different families
C) the dispersions of the distributions are different
D) the dispersions of the distributions are the same
Answer: C

64. The total area of a normal probability distribution is
A) between –3.0 and 3.0
B) 1.00
C) dependent on a value of ‘z’.
D) approximated by the binomial distribution.
Answer: B

67. The weekly mean income of a group of executives is $1000 and the standard deviation of this group is $100. The distribution is normal. What percent of the executives have an income of $925 or less?
A) About 15%
B) About 85%
C) About 50%
D) About 23%
Answer: D

68. The weight of cans of fruit is normally distributed with a mean of 1,000 grams and a standard deviation of 50 grams. What percent of the cans weigh 860 grams or less?
A) 0.0100
B) 0.8400
C) 0.0026
D) 0.0001
Answer: C

69. What is the distribution with a mean of 0 and a standard deviation of 1 called?
A) Frequency distribution
B) z-score
C) Standard normal distribution
D) Binomial probability distribution
Answer: C

73. A large manufacturing firm tests job applicants who recently graduated from college. The test scores are normally distributed with a mean of 500 and a standard deviation of 50. Management is considering placing a new hire in an upper level management position if the person scores in the upper 6 percent of the distribution. What is the lowest score a college graduate must earn to qualify for a responsible position?
A) 50
B) 625
C) 460
D) 578

75. The annual commissions per salesperson employed by a manufacturer of light machinery averaged $40,000 with a standard deviation of $5,000. What percent of the sales persons earn between $32,000 and $42,000?
A) 60.06%
B) 39.94%
C) 34.13%
D) 81.66%
Answer: A

76. The mean of a normal probability distribution is 500 and the standard deviation is 10. About 95 percent of the observations lie between what two values?
A) 475 and 525
B) 480 and 520
C) 400 and 600
D) 350 and 650
Answer: B

77. A cola-dispensing machine is set to dispense a mean of 2.02 liters into a container labeled 2 liters. Actual quantities dispensed vary and the amounts are normally distributed with a standard deviation of 0.015 liters. What is the probability a container will have less than 2 liters?
A) 0.0918
78. The employees of Cartwright Manufacturing are awarded efficiency ratings. The distribution of the ratings approximates a normal distribution. The mean is 400, the standard deviation 50. What is the area under the normal curve between 400 and 482?
   A) 0.5000
   B) 0.4495
   C) 0.3413
   D) 0.4750
   Answer: B

86. What is the formula to convert any normal distribution to the standard normal distribution?
   Answer: 
   \[ z = \frac{(X - \mu)}{\sigma} \]

88. What proportion of the area under a normal curve is to the right of a z-score of zero? _______
   Answer: 50% or 0.50

89. The mean of a normal probability distribution is 60 and the standard deviation is 5. What percent of observations are between 50 and 70? ______ %
   Answer: 95.44

90. What does a z value of –2.00 indicate about the corresponding X value? _______________________
   Answer: less than or to the left of the mean, or the X value is 2 standard deviations less than the mean
   Difficulty: Medium

92. What proportion of the area under a normal curve is to the right of z = –1.21? ______
   Answer: 0.8461

93. What proportion of the area under a normal curve is to the left of z = 0.50? ______
   Answer: 0.6914

94. What proportion of the area under a normal curve is to the left of z = –2.10? ______
   Answer: 0.0179

95. A statistics student receives a grade of 85 on a statistics midterm. If the corresponding z-score equals +1.5 and the standard deviation equals 7, what is the average grade on this exam? ______
   Answer: 74.5
Use the following to answer questions 116-121:
A sample of 500 evening students revealed that their annual incomes from employment in industry during the day were normally distributed with a mean income of $30,000 and a standard deviation of $3,000.

116. How many students earned more than $30,000? _______
   Answer: 250

117. How many students earned between $27,000 and $33,000? ______
   Answer: 341

118. How many students earned between $24,000 and $30,000? ______
   Answer: 239

119. How many students earned between $20,000 and $40,000? ______
   Answer: 500

120. How many students earned less than $22,500? _______
   Answer: 3

121. How many students earned more than $36,000? _______
   Answer: 11

Use the following to answer questions 122-128:
The weight of a bag of corn chips is normally distributed with a mean of 22 ounces and a standard deviation of ½ ounces.

122. What is the probability that a bag of corn chips is less than 20 ounces? _____
   Answer: 0.0

123. What is the probability that a bag of corn chips weighs more than 21 ounces? _____
   Answer: 0.9772

124. What is the probability that a bag of corn chips weighs more than 23 ounces? _____
   Answer: 0.0228

125. What is the probability that a bag of corn chips weighs less than 24 ounces? _____
   Answer: 1.0

126. What is the probability that a bag of corn chips weighs between 20.75 and 23.25 ounces? _____
   Answer: 0.9876

127. What is the probability that a bag of corn chips weighs 22.25 ounces? _____
   Answer: 0.0

128. What is the probability that a bag of corn chips weighs between 21.75 and 22.25 ounces? _____
   Answer: 0.3830

Use the following to answer questions 129-131:
Two business major students, in two different sections of economics, were comparing test scores. The following gives the students scores, class mean, and standard deviation for each section.

<table>
<thead>
<tr>
<th>Section</th>
<th>Score</th>
<th>μ</th>
<th>σ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>84</td>
<td>75</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>60</td>
<td>8</td>
</tr>
</tbody>
</table>

129. Which student scored better compared to the rest of the section? _______________
Answer: student from section 2

130. What is the z-score of the student from section 1? _____________
Answer: 1.28

131. What is the z-score of the student from section 2? _____________
Answer: 1.87

**Multiple Choices**

Use the following to answer questions 132-134:
The average score of 100 students taking a statistics final was 70 with a standard deviation of 7.

132. Assuming a normal distribution, approximately how many scored 90 or higher?
   A) 0.4979
   B) 0.0021
   C) 0.9979
   D) 2.86
   Answer: B

133. Assuming a normal distribution, approximately how many scored less than 60?
   A) 0.2271
   B) 0.3729
   C) 0.8929
   D) -1.14
   E) None of the above
   Answer: E

134. Assuming a normal distribution, approximately how many scored greater than 65?
   A) 0.2611
   B) 0.2389
   C) 0.7611
   D) -0.714
   Answer: C

Use the following to answer questions 135-138:
Bottomline Ink, a forms management company, fills 100 orders a day with a 2% error rate in the completed orders. Assume this to be a binomial distribution.
135. What is the mean for this distribution?
A) 0.02
B) 1.4
C) 2
D) There is no mean for this type of distribution.
Answer: C

136. What is the standard deviation for this distribution?
A) 0.02
B) 4
C) 2
D) There is no standard deviation for this type of distribution.
Answer: B

137. What is the probability that there will be more than 5 order errors in a given day?
A) 0.1894
B) 0.4838
C) 0.9838
D) 2.1428
Answer: A

138. The probability of less than 1 order error in a given day is
A) 0.7143.
B) 0.3520
C) 0.2611.
D) 2.7611.
Answer: B

Fill-in-the-Blank

141. How is the expected value of a normal distribution computed?
Answer: Σ X/ N

142. How is the standard deviation of a normal distribution computed?
\[ \sqrt{\frac{(X - \mu)^2}{N}} \]
Answer:

144. For a binomial distribution with both \( n \pi \) and \( n (1 - \pi) \) greater than 5, what can we conclude about the characteristics of the distribution?
Answer: the distribution is approximately normal with a mean of \( n \pi \) and a standard deviation of \( n \pi (1 - \pi) \)