

**Statistis STA 2033**

Review for Test 2

Name \_\_\_\_\_

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**Draw th normal model and use it to answer the question.**

- 1) The amount of Jen's monthly phone bill is normally distributed with a mean of \$55 and a standard deviation of \$8. Fill in the blanks. 68% of her phone bills are between \$\_\_\_ and \$\_\_\_. 1) \_\_\_\_\_

**In a large class, the professor has each person toss a coin several times and calculate the proportion of his or her tosses that were heads. The students then report their results, and the professor plots a histogram of these several proportions.**

**Use the 68–95–99.7 Rule to provide the appropriate response.**

- 2) If the students toss the coin 80 times each, about 95% should have proportions between what two numbers? 2) \_\_\_\_\_

**Find the specified probability.**

- 3) The number of hours per week that high school seniors spend on computers is normally distributed, with a mean of 5 hours and a standard deviation of 2 hours. 70 students are chosen at random. Let  $\bar{y}$  represent the mean number of hours spent on the computer for this group. Find the probability that  $\bar{y}$  is between 5.1 and 5.7. 3) \_\_\_\_\_

- 4) According to Gallup, about 33% of Americans polled said they frequently experience stress in their daily lives. Suppose you are in a class of 45 students. 4) \_\_\_\_\_

- a. What is the probability that no more than 12 students in the class will say that they frequently experience stress in their daily lives? (Make sure to identify the sampling distribution you use and check all necessary conditions.)
- b. If 20 students in the class said they frequently experience stress in their daily lives, would you be surprised? Explain, and use statistics to support your answer.

- 5) The average composite ACT score for Ohio students who took the test in 2003 was 21.4. Assume that the standard deviation is 1.05. In a random sample of 25 students who took the exam in 2003, what is the probability that the average composite ACT score is 22 or more? 5) \_\_\_\_\_

**Find the specified probability, from a table of Normal probabilities. Assume that the necessary conditions and assumptions are met.**

- 6) A summer resort rents rowboats to customers but does not allow more than four people to a boat. Each boat is designed to hold no more than 800 pounds. Suppose the distribution of adult males who rent boats, including their clothes and gear, is normal with a mean of 195 pounds and standard deviation of 10 pounds. If the weights of individual passengers are independent, what is the probability that a group of four adult male passengers will exceed the acceptable weight limit of 800 pounds? 6) \_\_\_\_\_

**Provide an appropriate response.**

- 7) The weights of hens' eggs are normally distributed with a mean of 56 grams and a standard deviation of 4.8 grams. What is the probability that a dozen randomly selected eggs weighs over 690 grams? 7) \_\_\_\_\_

**Find the specified probability, from a table of Normal probabilities. Assume that the necessary conditions and assumptions are met.**

- 8) The annual precipitation amounts in a certain mountain range are normally distributed with a mean of 77 inches, and a standard deviation of 10 inches. What is the probability that the mean annual precipitation during 25 randomly picked years will be less than 79.8 inches? 8) \_\_\_\_\_

**Answer the question.**

- 9) In a large class, the professor has each person toss a coin 200 times and calculate the proportion of his or her tosses that were tails. The students then report their results, and the professor records the proportions. One student claims to have tossed her coin 200 times and found 58% tails. What do you think of this claim? Explain your response. 9) \_\_\_\_\_

**Find the specified probability, from a table of Normal probabilities. Assume that the necessary conditions and assumptions are met.**

- 10) Researchers believe that 6% of children have a gene that may be linked to a certain childhood disease. In an effort to track 50 of these children, researchers test 950 newborns for the presence of this gene. What is the probability that they do not find enough subjects for their study? 10) \_\_\_\_\_
- 11) When a truckload of oranges arrives at a packing plant, a random sample of 125 is selected and examined. The whole truckload will be rejected if more than 8% of the sample is unsatisfactory. Suppose that in fact 10% of the oranges on the truck do not meet the desired standard. What's the probability that the shipment will be rejected? 11) \_\_\_\_\_

**Answer the question appropriately.**

- 12) A philosophy professor has found a correlation of 0.80 between the number of hours students study for his exams and their exam performance. During the time he collected the data, students studied an average of 10 hours with a standard deviation of 2.5 hours, and scored an average of 80 points with a standard deviation of 7.5 points. Create a linear model to estimate the number of points a student will score on the next exam from the number of hours the student studies. 12) \_\_\_\_\_

An article in the *Journal of Statistics Education* reported the price of diamonds of different sizes in Singapore dollars (SGD). The following table contains a data set that is consistent with this data, adjusted to US dollars in 2004:

2004 US \$	Carat	2004 US \$	Carat	2004 US \$	Carat
494.82	0.12	688.24	0.15	748.10	0.16
768.03	0.17	944.90	0.18	1076.18	0.19
1105.03	0.20	1071.75	0.21	1289.20	0.23
1508.88	0.25	1504.44	0.26	1597.63	0.27
1826.18	0.28	1908.28	0.29	2038.09	0.32
2096.89	0.33	2409.76	0.35		

- 13) Make a scatterplot and describe the association between the size of the diamond (carat) and the cost (in US dollars). 13) \_\_\_\_\_
- 14) Create a model to predict diamond costs from the size of the diamond. 14) \_\_\_\_\_

15) Do you think a linear model is appropriate here? Explain. 15) \_\_\_\_\_

16) Interpret the slope of your model in context. 16) \_\_\_\_\_

17) Interpret the intercept of your model in context. 17) \_\_\_\_\_

18) What is the correlation between cost and size? 18) \_\_\_\_\_

19) Explain the meaning of  $R^2$  in the context of this problem. 19) \_\_\_\_\_

20) Would it be better for a customer buying a diamond to have a negative residual or a positive residual from this model? Explain. 20) \_\_\_\_\_