

Math 150 Final Exam Fall 2009
City College of New York

Answer 11 complete questions. Omit four full questions.

**Answer any 11 complete questions.
If you answer more than 11, cross out all work not to be graded**

1. Draw a Venn diagram that accurately represents the relationship among the statements in the argument given below. Make no additional assumptions. Be sure to include a universe (you may create one) and label all sets accurately. Your diagram should illustrate whether or not the argument is valid and you should state that the argument is 'valid' or 'invalid.'

Some acrobats eat tomatoes.

No angry people eat tomatoes.

All people who eat tomatoes have good digestion.

Therefore: Some acrobats have good digestion

2. a) The percentage of people in Panama that used the Internet increased 259% in the last decade. If 13% of the people in Panama used the Internet in 1999, what percent used the Internet in 2009?

b) Describe the difference between a single-blind and a double-blind experiment.

3. a) Gold costs \$961 per ounce. Find its price in euros per gram, correct to two decimal places. Show your work. Use the following conversions: **1 euro = \$1.51 and 28.35 grams = 1 ounce.**

b) Then following argument involves a fallacy. Explain why the argument is deceptive.

Violent crimes by young people have risen at the same time that increased violence has been shown in the movies, thus proving that movie violence leads to real violence.

4. A tree grows so that its diameter increases at the rate of 0.85 inches per year. When the tree is first observed, its diameter is 4.22 inches.

a) Write a formula expressing the diameter of the tree in inches (d) as a function of the number of years after the first observation (t).

b) Find the tree's diameter in 32 years. Show your work.

c) Find how many years later the tree will be 18.67 inches in diameter. Show your work

5. Suppose the average gas mileage of a new model of hybrid car is normally distributed with a mean of 41 mpg and a standard deviation of 5 mpg. Use the table on the inside cover of the test booklet to answer the following questions.

a) What percent of the cars would get less than 44 mpg?

b) What percent of the cars get between 39 and 46 mpg?

c) In a sample of 600 of this type of hybrid, how many would you expect to get a gas mileage of more than 39 mpg?

6. Draw an appropriate graph, labeled appropriately and completely, to illustrate the following data showing the number of students of each sex graduating college in the U.S. in three different years.

Year	1960	1980	2000
Number of women (in thousands)	110	480	730
Number of men (in thousands)	250	520	650

7. A focus group to test a new toy consists of fourteen children with the following distribution of ages in years:

3, 4, 4, 5, 5, 5, 5, 6, 6, 6, 7, 7, 8, 9

- Find the mean median and mode of the data.
- Find the five number summary and draw a boxplot of the data.

8. a) Discuss a possible source of bias from the description of each of the following:

i) A maker of medical imaging equipment does a study to determine if using a medical imaging machine improves the survival rate of people with a certain kind of cancer.

ii) A poll by Gallup wishes to determine whether or not people in this country favor a public option for healthcare and asks a random sample of the U.S. population the question: "Do you want higher taxes in order to support a public option in healthcare?"

b) A map states that 1.5 centimeters on the map represents an actual distance on the ground of 60 kilometers. Find the scale ratio of the map as the ratio of two whole numbers in simplest form.

9. a) The floor of a dollhouse measures 20.0 inches by 2.00 feet. Find the area of the floor of the dollhouse in square centimeters to the nearest unit.

Use the following conversions: **2.54 centimeters = 1 inch and 12 inches = 1 foot.**

b) Name and describe two different sampling methods.

10. a) A survey of 150 people who say they exercise finds 88 people exercise outside, 100 people go to a gym and 70 people both go to a gym and exercise outside. Draw a labeled Venn diagram using this data, filling in the appropriate numbers and find the number of people in the survey who neither exercise outside nor go to a gym.

b) There are 6.692 billion people in the world of which 1.306 billion live in China. What percent of the world's population lives in China (correct to three decimal places?)

11. a) A patient in a hospital is given the drug Salbutamol. The drug is eliminated from the body exponentially, with the amount decreasing at about 8% per hour. If the initial dose is 2.25 milligrams, how much of the drug remains after 7 hours (correct to two decimal places?)

b) Use the rule of 70 to estimate the half-life of the drug described in part a).

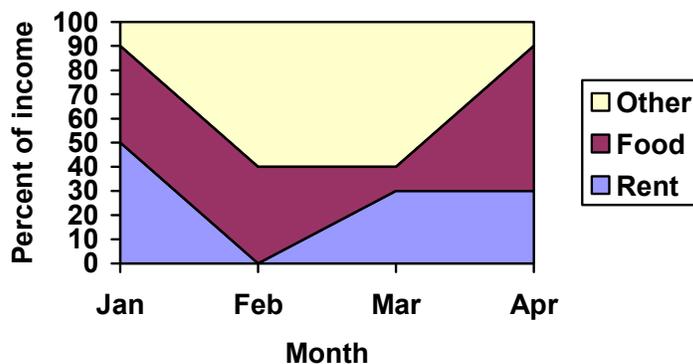
12. a) On Apr 29, 2009, the Christian Science Monitor stated that the U.S. government has pledged \$11.3 trillion for the economic bailout. There are approximately 305 million people in the U.S. Change both of these numbers to scientific notation and use scientific notation to calculate the number of dollars the bailout cost each person in the country. Give your answer to the nearest dollar.

b) Write the negation of the statement: **No figs are hairy.**

13. An air conditioner draws 900 watts. It is used for 11 hours per day for a month of 31 days. Find the cost of running the air conditioner for the month if electricity costs 18 cents per kilowatt-hour. Show your work.

14. The stack graph below shows how Tai Jones spent his income for the first four months of 2008. Assume that his income for each of the four months was a constant \$1200. He spent all of his money in one of the three categories: food, rent or other.

How Tai spent his income



a) Identify the month in which Tai gave up his apartment and lived with his parents and so he paid no rent. What percent of his income did he spend on items in the 'Other' category during that month?

b) Identify the month in which Tai ate out a lot and so spent the highest percent on food? What percent did he spend on food?

c) In March, how much did he pay for food? Remember his income is \$1200 for the month.

15. a) On black Friday, the price of a computer was lowered by 52%. Find the original price of the computer if the computer sold for \$330 on black Friday.

b) Give an example of inductive reasoning

END

Good Luck!