Math 206 - Test 2

Name _____

March 17, 2010

Score _____

Show all work. Supply explanations when necessary.

1. (4 points) For each of the following situations, tell which type of graph would best display the data. Choose from *line plot*, *bar graph*, *histogram*, *line graph*, *stem-and-leaf plot*, or *circle graph*. You may receive partial credit if you explain your reasoning.

   (a) A teacher has just returned the graded tests to a class of twenty-seven students. The test scores are whole numbers that range from 48 to 96. The teacher would like to show the entire list of scores.

   (b) A botany class spent the day at Morton Arboretum collecting leaves from mature elm trees. The leaves were measured, placed into groups according to lengths, and counted. The class would like to draw a graph to illustrate the numbers of leaves in the different groups.

   (c) A company's annual budget is $457,000. This money is budgeted into eight different categories. The company's president would like to make a chart showing the employees how the budget is divided into the eight categories.

   (d) Going back to 1990, the student government has obtained the total number of enrolled students for each academic year. The Student Government Association wants to make a chart showing how the enrollment has changed over the years.

2. (4 points) Construct a box plot (box-and-whisker plot) for the following set of home-work scores. Indicate outliers, if any, with asterisks.

$$85 \quad 80 \quad 70 \quad 70 \quad 60 \quad 80 \quad 60 \quad 35 \quad 85 \quad 10$$

3. (3 points) Halfway through the semester, John lost his notebook and along with it, his first four graded tests. He did remember, however, that his mean score of the four tests was 73. If John scored 68 and 78 on his last two tests, what is the mean score of all his tests?

4. (1 point) In a game where payoffs are involved, what does it mean to be a fair game?

5. (2 points) After collecting data from all of his classes, Horatio assigned probabilities to his grades. His probabilities are given in the following table. Grades are listed according to a 4-point scale: 4-A, 3-B, 2-C, 1-D, 0-F.

Grade	Probability
4	0.12
3	0.47
2	0.26
1	0.11
0	0.04

When Horatio takes a class, what number grade should he expect?

6. (3 points) Refer to the problem above.

(a) What are the odds in favor of Horatio getting an A?

(b) What are the odds against Horatio getting a D or F?

(c) Horatio occasionally takes classes with the pass/fail (P/F) grade option. When he does so, his odds in favor of receiving a P are 17:3. What is his probability of receiving a P?

7. (2 point) Suppose that a line is taken at random from each of two parallel planes. Must the lines be parallel? Explain your reasoning.

8. (2 points) Suppose you are given a weighted die for which it is a bit more likely to obtain a 4 or a 5 than each of the other numbers. Pretend you rolled the die 10 times. Construct a possible line plot showing the outcomes.

9. (4 points) Refer to the following three-dimensional figure. Be sure to use correct notation for your answers below.
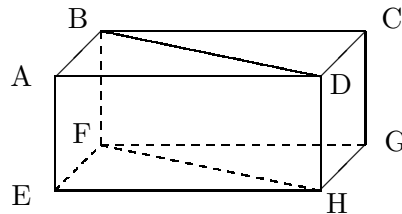
(a) Find a pair of skew lines or explain why it is not possible.

(b) Find three concurrent lines or explain why it is not possible.

(c) Find three points that are not coplanar or explain why it is not possible.

10. (5 points) Consider the following collection of test scores.

$$98 \quad 52 \quad 98 \quad 45$$
$$37 \quad 45 \quad 98 \quad 79$$

(a) Find the mean, median, and mode. Which is not an appropriate measure of central tendency and why?

(b) Find the range and standard deviation.

(c) Give a rough interpretation of the standard deviation in the context of this data set.

11. (3 points) Indicate whether each statement is true or false. If false, change one word to make the statement true. You will not get credit for simply adding the words "not" or "do not".

(a) Three collinear points uniquely determine a plane.

(b) If three lines share a single point, then the lines must be coplanar.

(c) Two parallel lines uniquely determine a plane.

12. (3 points) A machine that cuts cork for wine bottles produces corks whose diameters are normally distributed with mean $3\,\text{cm}$ and standard deviation $0.1\,\text{cm}$. Corks with diameters greater than $3.27\,\text{cm}$ cannot be made to fit the wine bottles. In a sample of 1500 corks, about how many are too big?

13. (3 points) An experiment involves drawing red or blue marbles from an urn. The probability tree for the experiment is shown here.
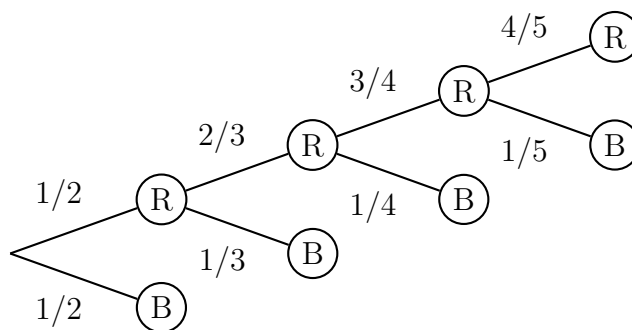
(a) What is the probability of drawing a blue marble on the third draw given that you drew a red marble on the second draw?

(b) What is the probability of drawing a red marble on the second draw given that you drew a blue marble on the first draw?

(c) Suppose X and Y are any two events. What is the formula for $P(X|Y)$?

14. (3 points) Suppose L and M are skew lines.

(a) Explain why L and M cannot possibly intersect.

(b) Since L and M never intersect, does that mean they are parallel? Explain your reasoning.

Math 206 - Test 2b

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Show all work. Supply explanations when necessary. This problem is worth eight (8) points. You must individually on this problem.

While trying to estimate the life expectancy of an average human, a group of students collected the following data.

36.6	47.5	50.4	52.8	53.0	54.2	55.7	57.9	58.4	59.1
60.3	60.8	61.1	63.8	63.8	65.3	65.6	66.2	66.5	66.6
66.7	67.4	67.7	68.4	68.6	68.8	68.9	69.3	69.4	69.9
70.3	70.5	71.4	72.0	72.4	72.9	73.1	76.9	77.2	77.5
78.1	78.2	78.4	79.2	79.8	80.4	80.9	80.9	82.4	85.0

The numbers in the data set represent ages (in years) at death.

1. Group the data into the intervals 1–10.9, 11–20.9, 21–30.9, etc. Construct the corresponding frequency table.

2. On a separate sheet of graph paper, construct the corresponding histogram.

3. Find the mean and the standard deviation of the ages in the data set.

4. Assume that the ages in the data set are samples from a normal distribution with mean and standard deviation as found above. If 750 people are selected from this population, about how many will die before age 50?