

# Sampling Variability Questions

Name \_\_\_\_\_

Directions: Read carefully. Find answers to the nearest hundredths unless told otherwise.

- 1. A snake lays 4 eggs which hatch into one male and three females: Martin, Alisa, Tabitha and Heather. Two of the baby snakes are selected at random with replacement.
  - a) In the chart, identify the 16 possible samples. (Martin, Alisa) and (Alisa, Martin) are different.
  - b) In the chart, find the proportion,  $p$ , of females in each of the samples.
  - c) Create a dot plot to model the Sampling Distribution of Sample Proportions.



Sample	$p$

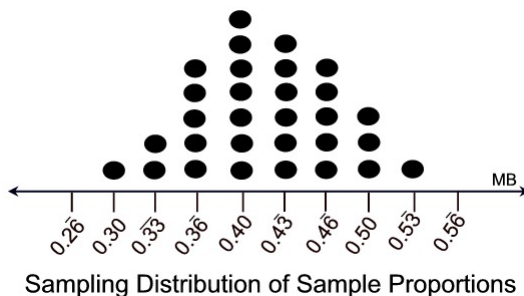
- d) State the mean of the Sampling Distribution. \_\_\_\_\_
- e) What is the population proportion of females? \_\_\_\_\_
- f) Is the mean of the Sampling Distribution equal to the population proportion of females? \_\_\_\_\_
- g) In this specific situation, it can be said (without any calculations) that the mean of the Sampling Distribution will be EQUAL to the population proportion. How do we know that it is “EQUAL to” and not just an “approximation of” the population proportion?

- 2. In a class of 30 students, each student pulls a random sample of 30 chips, with replacement, from a brown paper bag containing red chips and white chips. The number of red chips is counted.



### Proportion of Red Chips

**Sample Draw 1**      **Sample Draw 2**  
Proportion:      Proportion: \_\_\_\_\_  
= 12/30 or 0.40      = 10/30 or 0.33



A dot plot of the 30 sample proportions of red chips reported by each student is shown above.

Using a calculator (round to nearest thousandths),

- a) find the mean of the Sampling Distribution. \_\_\_\_\_
- b) find the standard deviation of the Sampling Distribution. \_\_\_\_\_
- c) Based upon your findings, what is the population proportion? \_\_\_\_\_
- d) If the bag contains 100 chips, of which 40 are red, what is the actual population proportion? \_\_\_\_\_
- e) Why, in this problem, is the actual population proportion different from the mean of the sampling distribution of the sample proportions?

