

Names: _____

MATH 232 · Introduction to Statistics

Spring 2017

Instructor: E.M. Kiley

April 14 Cartoon Guide Questions

Please read pages 73–78 of the Cartoon Guide with your group, and answer the following questions. **Please complete the reading before answering the questions.**

- Question 1.** Referring to the example in the cartoon at the top of page 74, what outcome of the *smog test* corresponds to a failure of the *experiment*?
- Question 2.** Suppose that all people are either left-handed or right-handed, and nobody is both. About 10% of the population is known to be left-handed, and this ratio tends to be the same across all segments of the world population. Suppose you are conducting an experiment: you randomly select a person and record whether that person is left-handed or right-handed. Does this experiment constitute a Bernoulli trial?
- Question 3.** Give at least two examples of Bernoulli trials that did not come from the text or notes, and show why they are Bernoulli trials. What is the probability of success?
- Question 4.** By now, you perhaps realize that the pea plant experiment discussed in Wednesday’s class was an example of a Bernoulli trial, and that the random variable X we defined (the number of offspring plants, from a random selection of 5 from a greenhouse filled with offspring, that have green pods) is a binomial random variable. What is n for this example, and what is p for this example?
- Question 5.** Who is the character at the bottom of page 75, and where have you seen him before?
- Question 6.** What is another name that we know for the binomial coefficient discussed on page 76?
- Question 7.** What purpose does the illustration on page 76 of “ $\{A, B, C, D\} \rightarrow AB, AC, AD, BC, BD, CD$ ” serve, in relation to the text on the page?

Question 8. Use Pascal's triangle to compute $5C_0$, $5C_1$, $5C_2$, and $5C_3$.

Question 9. Explain why Pascal's triangle is symmetric. Do we have any other rule about "symmetry" of binomial coefficients? [Remember: choosing 4 students to represent our class is the same as choosing 22 students who don't...]

Question 10. Fill in a probability distribution corresponding to a Bernoulli trial you gave as an example above.

Question 11. Compute the mean and standard deviation of the "5 green pea plants" distribution using the formula/method we already know for computing the mean and standard deviation of a probability distribution.

Question 12. Compute the mean and standard deviation of the "5 green pea plants" distribution using the formulas on page 78. Compare to your answer above.

Question 13. Use the table of page 78 to fill in a probability distribution corresponding to the random variable that denotes the number of cars, out of a random sample of 10, that fail the emissions tests in Massachusetts, given that the test constitutes a Bernoulli trial with probability $p = 10\%$ of success for each trial.