Thanos Exam - 10.3

1) The candidates for a bank teller job sit 3 examinations; in English, Mathematics and Economics. For each candidate, the score in English has 35% of the overall score, the score in Mathematics has 25% of the overall score and the score of the Economics has 40% of the overall score. Michael scored 70 points in English, 62 points in Mathematics and 80 points in Economics. What was his overall score?

2) Let X be the glucose level (in milligrams per 100 milliliters) of diabetics. It may be assumed that X ~ N (106, 8 ^ 2). Find a). The probability that a diabetic has a glucose level of at most 120mg/100ml. b). The probability that a diabetic has a glucose level more than 130mg/100ml. c). The level of glucose such that 90% of diabetics have less than this value. d). A hospital serves 5800 diabetics. How many are expected to have a glucose level of more than 110mg/100ml.

3) Let X ~ Po ( 10 ) a). Find E(X) b). Find Var(X) c). Write the expression for the pdf of X d). p ( X<= 4 ) e). p ( X < 4 ) f). p ( X = 4 ) g). p ( 4 <= X <= 9 )

4) On average California is hit every year by 1 destructive earthquake. Find the probability that California will experience a. two such earthquakes during a 6-month period b. one such earthquake during a 4-month period

5) Let X ~ B(15,0.2) a). Write the expression for the density of X . b). Evaluate E(X) and Var(X) c). Find F(1) by evaluating the pdf. Compare your answer to that given in Table 1. d). Using Table 1 find i). p( X <= 5 ) ii). p ( x < 5 ) iii). p( X >= 3 ) iv). F( 9 ) v). F ( 20 ) vi). p ( 2 <= X < 7 ) vii). p ( 2 <= X <= 7 ) viii). p( X = 10 )

6) A data set consists of 85 data entries and the mean is 3. A new data entry is added and the new mean is still 3. Find the value of this new data entry

7) A sample consists of 14 data entries and the mean is 4.5. A new data entry, which has the value 0, is added to the sample. Find the mean of the new sample

8) A machine that stuffs a cheese-filled snack product can be adjusted for the amount of cheese injected into each unit. A random sample of 34 units was selected. The sample mean amount of cheese injected was 3.5 gr. The distribution is normal and the population standard deviation is known and its value is 0.3 gr. Find the 95% confidence interval for the average amount of cheese injected by the machine.

9) A random sample of 93 American firms is selected. Each firm is asked to report the number of new products it introduced last year. The sample mean was 26.7 new products. Note that the population standard deviation is known and its value is 7.5 new products. Calculate the 99% confidence interval for the population mean number of new products introduced by all American firms in the last year.

10) Let 𝑋 denote the time in hours needed to locate and correct a problem in the software that regulates the timing of traffic lights in the center of a large city. Assume that 𝑋 is normally distributed with mean 8.5 and variance 7. a). Find the probability that the next traffic lights problem will require i). at most 13 hours to find and correct. ii). More than 6 hours to find and correct iii). Between 9 and 15 hours to find and correct b). The fastest 2.5% of repairs take at most how many hours to complete? c) The slowest 1% of repairs take at least how many hours to complete?

11) In a certain manufacturing process it is known that 1% of the items inspected are defective. What is the probability that the 5th product inspected is the first to be found defective?

12) The mean in a midterm examination was 67 points. Out of the 30 students that took the examination, 4 scored the same number of points. One week later these 4 students withdrew from the course. The lecturer deleted their names and scores from her list and found that the mean of the midterm examination became 73. What was the score of each of the 4 students?

13) In this course the midterm examination has 40% of the overall course score, the final examination has 50% of the overall course score and class participation has 10% of the overall course score. Joan got 60 points in the midterm examination, 66 points in the final examination and 90 points for class participation. What was her overall course score?

14) A sample of the files of 8 public servants revealed that, last year, they missed the following number of days due to illness: 16, 20, 11, 14, 10, 13, 21, 31. Find the mean, median, variance, standard deviation and range.