

In the space provided, please report your answers to each question and consistently round to two decimal places for the most accurate answers. Please show as many calculations as possible. It is strongly suggested that you attach additional

Name: \_\_\_\_\_

Person Number \_\_\_\_\_

Recitation Section: \_\_\_\_\_

### Exam Practice Problem Set (Ch5-8)

1.) For a test with  $\mu = 78$  and  $\sigma = 5.5$ , calculate the z-score for the following scores:

a.) 83:  $z =$  \_\_\_\_\_

c.) 46:  $z =$  \_\_\_\_\_

b.) 95:  $z =$  \_\_\_\_\_

d.) 78:  $z =$  \_\_\_\_\_

2.) Convert the following z-scores back to their corresponding raw scores based on these population parameters :  $\mu = 300$  and  $\sigma = 75$ .

a.)  $z = 1.67$ :  $X =$  \_\_\_\_\_

c.)  $z = -0.41$ :  $X =$  \_\_\_\_\_

b.)  $z = 2.62$ :  $X =$  \_\_\_\_\_

d.)  $z = -1.17$ :  $X =$  \_\_\_\_\_

3.) Sarah received a 91 on her history exam and a 76 on her statistics exam. Given the means and standard deviations below, report the z-scores and which exam she did better on. Identify who did better.

History:  $\mu = 90$ ,  $\sigma = 5$

Statistics:  $\mu = 65$ ,  $\sigma = 8$

What were her z-scores for each test?

History: \_\_\_\_\_

Statistics: \_\_\_\_\_

4.) For any distribution, what is the z-score corresponding to the mean? \_\_\_\_\_. What is the z-score corresponding to the 2 standard deviations above the mean? \_\_\_\_\_.

5.) For a sample with  $M = 80$ , a score of  $X = 88$  corresponds to  $z = 2.00$ . What is the sample standard deviation? \_\_\_\_\_.

6.) A normal distribution has a mean of  $\mu = 100$  with  $\sigma = 20$ . If one score is randomly selected from this distribution, what is the probability that the score will be less than  $X = 84$ ? \_\_\_\_\_

7.) IQ scores form a normal distribution with  $\mu = 100$  and  $\sigma = 15$ . Individuals with IQs above 140 are classified in the genius category. What proportion of the population consists of geniuses? \_\_\_\_\_

8.) A normal distribution has a mean of  $\mu = 100$  with  $\sigma = 20$ . If one score is randomly selected from this distribution, what is the probability that the score will have a value between  $X = 90$  and  $X = 120$ ?

9.) Scores on the SAT form a normal distribution with a mean of  $\mu = 500$  with  $\sigma = 100$ . If the state college only accepts students who score in the top 60% on the SAT, what is the minimum score needed to be accepted? \_\_\_\_\_

10.) In a normal distribution, what z-score value separates the lowest 25% of the scores from the rest of the distribution? \_\_\_\_\_

11.) A bowl of Halloween candy has 17 Kit-Kats, 23 Hershey bars, 11 Starbursts, and 14 Skittles packets.

Assuming sampling with replacement:

a.) What is the probability that you will select a piece of chocolate candy? \_\_\_\_\_

b.) What is the probability that you will select a Starburst? \_\_\_\_\_

Now assuming sampling without replacement:

c.) If you select a random sample of  $n=4$  and the first three candies are a 2 Kit-Kats and a Skittles, what is the probability that you will select a chocolate piece of candy as the fourth item?

d.) If you select a random sample of  $n=4$  and the first three candies are 1 Kit-Kat, 1 Skittles, and 1 Hershey bar, what is the probability that the final candy will be a Starburst?

12.) A population of 32 scores has a rectangular shape and a mean of  $\mu = 44$ .

a.) If all possible samples are taken from this distribution of scores, how what will the shape of the distribution of sample means be?

b.) If all possible samples are taken from this distribution of scores, what will the mean of the sampling distribution be?

13.) Describe what the standard error of the mean ( $\sigma_M$ ) represents?

14.) For a population with a mean of  $\mu = 50$  and a standard deviation of  $\sigma = 10$ , how much error, on average, would you expect between the sample mean ( $M$ ) and the population mean for:

a) A sample of  $n = 4$  scores

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b) A sample of  $n = 16$  scores

.....

c) A sample of  $n = 25$  score

15.) For a normal population with  $\mu = 70$  and  $\sigma = 20$ , what is the probability of obtaining a sample mean greater than  $M = 75$

a) For a random sample of  $n = 4$ ?

b) For a random sample of  $n = 16$ ?

c) For a random sample of  $n = 100$ ?