

Name: \_\_\_\_\_ Boro of residence: \_\_\_\_\_

Something that interests you: \_\_\_\_\_ Favorite Number: \_\_\_\_\_

**Math 102: Math for Liberal Arts**  
**Midterm Exam 1**  
**March 8, 2006**

*Read each question carefully, answer each question completely, and show all of your work. Write your solutions clearly and legibly; no credit will be given for illegible solutions. Remove sunglasses and brimmed hats. Do not sit next to anyone. Turn your cell phones off. No notes, human assistance, or cheat-sheets.*

*"The mathematical sciences particularly exhibit order, symmetry, and limitation; and these are the greatest forms of the beautiful."*

Aristotle

*"Anyone who cannot cope with mathematics is not fully human. At best he is a tolerable subhuman who has learned to wear shoes, bathe, and not make messes in the house."*

Lazarus Long, fictional character of Robert A. Heinlein

*"There are many questions which fools can ask that wise men cannot answer."*

György Pólya

*"No pain, no gain."*

Arnold Schwarzenegger

| #        | Max | Score |
|----------|-----|-------|
| 1        | 10  |       |
| 2        | 10  |       |
| 3        | 10  |       |
| 4        | 10  |       |
| 5        | 10  |       |
| 6        | 10  |       |
| 7        | 10  |       |
| 8        | 10  |       |
| 9        | 10  |       |
| 10       | 10  |       |
| $\Sigma$ | 100 |       |

1. (5 points)  $0! =$

2. (5 points) If the probability of winning the lottery is 0.000000045, what is the probability of not winning the lottery?

3. (20 points) You are to roll one die and to flip two coins. What is the probability that you get both an odd number on the die and 'head's on both coins?



9. Ten marbles are placed in a bag: 3 red, 3 green, 3 blue, and one black. You withdraw, without being able to see the color, one marble. If you get the black marble then you win \$10, if you get a blue marble, you win \$1, if you get a green marble, then you break even, and if you get a red marble, then you lose \$4. What is the expected value of this game (for you)? Is this a game that a casino would sponsor?

10. According to the U.S. Census Bureau, in the year 2000 there were 281,425,000 U.S. residents: 138,056,000 males and 143,368,000 females. Of these, a total of 263,230,000 were age 5 or older. Of the people age 5 or older, 214,809,000 spoke only English at home, 29,698,000 spoke Spanish at home, 1,379,000 spoke French at home, 1,094,000 spoke German at home, 2,193,000 spoke Chinese at home, 1,104,000 spoke Vietnamese at home, and 1,262,000 spoke Tagalog at home. Arrange the data about at-home languages into a table, remembering to include a row for 'other'. How many residents spoke a language at home that is not listed here?

If you pick a resident of the U.S. at random (each person over age 5 is equally likely to be chosen), what is the probability that the chosen person spoke primarily English at home?