Name: _____ Date: _____ Teacher: **A. Richardson**

Note to Students: STOP!!! If you have access to technology, THIS IS THE WRONG ASSIGNMENT!

Go back to my website and click on the "assignments" page link near the bottom of the welcome page. (You want the section labeled "WITH ACCESS")

Click here to view the online assignment page.

Statistics: Week 1 (Offline) Assignments

4/6 – 4/13

Directions: Complete all the items below and turn in the completed packet to the office no later than Monday, April 13th . BE SURE YOUR NAME IS ON ALL ASSIGNMENTS.

Part 1: Completing the Guided Notes (attached on the next pages)

- **Read pages 445-451 of the textbook and fill-in the guided notes**. "Chapter 17- Sampling Distributions." (Be sure to try the three "Just Checking" practice problems on page 451 to check your understanding! Then, check your answers to these problems on page 472)

Part 2: Textbook Problems

- On a separate piece of paper, **complete the following problems from the textbook: Page 464, #2-12 evens**. Be sure to clearly label your work and answers! Make sure your name is on it!

Additional Resources

- The last two pages of the packet are handwritten notes to help you with Chapter 17.

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Chapter 17: Sampling Distributions Guided Notes

1. Explain the difference between a *parameter* and a *statistic*.

2. Explain the difference between p and $\hat{p}$?

3. What is meant by *sampling variability*?

4. What is meant by the *sampling distribution model* of a statistic?

5. How is the size of a sample related to the *spread* of the sampling distribution?

6. In an SRS of size n, what is true about the sampling distribution of $\hat{p}$ when the sample size n increases?

7. In an SRS of size n, what is the mean of the sampling distribution of $\hat{p}$?

8. In an SRS of size n, what is the standard deviation of the sampling distribution of $\hat{p}$?

9. What happens to the standard deviation of $\hat{p}$ as the sample size n increases?

10. When does the formula $\sqrt{\frac{pq}{n}}$ apply to the standard deviation of $\hat{p}$?

11. When the sample size n is large, the sampling distribution of $\hat{p}$ is approximately normal. What test can you use to determine if the sample is large enough to assume that the sampling distribution is approximately normal?

Name: _____ Date: _____ Teacher: **A. Richardson**

12. The mean and standard deviation of a population are *parameters*.

    What symbols are used to represent these *parameters*?

13. The mean and standard deviation of a sample are *statistics*.

    What symbols are used to represent these *statistics*?

14. Because averages are less variable than individual outcomes, what is true about the standard deviation of the sampling distribution of $\bar{x}$?

15. What is the mean of the sampling distribution of $\bar{x}$, if $\bar{x}$ is the mean of an SRS of size n drawn from a large population with mean μ and standard deviation σ?

16. What is the standard deviation of the sampling distribution of $\bar{x}$, if $\bar{x}$ is the mean of an SRS of size n drawn from a large population with mean μ and standard deviation σ?

Name: _____ Date: _____ Teacher: **A. Richardson**

Additional Resources: Handwritten Notes (Courtesy of Mrs. Weinert)

17 Sampling distributions for proportions

sampling distribution → looks at outcomes from all possible samples of the same size

turns out that no matter what shape the population is the sampling distribution

as the sample size increases
- → becomes more symmetric (normal)
- → is always centered at the true mean (p)
- → the spread gets smaller

a single sample will look like the population

→ results from repeated samples are what makes sampling distribution

process:
1. check if normal is okay
   - random / representative
   - independence
   - $10 \cdot n \leq$ population
   - $np \geq 10$ and $nq \geq 10$ both at least
2. make model $\text{apx } N\left(p, \sqrt{\frac{pq}{n}}\right)$
3. find probability using z (if asked)

Name: _____ Date: _____ Teacher: **A. Richardson**

4466

(7) $p = .05$

(a) means should all be = .05

sd	n = 20	n = 50	n = 100	n = 200
$\sqrt{\frac{pq}{n}}$	$\sqrt{\frac{.05(.95)}{20}}$	$\sqrt{\frac{.05(.95)}{50}}$	$\sqrt{\frac{.05(.95)}{100}}$	$\sqrt{\frac{.05(.95)}{200}}$
	↓	↓	↓	↓
	.0487	.0308	.0218	.0154

(b) the simulated values are really close to the theoretical values.

(c) n = 200 looks nearly normal

(d) $200(.05) = 10$ ← smallest it can be for normal to be okay
$200(.95) = 190$

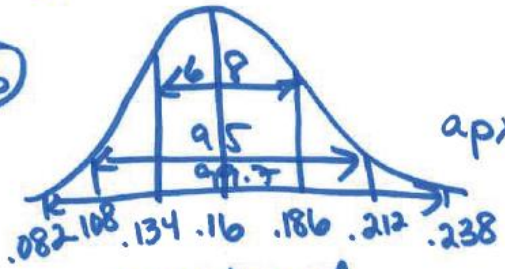
(14) n = 200 p = .16 green

(a) is normal okay?

- assume bag is a random sample (mixed)
- assume proportion of green in one bag doesn't impact another
- $10 \cdot 200 = 2000$ < all mins ✓
- $200(.16) = 32$, $200(.84) = 168$ } both at least 10 ✓

apx $N(.16, .026)$ $\sqrt{\frac{.16(.84)}{200}}$

(b)



proportion of green

(c) If bags have more candies the mean stays the same, spread gets smaller, shape stays normal.