

2. A young child has six wooden blocks of differing shapes.

[15]

a. In how many ways can the child choose four of them and build a tower by stacking the four blocks one on top of another?

b. As part of a developmental test, an evaluator builds a tower in front of the child using four of the blocks. The tower is then knocked down and all six blocks are mixed together. Suppose the child is able to rebuild the tower exactly as it was before. What does this suggest about the child's visual memory? **Be as specific as possible and include reference to probability concepts.**

4. A city council consists of 13 members. Three are to be chosen to go to an expenses-paid urban planning conference in Las Vegas. Not surprisingly, everyone volunteers to go.

[15]

a. How many different groups of three could be selected?

b. A drawing is to be held to determine who will attend. Suppose that all three people selected to attend just happen to be council officers. (There are four officers — president, vice-president, secretary and treasurer.) What might you conclude about the drawing? **Explain why and be as specific as possible.**

5. You are offered the following game. You will roll a fair *five*-sided die, having faces numbered 1 through 5. If you roll an odd number you win \$700. If you roll an even number you lose \$1000.

[15]

- a. What is the *expected* amount you will win per roll?
- b. Based on (a), if you could play this game many, many times would you want to play? **Your answer should include a discussion about how much cash you have available in your bank account!**

6. A ten-digit phone number in the U.S. and Canada consists of a three-digit area code, followed by a three-digit prefix, followed by a four-digit extension. For example my phone number is 219-982-5011. How many phone numbers can be constructed given the following restrictions must be met?

[15]

The first digit of the area code cannot be a 0 or 1
The first digit of the prefix cannot be a 0 or 1.

EXTRA CREDIT [+5]

If you are “randomly” assigned a phone number (based on the above rules) what is the probability that it will contain only odd digits (that is, 1, 3, 5, 7 and 9)?