**Math 153 - Quiz 12**

November 6, 2018

Name key

Score _____

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

1. (3 points) Determine whether the procedure results in a binomial distribution. If not, explain why.

   (a) In a survey, 1019 adults were randomly selected without replacement. They were each asked if they had one or more credit cards, and responses were recorded as "yes" or "no."

   YES, EVEN THOUGH SELECTIONS ARE NOT TECHNICALLY INDEPENDENT, THEY ARE VERY CLOSE (1019 IS FAR LESS THAN 5% OF ADULT POPULATION).

   (b) There are 100 U.S. senators. Forty different senators are randomly selected without replacement, and the gender of each selected senator is recorded.

   NO, SELECTIONS ARE NOT INDEPENDENT (40 IS MORE THAN 5% OF 100).

   (c) 291 single births were selected at random, and the weights of the babies were recorded.

   NO, WEIGHTS GIVE RISE TO MORE THAN 2 OUTCOMES PER TRIAL.

2. (2 points) Based on a Harris Interactive poll, 20% of adults believe in reincarnation. Six adults are randomly selected.

   binomial
   $n = 6$
   $p = 0.20$

   (a) What is the probability that exactly five believe in reincarnation?

   $P(X=5) = \text{binompdf}(6, 0.20, 5) = 0.001536$

   (b) What is the probability that at least five believe in reincarnation?

   $P(X=5) + P(X=6) = 0.0016$