**Math 150 Final Exam Spring 2012**

City College of New York

**Answer 9 complete questions. Omit three complete questions**. Calculators are permitted on the exam. **Show your work.** Each question is worth 11 points with 1 free point.

*1.* An exercise club charges an initial charge of $200 and also $25 per week for membership. (5, 3, 3 pt.)
a) Write an equation that relates the price of the membership to the number of weeks that you belong to the club. Be sure to label your variables carefully.
b) Use your answer to part a) to find the total price of belonging to the exercise club for 11 weeks.
c) If you want to spend a total of $1000 on club membership, for how many weeks can you belong to the club?

2. a) Demonstrate why this argument given below is, or is not, valid stating your conclusion: Premise : No pilot wears jeans.
 Premise: All motorcycle riders wear jeans
 Conclusion: No pilot is a motorcycle rider. (6 pt.)

b) A light bulb that is rated at 200 watts burns for 4 days. Find the energy the bulb uses in kilowatt-hours.

 (5 pt.)

3.a ) My weight rose by 13% in year 1, rose by 20% in year 2, and fell by 31% in year 3. What was my cumulative percentage gain or loss over the three-year period to the nearest tenth of a percent? Show your calculations. (6 pt.)

b) Give an example of inductive reasoning, indicating premises and conclusion. (5 pt.)

4. a) A Mexican firm sells a bolt of fabric for 6429 pesos. The bolt is 25 meters long. Find the cost in dollars (to nearest cent) of **one** yard of the fabric. Use the following conversions:
 1 U.S. dollar = 13.05 pesos 1 meter = 1.094 yards. (7 pt.)

b) An investment grows by 5% a year. Its beginning value is $1000. Using the “rule of 70,” find both the doubling time and find the value of the investment in 84 years? (4 pt.)

5. A shipment of 30,000 batteries has lifetimes that are normally distributed with a mean of 350 days and a standard deviation of 25 days. Use the chart on the last page of the exam for this question. (11 pt.)
a) What percent of the batteries would be expected to last more than 365 days?
b) What percent of the batteries would be expected to last more than 300 days?
c) What percent of the batteries would be expected to last between 330 and 360 days?
d) Approximately how many batteries in the shipment would be expected to last less than 365 days?

6. a) The current price of a stock is 258% of its price ten years ago. Its price 10 years ago was $79 per share. Find the current price of the stock. Round your answer to the nearest dollar. (5 pt.)

b) Use a Venn diagram to represent the following data and answer the question below.
Out of 39 people, 20 watch “Friends,” and 15 watch “King of Queens.” 7 of the 39 people watch both shows. How many people watch neither show? (6 pt.)

7.a) The price of a dress was lowered by 43%. The new price is $84. What was the original price of the dress? Round your answer to the nearest cent. (5 pt.)
b) The Martian rover was designed to explore the surface of Mars. It can cover 271 feet in a minute. Assuming it moves at this constant rate, find how many miles it can cover in 24 hours? Note: 5280 feet = 1 mile (6 pt.)

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 10 11 12 13 14 15 16 17 18 19 20

a) Use the chart above or copy it below and make a box and whiskers plot for the following data. The numbers below represent the number of free throws made out of twenty attempts.
 12, 13, 13, 13, 14, 14, 14, 14, 16, 16, 17, 17, 18
 Also find the **mean** and the **mode** of the scores, rounding if necessary to one decimal place. (6 pt.)

 b) Given the distribution of scores above, draw a frequency histogram of the data. (5 pt,)

 9. Consider the chart below depicting automobile sales (in millions) in the US for several years. Show the numbers and calculations that you are using to answer each question.

* 1. In 1977, domestic sales represented what percent of total sales?
	2. Comparing 1973 and 1983, in which year did imports represent a greater percent of total sales? Justify your answer with calculations.
	3. In which two-year period did total sales decrease the most? By what percent?

	

10. a) If 1 kilogram equals 2.205 pounds, how many pounds in 550 grams. Give your answer correct to three decimal places? (3 pt.)

 b) Perform the calculation (by hand, showing your work) and write the answer in scientific notation:

 (1.2 x 1012) ÷ (3 x 10-5) (4 pt.)

 c) A survey of readers of the magazine Dog Fancy determined that dogs are the most popular pet among Americans. Give one source of bias in this survey. (4 pt.)

11. A study is to be conducted to determine whether large doses of enzyme CoQ10 can decrease the severity of heart disease by comparing 2 groups, one of which will be given the enzyme and the other will not.

a) Explain the placebo effect.

b) How could they make the study single-blind?

c) How could they make the study double-blind?

12. a) The Consumer Price Index for the year 1980 is 82.4 and for the year 2000 is 172.2. If someone needed $25,000 to maintain a certain standard of living in 1980, how much would be needed to maintain the same standard of living in 2000? (4 pt.)

 b) As of 2009, U.S. consumer debt was 2564 billion dollars. Rewrite that amount in scientific notation. (4 pt.)

 c) I’m earning 3 times as much now as I did in my first job. That’s like getting a \_\_\_\_\_\_% raise. (3 pt.)

END

Good Luck!!!

Standard scores and percentiles for normal distributions

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