**Review chapter 4**

1. Suppose that a continuous random variable X has probability density function f(x) = 4x3, 0 ≤ x ≤ 1.
2. Find P(X ≥ 2/3).
3. Find the mean and standard deviation of X.
4. The amount of time (in minutes) that a train is late is modeled by a continuous random variable Y with probability density function (A negative value of Y corresponds to the train being early)
5. Find the mean and the variance of the amount of time in minutes the train is late.
6. Find the probability that a train is late under 3 minutes.
7. Find F(1).
8. Let  be a cumulative distribution function of a continuous random variable X. a) Find P( X < 0.7). b) Find f(2). C) Find P(0.2 < X < 0.5)
9. The time it takes to assemble a children's bicycle by a parent 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, what is the probability that it will take a randomly selected parent between 300 and 340 minutes?.

A) 0.0438 B) 0.2975 C) 0.3413 D) 1.000

5) Let X be a normal distribution with the mean of 4 and the variance of 9. Find the value of x such that P(x < X < 7) = 0.5.

A)0 B) 2.8 C) 7 D) 4

6 ) 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,

1. what is the probability that the time it takes for a randomly selected customer will be less than 5 minutes?

A) 0.30 B) 0.80 C) 0.40 D) 0.20

b) Find amount of time in which 95% of customers are served.

7) 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. Let, the time limit should be:

A) approximately 5.19 minutes B) about 14.58 minutes.

C) 10.35 minutes. D) about 11.23 minutes.

8) The life expectancy (in years) of a component in a microcomputer is an exponential random variable. A third of the components fail in the first 3 years. The company that manufactures the component offers one year warranty. What is the probability that a component will fail during the warranty period?

9) Let X be a random variable that have exponential distribution with standard deviation of 3. Find P(X > 1).

A) 2.718 B) 3.504 C) 1.024 D) None of the others.

10) The lifetime X of an electronic component has an exponential distribution such that P(X<=1000) =0.75. What is the expected lifetime of the component?

11) The life of a certain brand of light bulb can be approximated by the exponential probability density function, if the mean life of the light bulb is 100 hours, determine the probability that the bulb will last more than 1000 hours.

12) The length of time for telephone conversations (in minutes) is exponentially distributed with average (mean) length of conversation of 3 minutes. What is the probability that a conversation lasts less than 2 minutes?

13) For standard normal curve, what is the area between the mean and 0.85 standard deviation below the mean?

14) What x score is exceeded by 10% of all scores under the normal curve with mean of 5 and standard deviation of 2?

15) Let X be a uniformly distributed random variable. Assume that P(X<30)= ¼; P(X>50) = ¼.

a) Find the probability density function of X. b) Find the cumulative distribution function of X.

c) Find mean and standard deviation of X. d) Find P(20<X<40).

16) Find P(μ-σ < X < μ+σ) if X is uniformly distributed on[-5; 5].

17) Let X be a uniformly distributed random variable. Assume Pr(X< 30)= 1/4; and P(X ≥ 50) = 1/4

a) Find f(x) & F(x). b) Find the expected value and standard deviation of X.

18) The time (in minutes) it takes adult o memorize a sequence of random digits is an exponential random variable. The average (mean) time is 2minutes. What is the probability that it takes an adult over ﬁve minutes to memorize the digits?

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9) The systolic blood pressure of 18-year-old women is normally distributed with a mean of 120 mmHg and a standard deviation of 12 mmHg.

a) What percentage of 18-year-old women have a systolic blood pressure that lies within 3 standard deviations of the mean.

b) What level of systolic blood pressure is exceeded by 90% of 18-year-old women?

20) The systolic blood pressure of 18-year-old women is normally distributed with a mean of 120 mmHg and a standard deviation of 12 mmHg. What percentage of 18-year-old women have systolic blood pressures that lies within 3 standard deviations of the mean?