

Sample Means and Proportions

AP Review

For single sample means, if

- Given simple random sample
- $N < 10\%$ population
- Independent observations within the sample
- $N \geq 30$

Then \bar{x} has an approximately normal distribution.

If the population has a normal distribution, then \bar{x} also has a normal distribution (large n)

Sample Means Problem

- Draw a frequency table and histogram
- Reminder: number of classes k must be the smallest number so that

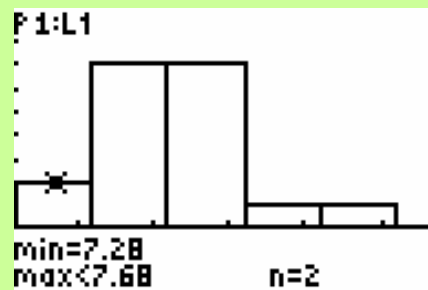
$$n \leq 2^k$$

To get correct number of bins on the calculator

- WINDOW
 - Increase the XSCAL slightly. Graph.

Column min - max	Frequency
7.28 - < 7.68	2
7.68 - < 8.08	7
8.08 - < 8.48	7
8.48 - < 8.88	1
8.88 - < 9.28	1

Sample Means Histogram



Answers to parts b, c, d

b. from calculator 1 var stats

$$\mu_{\bar{x}} = 8.075, s_{\bar{x}} = .4185$$

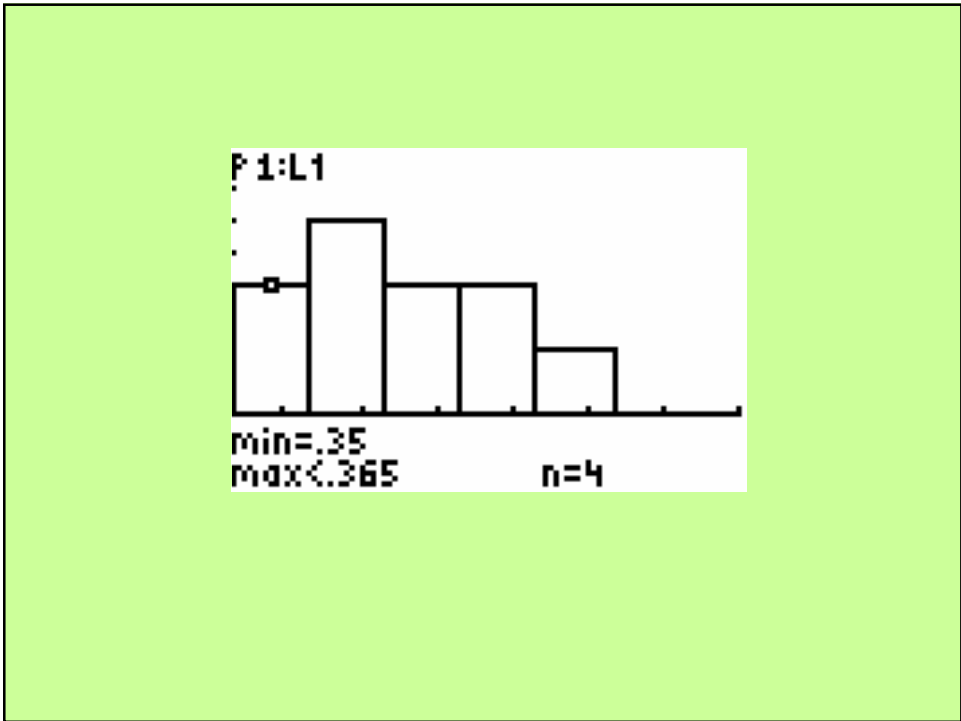
c. $\mu_{\bar{x}} = 8.075 = \mu$

d. Since $s_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$ then $.4185 = \frac{\sigma}{\sqrt{30}}$,
so $\sigma = 2.29$

Sample Proportions Problem

- Create a frequency table and histogram.
- Remember the rule for the number of bins.

Column min - max	Frequency
.35 < .365	4
.365 - < .38	6
.38 - < .395	4
.395 - < .41	4
.41 - < .425	2



Answers to b and c

b. $\mu_{\hat{p}} = .3811$ $s_{\hat{p}} = .01832$

This is our estimate of the population proportion. (part c)

A potato chip manufacturer makes snack size bags of potato chips. The Snack Pack of potato chips is advertised to weigh 3.5 OZ.

- a. Which will have the smaller variability, a sample size of 50 or a sample size of 15? Explain.
- b. The weights of the snack size bags are normally distributed with mean 3.5 oz and standard deviation 0.2 oz. What percentage of bags will have a weight within 0.1 oz of the mean?

- c. What percentage of bags will weigh less than 3.3 oz?
- d. Out of the next 9 bags, what is the probability that 2 of them will weigh less than 3.3 oz?

Fertilized chicken eggs from a particular supplier has a hatch rate of 75%.

- a. How large must a sample be for the hatch rate of the sample to be approximately normal?

- b. Suppose you are given 45 randomly chosen fertilized eggs from this supplier. What is the probability that the hatch rate of the sample is at least 80%?

- c. Suppose you took 7 eggs home to hatch for Easter chicks with your family. What is the probability that only 4 eggs will hatch?

