V55.0105: Elementary Statistics. Quiz 5 – 20 minutes
12 April 2006

• **Show you work, not only final answers**

• Use of notes or book **not** allowed. You can use a calculator.

Name:

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Two formula’s you may find useful (both giving the probability of \( x \) successes in \( n \) trials):

- **Binomial distribution:** \( f(x) = \binom{n}{x} p^x (1-p)^{n-x} \)

- **Hypergeometric distribution:** \( f(x) = \frac{\binom{a}{x} \binom{b}{n-x}}{\binom{a+b}{n}} \)

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1. [10 points] In a group of 15 people, 11 are right-handed and 4 are left-handed. If you randomly select 5 people from this group, what is the probability that 3 of those 5 are right-handed and the other 2 are left-handed?
2. [10 points] If you roll a die 20 times, what is the probability that 4 of those 20 times you get a 6?

3. The governor of a state is considering whether or not to have a car-pool lane built on a certain highway. Research shows that for cars on that highway, the probabilities of a car having 1, 2, 3, 4 or 5 persons in it are 0.50, 0.32, 0.12, 0.05, 0.01. Calculate the mean and variance of this probability distribution.

(a) [10 points] Calculate the mean and variance of this probability distribution.

(b) [5 points] For another highway, similar research shows that the probabilities of a car having 1, 2, 3, 4 or 5 persons in it are 0.31, 0.42, 0.19, 0.05, 0.02. Why is this no longer a probability distribution?