Business Statistics, 9e **(Groebner/Shannon/Fry)**
Chapter 6 Introduction to Continuous Probability Distributions

1) The normal distribution is one of the most frequently used discrete probability distributions.
Answer: FALSE
Diff: 1
Keywords: normal distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 1

2) Typically, a continuous random variable is one whose value is determined by measurement instead of counting.
Answer: TRUE
Diff: 1
Keywords: continuous, random, variable
Section: 6-1 The Normal Probability Distribution
Outcome: 3

3) The number of defects manufactured by workers in a small engine plant is an example of a discrete random variable.
Answer: TRUE
Diff: 1
Keywords: discrete, random, variable
Section: 6-1 The Normal Probability Distribution
Outcome: 3

4) One example of a difference between discrete random variables and continuous random variables is that in a discrete distribution $P(x > 2) = P(x \geq 3)$ while in a continuous distribution $P(x > 2)$ is treated the same as $P(x \geq 2)$.
Answer: TRUE
Diff: 2
Keywords: discrete, continuous, random, variable
Section: 6-1 The Normal Probability Distribution
Outcome: 3

5) The probability distribution for a continuous random variable is represented by a probability density function that defines a curve.
Answer: TRUE
Diff: 1
Keywords: probability, density, continuous, variable
Section: 6-1 The Normal Probability Distribution
Outcome: 2

6) When graphed, the probability distribution for a discrete random variable looks like a histogram.
Answer: TRUE
Diff: 2
Keywords: discrete, variable, distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 3

7) For a continuous distribution the total area under the curve is equal to 100.
Answer: FALSE
Diff: 1
Keywords: normal, distribution, continuous, variable
Section: 6-1 The Normal Probability Distribution
Outcome: 3

8) A continuous random variable approaches normality as the level of skewness increases.
Answer: FALSE
Diff: 2
Keywords: continuous, variable, random
Section: 6-1 The Normal Probability Distribution
Outcome: 3

9) If the mean, median and mode are all equal for a continuous random variable, then the random variable is normally distributed.
Answer: FALSE
Diff: 2
Keywords: continuous, random, variable, normal
Section: 6-1 The Normal Probability Distribution
Outcome: 3

10) When a single die is rolled, each of the six sides are equally likely. This is an example of a uniform distribution.
Answer: TRUE
Diff: 1
Keywords: uniform, random, variable
Section: 6-2 Other Continuous Probability Distributions
Outcome: 1

11) All symmetric distributions can be assumed normally distributed.
Answer: FALSE
Diff: 1
Keywords: normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

12) The parameters of a normal distribution are the mean and the standard deviation.
Answer: TRUE
Diff: 1
Keywords: normal, distribution, mean, standard deviation
Section: 6-1 The Normal Probability Distribution
Outcome: 1

13) The actual weight of 2-pound sacks of salted peanuts is found to be normally distributed with a mean equal to 2.04 pounds and a standard deviation of 0.25 pounds. Given this information, the probability of a sack weighing more than 2.40 pounds is 0.4251.
Answer: FALSE
Diff: 2
Keywords: standardized normal, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 1

14) The standard normal distribution table provides probabilities for the area between the z-value and the population mean.
Answer: TRUE
Diff: 2
Keywords: z-value, standard normal distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 1

15) The standard normal distribution has a mean of 0 and a standard deviation of 1.0.
Answer: TRUE
Diff: 1
Keywords: standard normal
Section: 6-1 The Normal Probability Distribution
Outcome: 1

16) The time it takes a parent to assemble a children's bicycle has been shown to be normally distributed with a mean equal to 295 minutes with a standard deviation equal to 45 minutes. Given this information, the probability that it will take a randomly selected parent more than 220 minutes is about 0.0475.
Answer: FALSE
Diff: 2
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

17) The State Department of Forests has determined that annual tree growth in a particular forest area is normally distributed with a mean equal to 17 inches and a standard deviation equal to 6 inches. Based on this information, it is possible for a randomly selected tree not to have grown any during a year.
Answer: TRUE
Diff: 2
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

18) The State Department of Forests has determined that annual tree growth in a particular forest area is normally distributed with a mean equal to 17 inches and a standard deviation equal to 6 inches. If 2 trees are randomly chosen, the probability that both trees will have grown more than 20 inches during the year is approximately .037.
Answer: FALSE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

19) Watersports Rental at Flathead Lake rents jet skis and power boats for day use. Each piece of equipment has a clock that records the time that it was actually in use while rented. The company has observed over time that the distribution of time used is normally distributed with a mean of 3.6 hours and a standard deviation equal to 1.2 hours. Watersports management has decided to give a rebate to customers who use the equipment for less than 2.0 hours. Based on this information, the probability that a customer will get the rebate is 0.4082.
Answer: FALSE
Diff: 2
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

20) Watersports Rental at Flathead Lake rents jet skis and power boats for day use. Each piece of equipment has a clock that records the time that it was actually in use while rented. The company has observed over time that the distribution of time used is normally distributed with a mean of 3.6 hours and a standard deviation equal to 1.2 hours. Watersports management has decided to give a rebate to customers who use the equipment for only a short amount of time. They wish to grant a rebate to no more than 10 percent of all customers. Based on the information provided, the amount of time that should be set as the cut-off between getting the rebate and not getting the rebate is approximately 2.06 hours.
Answer: TRUE
Diff: 2
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

21) The Varden Packaging Company has a contract to fill 50 gallon barrels with gasoline for use by the U.S. Army. The machine that Varden uses has an adjustable device that allows the average fill per barrel to be adjusted as desired. However, the actual distribution of fill volume from the machine is known to be normally distributed with a standard deviation equal to 0.5 gallons. The contract that Varden has with the military calls for no more than 2 percent of all barrels to contain less than 49.2 gallons of gasoline. In order to meet this requirement, Varden should set the mean fill to approximately 49.92 gallons.
Answer: FALSE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

22) The Varden Packaging Company has a contract to fill 50-gallon barrels with gasoline for use by the U.S. Army. The machine that Varden uses has an adjustable device that allows the average fill per barrel to be adjusted as desired. However, the actual distribution of fill volume from the machine is known to be normally distributed with a standard deviation equal to 0.5 gallons. The contract that Varden has with the military calls for no more than 2 percent of all barrels to contain less than 49.2 gallons of gasoline. In order to meet this requirement, Varden should set the mean fill to approximately 50.225 gallons.
Answer: TRUE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

23) The Varden Packaging Company has a contract to fill 50-gallon barrels with gasoline for use by the U.S. Army. The machine that Varden uses has an adjustable device that allows the average fill per barrel to be adjusted as desired. However, the actual distribution of fill volume from the machine is known to be normally distributed with a standard deviation equal to 0.5 gallons. The contract that Varden has with the military calls for no more than 2 percent of all barrels to contain less than 49.2 gallons of gasoline. Suppose Varden managers are unwilling to set the mean fill at any level higher than 50 gallons. Given that, in order to meet the requirements, they will need to increase the standard deviation of fill volume.
Answer: FALSE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

24) A seafood shop sells salmon fillets where the weight of each fillet is normally distributed with a mean of 1.6 pounds and a standard deviation of 0.3 pounds. They want to classify the largest fillets as extra large and charge a higher price for them. If they want the largest 15 percent of the fillets to be classified as extra large, the minimum weight for an extra large fillet should be 1.91 pounds.
Answer: TRUE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

25) A seafood shop sells salmon fillets where the weight of each fillet is normally distributed with a mean of 1.6 pounds and a standard deviation of 0.3 pounds. Based on this information we can conclude that 90 percent of the fillets weight more than 1.0 pound.
Answer: FALSE
Diff: 2
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

26) The vehicle speeds on a city street have been determined to be normally distributed with a mean of 33.2 mph and a variance of 16. Based on this information, the probability that if three randomly selected vehicles are monitored and that two of the three will exceed the 35 mph speed limit is slightly greater than 0.18.
Answer: FALSE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

27) Any normal distribution can be converted to a standard normal distribution.
Answer: TRUE
Diff: 2
Keywords: standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

28) For a normal distribution, the probability of a value being between a positive z-value and its population mean is the same as that of a value being between a negative z-value and its population mean.
Answer: TRUE
Diff: 3
Keywords: z-value, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

29) Suppose the time it takes for a customer to be served at a fast-food chain business is thought to be uniformly distributed between 3 and 8 minutes, then the probability that it will take exactly 5 minutes is 0.20.
Answer: FALSE
Diff: 2
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

30) One of the basic differences between a uniform probability distribution and a normal probability distribution is that the uniform is symmetrical but the normal is skewed depending on the value of the standard deviation.
Answer: FALSE
Diff: 1
Keywords: uniform, normal, distribution, skewed
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

31) Suppose the time it takes for a customer to be served at a fast-food chain business is thought to be uniformly distributed between 3 and 8 minutes, then the probability that a customer is served in less than 3 minutes is 0.
Answer: TRUE
Diff: 1
Keywords: uniform distribution
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

32) If the time it takes for a customer to be served at a fast-food chain business is thought to be uniformly distributed between 3 and 8 minutes, then the probability that the time it takes for a randomly selected customer to be served will be less than 5 minutes is 0.40.
Answer: TRUE
Diff: 2
Keywords: uniform, probability, distribution
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

33) If a uniform distribution and normal distribution both have the same mean and the same range, the normal distribution will have a larger standard deviation than the uniform distribution
Answer: FALSE
Diff: 2
Keywords: uniform distribution, normal distribution
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

34) It has been determined the weight of bricks made by the Dillenger Stone Company is uniformly distributed between 1 and 1.5 pounds. Based on this information, the probability that two randomly selected bricks will each weigh more than 1.3 pounds is 0.16.
Answer: TRUE
Diff: 3
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

35) The amount of drying time for the paint applied to a plastic component part is thought to be uniformly distributed between 30 and 60 minutes. Currently, the automated process selects the part from the drying bin after the part has been there for 50 minutes. Based on this, the probability that a part selected will not be dry is approximately 0.33.
Answer: TRUE
Diff: 2
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

36) The amount of drying time for the paint applied to a plastic component part is thought to be uniformly distributed between 30 and 60 minutes. Currently, the automated process selects the part from the drying bin after the part has been there for 50 minutes. The probability that none of three parts picked are still wet when they are selected is approximately 0.04.
Answer: FALSE
Diff: 3
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

37) An assembly process takes between 20 and 40 minutes to complete with the distribution of time thought to be uniformly distributed. Based on this, the percentage of assemblies that require less than 25 minutes is 0.05.
Answer: FALSE
Diff: 2
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

38) Service time for customers at a drive-through coffee shop has been shown to be uniformly distributed between 2 and 10 minutes. Customers will complain when service time exceeds 7.5 minutes. Based on this information, the probability of getting a complaint based on service time is 0.3125.
Answer: TRUE
Diff: 2
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

39) An electronics repair shop has determined that the time between failures for a particular electronic component part is exponentially distributed with a mean time between failures of 200 hours. Based on this information, the probability that a part will fail in the first 20 hours is approximately 0.095.
Answer: TRUE
Diff: 3
Keywords: exponential distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

40) An electronics repair shop has determined that the time between failures for a particular electronic component part is exponentially distributed with a mean time between failures of 200 hours. Based on this information, the probability that a part will fail between 20 and 100 hours is approximately 0.30.
Answer: TRUE
Diff: 3
Keywords: exponential distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

41) An electronics repair shop has determined that the time between failures for a particular electronic component part is exponentially distributed with a mean time between failures of 200 hours. Based on this information, the probability that a part will not fail in the first 200 hours is 0.50.
Answer: FALSE
Diff: 2
Keywords: exponential distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

42) A study of cars arriving at a parking structure at the local airport shows that the time between arrivals is 1.2 minutes and is exponentially distributed. Based on this information, the mean number of cars arriving per minute is about 0.83.
Answer: TRUE
Diff: 2
Keywords: exponential distribution, lambda
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

43) A study of cars arriving at a parking structure at the local airport shows that the time between arrivals is 1.2 minutes and is exponentially distributed. The probability that more than 2 minutes will elapse between the arrivals of cars is about 0.81.
Answer: FALSE
Diff: 3
Keywords: exponential distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

44) Which of the following probability distributions can be used to describe the distribution for a continuous random variable?
A) Normal distribution
B) Binomial distribution
C) Poisson distribution
D) Hypergeometric
Answer: A
Diff: 1
Keywords: normal, distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 1

45) Which of the following is not a characteristic of the normal distribution?
A) Symmetric
B) Mean = median = mode
C) Bell-shaped
D) Equal probabilities at all values of x
Answer: D
Diff: 2
Keywords: normal, uniform, distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 1

46) Which of the following probability distributions could be used to describe the distribution for a continuous random variable?
A) Exponential distribution
B) Normal distribution
C) Uniform distribution
D) All of the above
Answer: D
Diff: 1
Keywords: normal, exponential, uniform, continuous, distribution
Section: 6-1 The Normal Probability Distribution
Outcome: 1

47) Assuming that the change in daily closing prices for stocks on the New York Stock Exchange is a random variable that is normally distributed with a mean of $.35 and a standard deviation of $.33. Based on this information, what is the probability that a randomly selected stock will close up $.75 or more?
A) 0.3869
B) 0.1131
C) 0.7100
D) 0.8869
Answer: B
Diff: 2
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

48) Assuming that the change in daily closing prices for stocks on the New York Stock Exchange is a random variable that is normally distributed with a mean of $0.35 and a standard deviation of $0.33. Based on this information, what is the probability that a randomly selected stock will be lower by $0.40 or more?
A) 2.27
B) 0.4884
C) 0.0116
D) 0.9884
Answer: C
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

49) Students who have completed a speed reading course have reading speeds that are normally distributed with a mean of 950 words per minute and a standard deviation equal to 220 words per minute. Based on this information, what is the probability of a student reading at more than 1400 words per minute after finishing the course?
A) 0.0202
B) 0.5207
C) 0.4798
D) 0.9798
Answer: A
Diff: 2
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

50) Students who have completed a speed reading course have reading speeds that are normally distributed with a mean of 950 words per minute and a standard deviation equal to 220 words per minute. If two students were selected at random, what is the probability that they would both read at less than 400 words per minute?
A) 0.4938
B) 0.0062
C) 0.00004
D) 0.2438
Answer: C
Diff: 3
Keywords: normal, probability, z-value, multiplication
Section: 6-1 The Normal Probability Distribution
Outcome: 2

51) The manager at a local movie theater has collected data for a long period of time and has concluded that the revenue from concession sales during the first show each evening is normally distributed with a mean equal to $336.25 and a variance equal to 1,456. Based on this information, what are the chances that the revenue on the first show will exceed $800?
A) 0.1255
B) Essentially zero
C) 0.3745
D) 0.9999
Answer: B
Diff: 2
Keywords: normal, z-value, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

52) The manager at a local movie theater has collected data for a long period of time and has concluded that the revenue from concession sales during the first show each evening is normally distributed with a mean equal to $336.25 and a standard deviation equal to $80. Based on this information, what are the chances that the revenue on the first show will be between $300 and $500?
A) About 0.3062
B) Approximately 0.6534
C) 0.1736
D) Approximately 0.4798
Answer: B
Diff: 2
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

53) The manager of a computer help desk operation has collected enough data to conclude that the distribution of time per call is normally distributed with a mean equal to 8.21 minutes and a standard deviation of 2.14 minutes. Based on this, what is the probability that a call will last longer than 13 minutes?
A) About 0.0125
B) Approximately 0.4875
C) About 0.5125
D) About 0.9875
Answer: A
Diff: 2
Keywords: normal, z-score, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

54) The manager of a computer help desk operation has collected enough data to conclude that the distribution of time per call is normally distributed with a mean equal to 8.21 minutes and a standard deviation of 2.14 minutes. The manager has decided to have a signal system attached to the phone so that after a certain period of time, a sound will occur on her employees' phone if she exceeds the time limit. The manager wants to set the time limit at a level such that it will sound on only 8 percent of all calls. The time limit should be:
A) 10.35 minutes.
B) approximately 5.19 minutes.
C) about 14.58 minutes.
D) about 11.23 minutes.
Answer: D
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

55) The manager of a computer help desk operation has collected enough data to conclude that the distribution of time per call is normally distributed with a mean equal to 8.21 minutes and a standard deviation of 2.14 minutes. What is the probability that three randomly monitored calls will each be completed in 4 minutes or less?
A) 0.4756
B) Approximately 0.1076
C) About 0.00001
D) Can't be determined without more information.
Answer: C
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

56) The makers of Sweet-Things candy sell their candy by the box. Based on company policy, the mean target weight of all boxes is 2.0 pounds. To make sure that they are not putting too much in the boxes, the manager wants no more than 3 percent of all boxes to contain more than 2.10 pounds of candy. In order to do this, with a mean weight of 2 pounds, what must the standard deviation be? Assume that the box weights are normally distributed.
A) Approximately 0.05 pounds
B) -0.133 pounds
C) 1.144 pounds
D) None of the above
Answer: A
Diff: 3
Keywords: normal, probability, z-value, standard deviation
Section: 6-1 The Normal Probability Distribution
Outcome: 2

57) The makers of Sweet-Things candy sell their candy by the box. Based on company policy, the mean target weight of all boxes is 2.0 pounds. To make sure that they are not putting too much in the boxes, the manager wants no more than 3 percent of all boxes to contain more than 2.10 pounds of candy. In order to do this, what should the mean fill weight be set to if the fill standard deviation is 0.13 pounds? Assume that the box weights are normally distributed.
A) Just over 2 pounds
B) Approximately 2.33 pounds
C) Nearly 1.27 pounds
D) Approximately 1.86 pounds
Answer: D
Diff: 3
Keywords: normal, mean, z-value, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

58) A major U.S. automaker has determined that the city mileage for one of its new SUV models is normally distributed with a mean equal to 15.2 mpg. A report issued by the company indicated that 22 percent of the SUV model vehicles will get more than 17 mpg in the city. Given this information, what is the city mileage standard deviation for this SUV model?
A) 0.77 mpg
B) Approximately 2.34 mpg
C) 1.8 mpg
D) Approximately 3.1 mpg
Answer: B
Diff: 3
Keywords: normal, z-value, standard deviation
Section: 6-1 The Normal Probability Distribution
Outcome: 1

59) A recent study showed that the length of time that juries deliberate on a verdict for civil trials is normally distributed with a mean equal to 12.56 hours with a standard deviation of 6.7 hours. Given this information, what is the probability that a deliberation will last between 10 and 15 hours?
A) Approximately 0.29
B) Nearly 0.75
C) About 0.48
D) About 0.68
Answer: A
Diff: 2
Keywords: normal, z-value, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

60) Suppose that it is believed that investor returns on equity investments at a particular brokerage house are normally distributed with a mean of 9 percent and a standard deviation equal to 3.2 percent. What percent of investors at this brokerage house earned at least 5 percent?
A) 89.44 percent
B) 10.56 percent
C) 39.44 percent
D) 100 percent
Answer: A
Diff: 2
Keywords: normal, z-value, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

61) A major cell phone service provider has determined that the number of minutes that its customers use their phone per month is normally distributed with a mean equal to 445.5 minutes with a standard deviation equal to 177.8 minutes. As a promotion, the company plans to hold a drawing to give away one free vacation to Hawaii for a customer who uses between 400 and 402 minutes during a particular month. Based on the information provided, what proportion of the company's customers would be eligible for the drawing?
A) Approximately 0.1026
B) About 0.004
C) Approximately 0.2013
D) About 0.02
Answer: B
Diff: 2
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

62) A major cell phone service provider has determined that the number of minutes that its customers use their phone per month is normally distributed with a mean equal to 445.5 minutes with a standard deviation equal to 177.8 minutes. The company is thinking of changing its fee structure so that anyone who uses the phone less than 250 minutes during a given month will pay a reduced monthly fee. Based on the available information, what percentage of current customers would be eligible for the reduced fee?
A) About 36.4 percent
B) Approximately 52 percent
C) About 86.6 percent
D) About 13.6 percent
Answer: D
Diff: 2
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

63) A major cell phone service provider has determined that the number of minutes that its customers use their phone per month is normally distributed with a mean equal to 445.5 minutes with a standard deviation equal to 177.8 minutes. The company is thinking of charging a lower rate for customers who use the phone less than a specified amount. If it wishes to give the rate reduction to no more than 12 percent of its customers, what should the cut-off be?
A) About 237 minutes
B) About 654 minutes
C) About 390 minutes
D) About 325 minutes
Answer: A
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

64) In a standard normal distribution, the probability that z is greater than 0 is:
A) 0.5
B) equal to 1
C) at least 0.5
D) 1.96
Answer: A
Diff: 1
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

65) In a standard normal distribution, the probability P(-1.00< z < 1.20) is the same as:
A) P(1< z < 1.20) - P(0 < z < 1.00).
B) P(1< z < 1.20) - 2*P(0 < z < 1.00).
C) 2 * P(1< z < 1.20) - P(0 < z <1.00).
D) P(1 < z < 1.20) + 2 * P(0 < z <1.00).
Answer: D
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

66) A professor noted that the grades of his students were normally distributed with a mean of 75.07 and a standard deviation of 11.65. If only 10 percent of the students received grades of A, what is the minimum score needed to receive an A?
A) 80.00
B) 85.00
C) 90.00
D) 95.00
Answer: C
Diff: 3
Keywords: normal, probability, z-value
Section: 6-1 The Normal Probability Distribution
Outcome: 2

67) A store sells 6 different models of cell phones and have found that they sell an equal number of each model. The probability distribution that would describe this random variable is called:
A) uniform distribution.
B) Poisson distribution.
C) continuous distribution.
D) relative frequency distribution.
Answer: A
Diff: 1
Keywords: uniform distribution
Section: 6-2 Other Continuous Probability Distributions
Outcome: 1

68) Which of the following probability distributions would most likely be used to describe the time between failures for electronic components?
A) Binomial distribution
B) Exponential distribution
C) Uniform distribution
D) Normal distribution
Answer: B
Diff: 1
Keywords: exponential distribution, continuous
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

69) It is assumed that the time customers spend in a record store is uniformly distributed between 3 and 12 minutes. Based on this information, what is the probability that a customer will spend more than 9 minutes in the record store?
A) 0.33
B) 0.1111
C) 0.67
D) 0.25
Answer: A
Diff: 2
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

70) It is assumed that the time customers spend in a record store is uniformly distributed between 3 and 12 minutes. Based on this information, what is the probability that a customer will be exactly 7.50 minutes in the record store?
A) 0.1250
B) 0.05
C) Essentially zero
D) 0.111
Answer: C
Diff: 1
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

71) Employees at a large computer company earn sick leave in one-minute increments depending on how many hours per month they work. They can then use the sick leave time any time throughout the year. Any unused time goes into a sick bank account that they or other employees can use in the case of emergencies. The human resources department has determined that the amount of unused sick time for individual employees is uniformly distributed between 0 and 480 minutes. Based on this information, what is the probability that an employee will have less than 20 minutes of unused sick time?
A) 0.002
B) 0.966
C) 0.063
D) 0.042
Answer: D
Diff: 2
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

72) Employees at a large computer company earn sick leave in one-minute increments depending on how many hours per month they work. They can then use the sick leave time any time throughout the year. Any unused time goes into a sick bank account that they or other employees can use in the case of emergencies. The human resources department has determined that the amount of unused sick time for individual employees is uniformly distributed between 0 and 480 minutes. Based on this information, what is the probability that three randomly chosen employees have over 400 unused sick minutes at the end of the year?
A) 0.1667
B) 0.0046
C) 0.5001
D) 0.0300
Answer: B
Diff: 3
Keywords: uniform, probability, multiplication
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

73) Employees at a large computer company earn sick leave in one-minute increments depending on how many hours per month they work. They can then use the sick leave time any time throughout the year. Any unused time goes into a sick bank account that they or other employees can use in the case of emergencies. The human resources department has determined that the amount of unused sick time for individual employees is uniformly distributed between 0 and 480 minutes. The company has decided to give a cash payment to any employee that returns over 400 minutes of sick leave at the end of the year. What percentage of employees could expect a cash payment?
A) 16.67 percent
B) 0.1667 percent
C) Just over 43 percent
D) 80 percent
Answer: A
Diff: 2
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

74) Employees at a large computer company earn sick leave in one-minute increments depending on how many hours per month they work. They can then use the sick leave time any time throughout the year. Any unused time goes into a sick bank account that they or other employees can use in the case of emergencies. The human resources department has determined that the amount of unused sick time for individual employees is uniformly distributed between 0 and 480 minutes. The company has decided to give a cash payment to any employee that returns over a specified amount of sick leave minutes. Assuming that the company wishes no more than 5 percent of all employees to get a cash payment, what should the required number of minutes be?
A) 24 minutes
B) 419 minutes
C) 456 minutes
D) 470 minutes
Answer: C
Diff: 2
Keywords: uniform, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

75) It is thought that the time between customer arrivals at a fast food business is exponentially distributed with λ equal to 5 customers per hour. Given this information, what is the mean time between arrivals?
A) 12 minutes
B) 5 minutes
C) 5 hours
D) 2 minutes
Answer: A
Diff: 1
Keywords: exponential, expected value
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

76) It is assumed that the time failures for an electronic component are exponentially distributed with a mean of 50 hours between consecutive failures. Based on this information, what is the probability that a randomly selected part will fail in less than 10 hours?
A) About 0.82
B) About 0.20
C) About 0.33
D) About 0.18
Answer: D
Diff: 2
Keywords: exponential, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

77) It is assumed that the time failures for an electronic component are exponentially distributed with a mean of 50 hours between consecutive failures. What is the probability that a component will be functioning after 60 hours?
A) Approximately 0.30
B) About 0.70
C) About 0.21
D) About 0.49
Answer: A
Diff: 2
Keywords: exponential, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

78) It is assumed that the time failures for an electronic component are exponentially distributed with a mean of 50 hours between consecutive failures. If one extra component is installed as a backup, what is the probability of at least one of the two components working for at least 60 hours?
A) About 0.51
B) About 0.09
C) About 0.06
D) About 0.70
Answer: A
Diff: 3
Keywords: exponential, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

79) The transportation manager for the State of New Jersey has determined that the time between arrivals at a toll booth on the state's turnpike is exponentially distributed with $\lambda = 4$ cars per minute. Based on this, the average time between arrivals is:
A) 15 seconds.
B) 12 seconds.
C) 25 seconds.
D) 4 minutes.
Answer: A
Diff: 2
Keywords: exponential, lambda
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

80) The transportation manager for the State of New Jersey has determined that the time between arrivals at a toll booth on the state's turnpike is exponentially distributed with $\lambda = 4$ cars per minute. Based on this information, the standard deviation for the time between arrivals is:
A) 25 seconds.
B) 3.87 seconds.
C) 15 seconds.
D) 2 minutes.
Answer: C
Diff: 1
Keywords: exponential, lambda, mean, standard deviation
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

81) The transportation manager for the State of New Jersey has determined that the time between arrivals at a toll booth on the state's turnpike is exponentially distributed with $\lambda = 4$ cars per minute. Based on this information, what is the probability that the time between any two cars arriving will exceed 11 seconds?
A) Approximately 1.0
B) Approximately 0.48
C) About 0.52
D) About 0.75
Answer: B
Diff: 2
Keywords: exponential, lambda, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

82) The time between calls to an emergency 911-call center is exponentially distributed with a mean time between calls of 645 seconds. Based on this information, what is the probability that the time between the next two calls is between 200 and 400 seconds?
A) Approximately 0.47
B) About 0.199
C) About 0.747
D) About 0.801
Answer: B
Diff: 3
Keywords: exponential, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

83) For a standardized normal distribution, calculate P(z < 1.5).
A) 0.9332
B) 0.0668
C) 0.333
D) 0.667
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

84) For a standardized normal distribution, calculate P(z ≥ 0.85).
A) 0.8033
B) 0.1977
C) 0.2340
D) 0.7660
Answer: B
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

85) For a standardized normal distribution, calculate P(-1.28 < z < 1.75).
A) 0.3997
B) 0.4599
C) 0.1404
D) 0.8596
Answer: D
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

86) For a standardized normal distribution, calculate P(0.00 < z < 2.33).
A) 0.7181
B) 0.5099
C) 0.4901
D) 0.2819
Answer: C
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

87) For a standardized normal distribution, calculate $P(-1.00 < z < 1.00)$.
A) 0.6826
B) 0.6667
C) 0.4572
D) 0.5521
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

88) For a standardized normal distribution, calculate $P(1.78 < z < 2.34)$.
A) 0.0124
B) 0.0341
C) 0.0412
D) 0.0279
Answer: D
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

89) For a standardized normal distribution, determine a value, say z_0, so that $P(0 < z < z_0) = 0.4772$.
A) 2.00
B) 2.33
C) 1.85
D) 1.66
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

90) For a standardized normal distribution, determine a value, say z_0, so that $P(-z_0 \leq z < 0) = 0.45$.
A) 1.84
B) 1.645
C) 1.96
D) 1.33
Answer: B
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

91) For a standardized normal distribution, determine a value, say z_0, so that $P(-z_0 \leq z \leq z_0) = 0.95$.
A) 2.14
B) 1.65
C) 1.96
D) 1.24
Answer: C
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

92) For a standardized normal distribution, determine a value, say z_0, so that $P(z > z_0) = 0.025$.
A) 1.96
B) 1.65
C) 1.24
D) 2.14
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

93) For a standardized normal distribution, determine a value, say z_0, so that $P(z \leq z_0) = 0.01$.
A) -2.33
B) -1.96
C) 2.33
D) 1.96
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

94) Consider a random variable, z, that has a standardized normal distribution. Determine $P(0 < z < 1.96)$.
A) 0.1250
B) 0.5250
C) 0.3250
D) 0.4750
Answer: D
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

95) Consider a random variable, z, that has a standardized normal distribution. Determine P(z > 1.645).
A) 0.05
B) 0.01
C) 0.03
D) 0.45
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

96) Consider a random variable, z, that has a standardized normal distribution. Determine P (1.28 < z < 2.33).
A) 0.0126
B) 0.3997
C) 0.0904
D) 0.4901
Answer: C
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

97) Consider a random variable, z, that has a standardized normal distribution. Determine (-2 ≤ z ≤ 3).
A) 0.12414
B) 0.97587
C) 0.47722
D) 0.49865
Answer: B
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

98) Consider a random variable, z, that has a standardized normal distribution. Determine P(z > -1).
A) 0.8413
B) 0.1251
C) 0.1512
D) 0.2124
Answer: A
Diff: 1
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

99) A random variable, x, has a normal distribution with $\mu = 13.6$ and $\sigma = 2.90$. Determine a value, x_0, so that $P(x > x_0) = 0.05$.
A) 14.46
B) 15.33
C) 18.37
D) 12.45
Answer: C
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

100) A random variable, x, has a normal distribution with $\mu = 13.6$ and $\sigma = 2.90$. Determine a value, x_0, so that $P(x \leq x_0) = 0.975$.
A) 16.678
B) 19.284
C) 23.360
D) 14.475
Answer: B
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

101) A random variable, x, has a normal distribution with $\mu = 13.6$ and $\sigma = 2.90$. Determine a value, x_0, so that $P(\mu - x_0 \leq x \leq \mu + x_0) = 0.95$.
A) 7.916
B) 4.535
C) 3.178
D) 9.425
Answer: A
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

102) For the normal distribution with parameters $\mu = 5$, $\sigma = 2$; calculate $P(0 < x < 8)$.
A) 0.8023
B) 0.4152
C) 0.9270
D) 0.8845
Answer: C
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

103) For the normal distribution with parameters $\mu = 5$, $\sigma = 4$; calculate $P(0 < x < 8)$.
A) 0.8841
B) 0.8812
C) 0.4215
D) 0.6678
Answer: D
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

104) For the normal distribution with parameters $\mu = 3$, $\sigma = 2$; calculate $P(0 < x < 8)$.
A) 0.3124
B) 0.9270
C) 0.8123
D) 0.6723
Answer: B
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

105) For the normal distribution with parameters $\mu = 4$, $\sigma = 3$; calculate $P(x > 1)$.
A) 0.8413
B) 0.4562
C) 0.7812
D) 0.4152
Answer: A
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

106) For the normal distribution with parameters $\mu = 0$, $\sigma = 3$; calculate $P(x > 1)$.
A) 0.5812
B) 0.1214
C) 0.3707
D) 0.4412
Answer: C
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

107) A randomly selected value from a normal distribution is found to be 2.1 standard deviations above its mean. What is the probability that a randomly selected value from the distribution will be greater than 2.1 standard deviations above the mean?
A) 0.0179
B) 0.0512
C) 0.0231
D) 0.0024
Answer: A
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

108) A randomly selected value from a normal distribution is found to be 2.1 standard deviations above its mean. What is the probability that a randomly selected value from the distribution will be less than 2.1 standard deviations from the mean?
A) 0.9488
B) 0.9821
C) 0.9976
D) 0.9712
Answer: B
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

109) A random variable is normally distributed with a mean of 25 and a standard deviation of 5. If an observation is randomly selected from the distribution, what value will be exceeded 10% of the time?
A) 31.40
B) 28.60
C) 66.23
D) 14.56
Answer: A
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

110) A random variable is normally distributed with a mean of 25 and a standard deviation of 5. If an observation is randomly selected from the distribution, what value will be exceeded 85% of the time?
A) 16.2
B) 17.9
C) 19.8
D) 14.2
Answer: C
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

111) A random variable is normally distributed with a mean of 25 and a standard deviation of 5. If an observation is randomly selected from the distribution, determine two values of which the smallest has 25% of the values below it and the largest has 25% of the values above it.
A) 18.85 and 27.94
B) 19.31 and 21.12
C) 16.23 and 18.82
D) 21.65 and 28.35
Answer: D
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

112) A random variable is normally distributed with a mean of 25 and a standard deviation of 5. If an observation is randomly selected from the distribution, what value will 15% of the observations be below?
A) 19.8
B) 16.2
C) 18.7
D) 17.2
Answer: A
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 1

113) If a continuous random variable is said to be exponentially distributed, what would be the easiest way to reduce the standard deviation?
Answer: The standard deviation of an exponential distribution is equal to the mean ($1/\lambda$) so the easiest way to reduce the standard deviation is to reduce the mean. This would be done by increasing λ.
Diff: 1
Keywords: exponential distribution, standard deviation, mean
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

114) What is the difference between a normal distribution and the standard normal distribution?
Answer: A normal distribution is a bell-shaped distribution defined by two parameters, μ and σ. The values for the mean and standard deviation reflect the population data and may be any values. Thus, a normal distribution may be centered at any value and may have any spread, but it will have the common bell shape. The standard normal distribution is a specific normal distribution with mean = 0 and standard deviation equal to 1.0. The horizontal axis of the standard normal distribution represents z-values. Any normal distribution can be converted to the standard normal by converting the random variable values to z-values.
Diff: 2
Keywords: normal distribution, standard normal distribution, mean, standard deviation
Section: 6-1 The Normal Probability Distribution
Outcome: 1

115) The weight of sacks of potatoes is normally distributed with a mean of 20 pounds and a standard deviation of 2 pounds. The weight of sacks of onions is also normally distributed with a mean of 20 pounds and a standard deviation of 0.50 pounds. Based on this information, which product will yield the highest probability of getting a very heavy sack?
Answer: Since both products have the same mean and are both normally distributed, the one with the largest standard deviation will provide the higher probability of a heavy sack. Since potatoes have a standard deviation of 2 pounds compared to 0.50 pounds for onions, you would be more apt to see a very heavy sack of potatoes than onions.
Diff: 1
Keywords: normal distribution, mean, standard deviation, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

116) A class takes an exam where the average time to complete the exam is normally distributed with a time of 40 minutes and standard deviation of 9 minutes. If the class lasts 1 hour, what percent of the students will have turned in the exam after 60 minutes?
Answer: We are looking for the area under the curve to the left of 60 minutes, which is above the mean so we need the area between 40 and 60 and then 0.5 will be added.
$z = \frac{x - \mu}{\sigma} = \frac{60 - 40}{9} = 2.22$. Looking up 2.22 in the standard normal table we find 0.4868, which is the area between 40 and 60. So P(time $\leq$ 60) = .5 + .4868 = .9868, which means 98.7 percent of class finishes the test before time is up.
Diff: 2
Keywords: normal distribution, standard normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

117) The fares received by taxi drivers working for the City Taxi line are normally distributed with a mean of $12.50 and a standard deviation of $3.25. Based on this information, what is the probability that a specific fare will exceed $15.00?
Answer: Since this is a normal distribution problem, the first step is to convert the normal distribution to a standard normal distribution. We do this by converting the $15.00 value to a z-value using:
$z = \frac{x - \mu}{\sigma} = \frac{15.00 - 12.50}{3.25} = 0.7692 \approx 0.77$. Then we go to the standard normal table and locate a z-value = 0.77. The probability corresponding to z = 0.77 is 0.2794. The table in the text always gives the probability between the z-value and the mean. Since we want $P(x > \$15.00)$, we need to subtract from 0.50, giving 0.5000 - 0.2794 = 0.2206.
Diff: 2
Keywords: normal distribution, standard normal, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

118) The fares received by taxi drivers working for the City Taxi line are normally distributed with a mean of $12.50 and a standard deviation of $3.25. Suppose a driver has four consecutive fares that are less than $6.00. What is the probability of this happening?
Answer: Since this is a normal distribution problem, the first step is to convert the normal distribution to a standard normal distribution. We do this by converting the $6.00 value to a z-value using:
$z = \frac{x - \mu}{\sigma} = \frac{6.00 - 12.50}{3.25} = -2.00$. Then we go to the standard normal table and locate a z-value = -2.00.
The probability corresponding to z = -2.00 is 0.4772. The table in the text always gives the probability between the z-value and the mean. Since we want P(x ≤ $6.00), we need to subtract from 0.50, giving 0.5000 - 0.4772 = 0.0228. This is the probability of one fare being less than $6.00. To get the probability of four consecutive fares being less than $6.00, we can use the multiplication rule for independent events discussed in Chapter 4.
This gives: 0.0228 × 0.0228 × 0.0228 × 0.0228 = 0.0000003. Since this is such a low probability, we would not expect such an event to occur. If it did, then it is likely that the fare distribution has changed.
Diff: 2
Keywords: normal distribution, probability
Section: 6-1 The Normal Probability Distribution
Outcome: 2

119) The money spent by people at an amusement park, after paying to get in the gate, is thought to be uniformly distributed between $5.00 and $25.00. Based on this, what is the probability that someone will spend between $8.00 and $12.00?
Answer: The continuous uniform probability distribution has a function: $f(x) = \frac{1}{b - a}$ where b is the upper extreme of the distribution ($25.00) and a is the lower extreme ($5.00).
Then $f(x) = \frac{1}{25.00 - 5.00} = \frac{1}{20} = 0.05$.
Now, $p(8.00 \le x \le x \le 12.00) = f(x)(12.00 - 8.00) = 0.05(4.00) = 0.20$. Thus, there is a 0.20 probability that someone will spend between $8.00 and $12.00 after getting into the amusement park.
Diff: 2
Keywords: uniform distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

120) In comparing a uniform distribution with a normal distribution where both distributions have the same mean and the same range, explain which distribution will have the larger standard deviation.
Answer: A picture of this situation would show a larger area of the uniform distribution farther away from the mean. In the normal distribution, the majority of the distribution is close to the mean and a much smaller proportion is near the edges. As the empirical rule says, about 68 percent should be within one standard deviation of the mean. In the uniform distribution this percentage will be lower (about 58 percent). Further the standard deviation of the normal distribution can be approximated using the 6-sigma rule of thumb for the range, meaning that the standard deviation is approximately 1/6 of the range. In the uniform distribution the standard deviation is (range)/3.46, where 3.46 is the square root of 12. All of which gives a larger standard deviation to the uniform distribution.
Diff: 3
Keywords: uniform distribution, normal distribution
Section: 6-2 Other Continuous Probability Distributions
Outcome: 4

121) At the West-Side Drive-Inn, customers arrive at the rate of 10 every 30 minutes. The time between arrivals is exponentially distributed. Given this, what is the mean time between arrivals?
Answer: The parameter for the exponential distribution is lambda, λ. This was given as 10 per 30 minutes. Then the mean time between arrivals is $\frac{1}{\lambda} = \frac{1}{10} = 0.10$. The value 0.10 represents the fraction of the 30 minutes that occurs between arrivals. Thus, the mean time between arrivals is 0.10(30 minutes) = 3 minutes. On average, customers arrive every 3 minutes.
Diff: 2
Keywords: exponential distribution, mean
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5

122) At the West-Side Drive-Inn, customers arrive at the rate of 10 every 30 minutes. The time between arrivals is exponentially distributed. Based on this information, what is the probability that the time between two customers arriving will exceed 6 minutes?
Answer: To solve this problem, we are looking for $P(x > 6)$. It will be helpful to use the complement approach. Therefore, we wish to find $1 - P(x \leq 6)$. Since we are dealing with an exponential distribution with arrival rate equal to 10 per 30 minutes, λ = 10 per 30 minutes = 0.33 per minute. Then we use $P(x \leq a) = 1 - e^{-\lambda a}$. To do this we can use either the table of exponential values in the back of the text or software such as Excel. We are looking for:
$1 - (1 - e^{-33(6)}) = 1 - (1 - e^{2}) = 1 - (1 - 0.1353) = 0.1353$
Thus, there is approximately a 0.1353 probability that the time between two customers arriving will exceed 6 minutes. Note that if Excel or other software is used, the answer might be slightly different due to rounding differences.
Diff: 2
Keywords: exponential distribution, probability
Section: 6-2 Other Continuous Probability Distributions
Outcome: 5