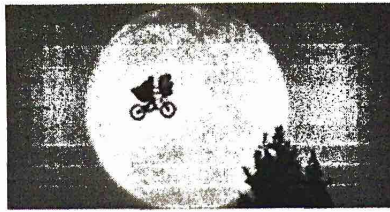


Lesson 7.2: What's the proportion of orange Reese's Pieces?



If we take a sample of Reese's Pieces, what proportion of the candies will be orange?

Suppose a large bag of Reese's Pieces has 1000 pieces. The manufacturer says that exactly 40% of the candies are orange. If we select a sample of 50 pieces, how many will be orange? Let X = the number of orange candies in the sample.

1. What type of probability distribution does X have? Justify.

B - Binary
 Success - orange
 Failure - not orange
 $N - n = 50$

1 - 10% condition
 $50 < \frac{1}{10} \times 1000$

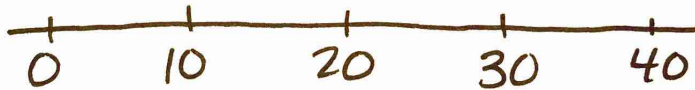
$S - p = .40$

2. Draw a sample of 50 Reese's Pieces using the applet. How many pieces were orange? Repeat this 5 times. Write the values below.

$X =$

3. Write the values on sticker dots and add it to the dotplot on the board. Sketch the dotplot below.

Sampling Distribution of X



4. What does each dot represent?

The number of orange from a sample 50.

5. What is the mean and the standard deviation for the distribution of X ? Show work.

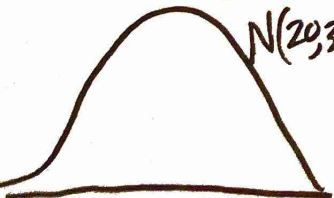
$$\mu_x = n \times p = 50 \times .4 = 20 \quad \sigma_x = \sqrt{n \times p \times (1-p)} = \sqrt{50 \times .40 \times .60} = 3.46$$

6. What is the approximate shape of the sampling distribution for X ? Explain and sketch it below.

Normal because of Large Counts,
 $n \times p$

$$50 \times .40 = 20 \geq 10 \quad n \times (1-p) \quad 50 \times .60 = 30 \geq 10 \quad \checkmark$$

$N(20, 3.46)$



Review of Chapter 6

Name: _____ Hour: _____ Date: _____

Instead of finding the number of candies that are orange, we will now find the **proportion** of candies that are orange.

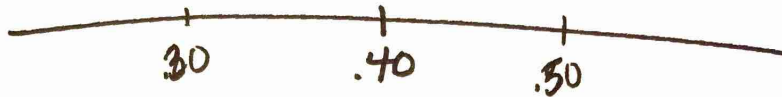
7. Use your samples from #2 and turn each number of orange candies into the **proportion of orange candies** in the sample. Write the proportions below and add them to the dotplot on the board.

Divide by 50: $\times \frac{1}{50}$

$$\hat{p} =$$

8. Sketch the dotplot below.

Sampling Distribution of \hat{p}



Compare to original dotplot.

9. What does each dot represent?

The proportion of orange from a sample of 50

10. Find the new mean and standard deviation. Show work.

$$\mu_{\hat{p}} = p$$

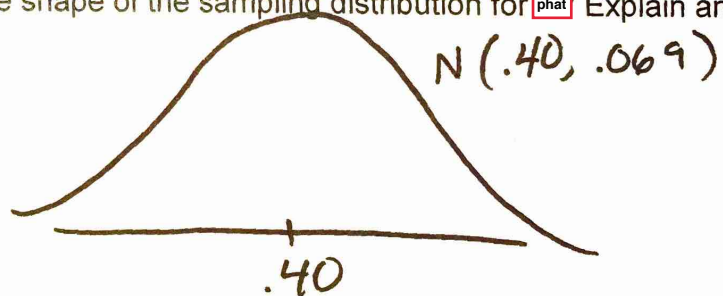
$$\mu_{\hat{p}} = \frac{20}{50} = .40$$

$$\sigma_{\hat{p}} = \frac{\sqrt{50 \times .4 \times .6}}{50} = 0.069$$

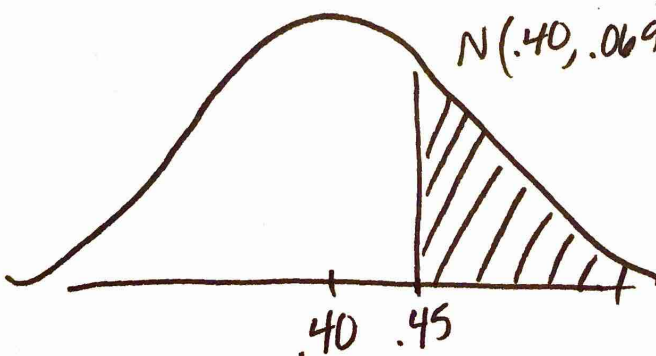
$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$$

11. What is the approximate shape of the sampling distribution for \hat{p} ? Explain and sketch it below.

Normal because of large counts



12. We know that bags of Reese's Pieces contain exactly 40% that are orange. If we select a random sample of 50 candies, what is the probability that the sample proportion will be 45% or greater?



$$Z = \frac{\hat{p} - p}{\sigma} \quad \text{OR} \quad Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$$

$$Z = \frac{.45 - .40}{.069} = .72$$

$$\rightarrow \boxed{.2358}$$

Large counts $n \cdot p \geq 10$ $n \cdot (1-p) \geq 10$