

Math 153 - Quiz 6

April 3, 2014

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (2 points) Suppose x is a random variable in a binomial distribution with $p = 0.36$ and $n = 35$. Compute $P(x > 16)$.

$$P(x > 16) = 1 - P(x \leq 16) = 1 - \text{binomialcdf}(35, 0.36, 16) \\ \approx 0.08651$$

2. (3 points) To ensure that his customers are happy, Papa Steve almost always makes his 16 in pizzas bigger than 16 in. In fact, Papa Steve has calculated that 89% of his pizzas are made too big. In an order of four 16 in pizzas, what is the probability that at least one of them is 16 in or smaller?

A success is a pizza being
16" or smaller.

$$p = 1 - 0.89 = 0.11$$

$$P(x \geq 1) = 1 - P(x \leq 0) = \\ 1 - \text{binomialcdf}(4, 0.11, 0) \\ \approx 0.3726$$

COULD ALSO DO
 $\text{binomialcdf}(4, 0.89, 3) \approx 0.3726$

3. (5 points) A candy company estimates that 0.5% of its candy bars are damaged while be shipped. Suppose you buy 25 candy bars from a local store.

- (a) In this experiment, are the trials independent? Is this experiment approximately binomial?

THE TRIALS ARE NOT TECHNICALLY INDEPENDENT,
BUT WE CAN ASSUME THAT SO MANY CANDY BARS
ARE SHIPPED THAT 25 IS LESS THAN 5% OF THE POPULATION.

- (b) In your sample of 25 candy bars, how many should you expect to be damaged?

So, Yes,
Approx.
BINOMIAL.

$$\mu = 25(0.005) = 0.125$$

- (c) What would be an unusually large number of damaged candy bars?

$$\sigma = \sqrt{25(0.005)(0.995)} = \sqrt{0.124375} \approx 0.353$$

$$\mu + 2\sigma = 0.831$$

AN UNUSUALLY LARGE # OF
DAMAGED BARS IS 1 or more.