

## MAT 126: Sample Final Exam

Lehman College CUNY

Fall, 2012

**Instructions.** Answer each of the following questions in the blue book provided. Partial credit will be given, so show all of your work. Where relevant, round your answer to two decimal places. Scientific calculators are permitted.

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**Problems.** Problems 1 and 2 are worth 5 credits each. Each other problem is worth 10 credits.

- What percent of 230 is 12?
  - A pair of jeans cost \$80 after an 8% sales tax. How much were the jeans before tax?
- An AP/CBS telephone poll of 998 randomly selected Americans revealed that 6 in 10 people believe that there has been progress in finding a cure for cancer in the last 30 years. Find the population, sample, population parameters and sample statistics of this study.
- Every Lehman student has an EMPLID number. This number is 8 digits long and each of these 8 digits can be any one of the following numbers: 0,1,2,3,4,5,6,7,8, or 9.
  - Find the probability that a random student's EMPLID ends in the same digit as yours?
  - How many different EMPLID numbers can be created?
  - What is the probability that your friend's EMPLID number is within 2 of your EMPLID?
- The preference schedule for an election is given below. Use it to answer the questions that follow.

First	B	D	C	A	D	C
Second	D	A	D	D	A	A
Third	C	C	A	C	B	B
Fourth	A	B	B	B	C	D
Total	25	15	10	8	7	5

- Find the plurality winner. Does the plurality winner also win a majority?
  - Find the winner by runoff of the top two candidates.
  - Explain why Candidate B is NOT a Condorcet winner.
  - Who do you think the winner of the election should be? Defend your position.
- A chain of hardware stores is reapportioning its 25 managers among stores in four locations according to their monthly gross sales. The sales at the four stores are as follows: Boulder, \$2.5 million; Denver, \$7.6 million; Broomfield, \$3.9 million; Ft. Collins, \$5.5 million.
    - Use Hamilton's method of apportionment to determine how many managers should be sent to each of the four locations.
    - Does the Alabama Paradox occur if the store reapportions 26 managers to the same stores in the same way?

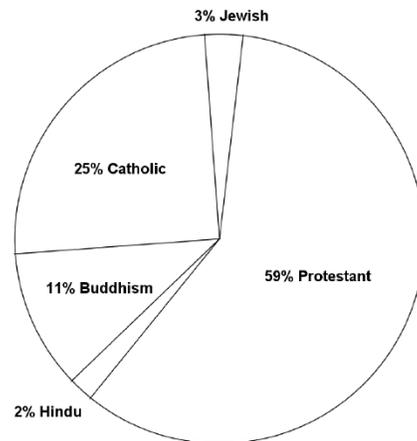
**More Problems On Back**

6. Franklin has been working the same job since 1990. Given that Franklin's starting salary was \$40,000 a year, answer the following questions.
- Use the CPI to estimate Franklin's yearly salary in 2011.
  - Based on your answer in (a), should Franklin be content with his current annual salary of \$65,000? Explain your reasoning.
7. At age 35, Christina starts saving for retirement. Assume that she retires after 25 years of work and that her investment plan pays an APR of 6%.
- If Christina saves \$150 monthly, what is her investment worth when she retires?
  - If Christina wants to have \$2 million in her account at the time of her retirement, then how much should she deposit monthly?

8. Based on the given pie chart, the following statement was made:

“Twenty-five percent of Catholics choose to get cremated”

**1996-97 Cremations In North America By Religion**



- Explain why the above statement is a mis-interpretation of the pie chart.
  - Write a similar, but correct statement based on the given pie chart.
9. There are 700 patients in a study that receive treatment for both large and small kidney stones. Out of the total, 350 receive Treatment A and 350 receive Treatment B. The table below shows the outcomes of their treatments; use it to answer the questions that follow.

Stone Size	Treatment A		Treatment B	
	Successful	Not Successful	Successful	Not Successful
SMALL STONES	81	6	234	36
LARGE STONES	192	71	55	25

- Compute the proper percentage to defend each statement below:
  - Treatment A is more effective than Treatment B for people with small kidney stones.
  - Treatment A is more effective than Treatment B for people with large kidney stones.
  - Treatment B is more effective than Treatment A for people with kidney stones.
- Explain how this is an example of Simpson's Paradox.