

Show all complete and correct work to receive full credit. A correct answer with little or no work will receive 2 pts.

1. What two conditions must be met in order for the shape of the sampling distribution of \hat{p} to be approximately normal? (stated in word form or formula form)

2. When asked to “describe” either of the sampling distributions, what two parameters must be stated?

3. With regard to the distribution of sample proportions, $\mu_{\hat{p}} = \underline{\hspace{2cm}}$ and $\sigma_{\hat{p}} = \underline{\hspace{2cm}}$?

4. With regard to the distribution of the sample mean, if the distribution of the population is not normal then the distribution of the sample mean is approximately normal provided the sample size (n) is greater than or equal to .

5. With regard to the distribution of the sample mean, the Central Limit Theorem states that the distribution of sample means will have $\mu_{\bar{x}} = \underline{\hspace{2cm}}$ and $\sigma_{\bar{x}} = \underline{\hspace{2cm}}$.

- 6. According to a study done by the Pew Research Center, 39% of adult Americans believe that marriage is now obsolete.**
 - (a) Suppose a random sample of 500 adult Americans is asked whether marriage is obsolete. Describe the sampling distribution if \hat{p} , the proportion of adult Americans who believe marriage is obsolete.

 - (b) What is the probability that in a random sample of 500 adult Americans less than 38% believe that marriage is obsolete?

(c) What is the probability that in a random sample of 500 adult Americans between 40% and 45% believe that marriage is obsolete?

7. Based on tests of the Hyundai Tucson, engineers have found that the miles per gallon in highway driving are normally distributed, with a mean of 32 miles per gallon and a standard deviation of 3.5 miles per gallon.

(a) What is the probability that a randomly selected Tucson gets more than 34 miles per gallon?

(b) Ten Tucsons are randomly selected and the miles per gallon for each is recorded. What is the probability that the average miles per gallon exceeds 34 miles per gallon?

(c) Twenty Tucsons are randomly selected and the miles per gallon for each is recorded. What is the probability that the mean miles per gallon exceeds 34 miles per gallon?