

1. Identify the type of sample described. Then tell if the sample is biased and explain why or why not.

- A. Convenience B. Self Selected C. Systematic D. Random E. Clustered F. Stratified

Systematic
Unbiased A survey is being conducted to determine if residents want to raise property taxes to increase school system revenues. The county surveys every 4th person that enters the County Fair.

Convenience
Biased A survey is being conducted to determine if residents of Cobb County want to add a traffic light at the rear entrance of Hillgrove HS. The survey is given to the first 1,500 people that attend the Hillgrove vs. McEachern football game.

Stratified
Unbiased A survey is given regarding students favorite lunch line. Students are randomly selected from the freshmen class, sophomore class, junior class and senior class.

Self Selected
Unbiased A survey is being conducted to determine if students would like to have prom at Hillgrove HS instead of an off campus site. The survey sheets are left at the front office for volunteers to pick up if they want to participate in the survey.

Clustered
Unbiased A survey is given regarding their favorite class at Hillgrove. All Freshmen and all seniors are selected to take the survey.

Random
Unbiased A survey is conducted to determine if residents of Cobb Co would want a running/walking trail built in the West Cobb area. Residents are called at random to determine what residents would like.

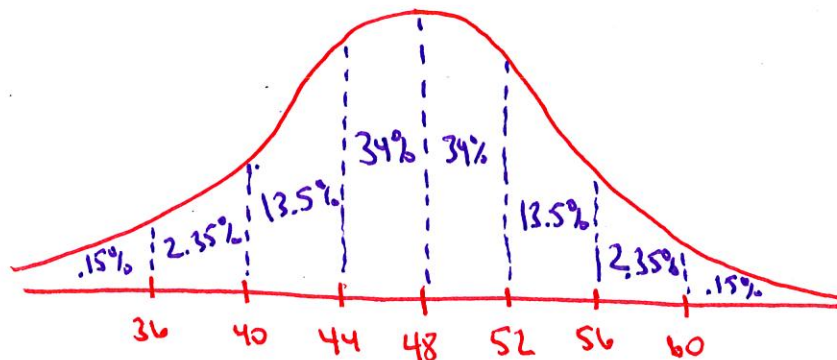
2. Dr. Smith wants to see if squirrels in the area grow larger when eating acorns and pine cones or when eating manufactured squirrel feed you purchase at Walmart. Is this an experiment or an observational study? If an experiment, what is the treatment group, the control group, and the treatment.

Experimental Treatment - Squirrel feed
Treatment group - Eat manufactured squirrel feed
Control group - Eat acorns & Pine Cones

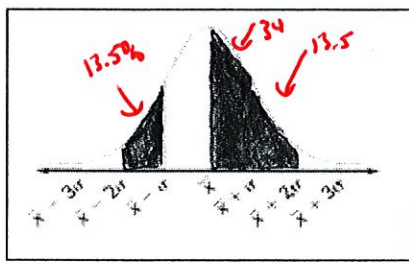
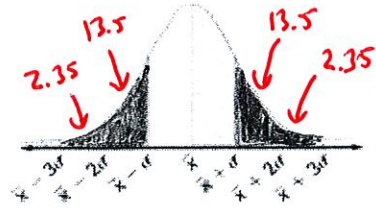
3. Dr. Smith is studying birds in a bird sanctuary. He wants to see if the color of the bird has any bearing on the timing of when birds eat from the bird feeders. Is this an experiment or an observational study? If an experiment, what is the treatment group, the control group, and the treatment.

Observational Study

4. Draw a normal curve for a normal distribution with a mean of 48 and a standard deviation of 4. Label all areas under the curve.



Give the PERCENT of the area under the normal curve represented by the shaded area

<p>5. <u>61%</u></p>  <p>34 27 61</p>	<p>6. <u>31.7%</u></p>  <p>27 + 4.7 31.7</p>
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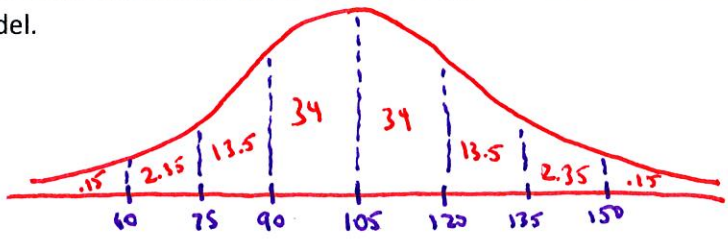
7. 400 students out of 2,000 at a school are surveyed. 50 said they play a sport at the high school. Predict the number of students in the population (the entire school) that would answer similarly.

$$\frac{50}{400} = \frac{x}{2000}$$

$$400x = 100000$$

$$x = 250 \text{ people}$$

8. Given the following information : a normal distribution has a mean of 105, and a standard deviation of 15.
a. Draw and clearly label the model.



b. What PROBABILITY:

- a. Between 60 & 90

.1585

- b. At least 90

.84

- c. Between 75 and 135

.95

- d. at most 120

.84

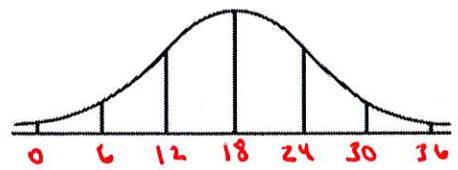
- e. is less than 54

.00037

- f. at least 48

.999728

9. Each year high school students take the ACT to seek admission to college. A mean test score in 2011 was 18 and the standard deviation is 6.



- a. What is the PERCENT of students that score above a 32?

.98%

- b. What is the PERCENT of students that score between 17 & 25?

44.45%

- c. What is the PERCENT of students that score at least 22?

25.25%

- d. What is the PERCENT of students that score at most 26?

90.88%

10. **Test Comparison:** The SAT math section has a mean of 500 and a standard deviation of 100. The ACT math section has a mean of 18 and a standard deviation of 6. Cade took both the SAT and the ACT in the fall. He made a 670 on the math section of the SAT. He made a 29 on the math section of the ACT. Which test did he perform better on the math section?

$$Z = \frac{X - \bar{x}}{\sigma}$$

SAT

$$Z = \frac{670 - 500}{100}$$

Z = 1.7

ACT

$$Z = \frac{29 - 18}{6}$$

Z = 1.83

Cade performed better on ACT

11. The mean test score on a Economics test was a 79 with standard deviation of 3. **How many standard deviations** from the mean is a test score of a 85?

2 standard deviations above the mean



12. **Light Bulbs** – On average, a light bulb is a normal distribution and has a mean of 550 hours with a standard deviation of 70.5 hours. If Home Depot on Dallas Highway has 5,000 light bulbs in stock, then:

a. How many light bulbs would last longer than 690 hours? $.0235 (5000)$

≈ 118 bulbs

b. How many light bulbs would last less than 450 hours?

$.07803 (5000)$

≈ 390 bulbs

c. How many light bulbs would last between 425 hours and 710 hours?

$.95027 (5000)$

≈ 4751 bulbs

13. **Class Test Scores** – 32, 88, 89, 84, 93, 94, 87, 103, 82, 85

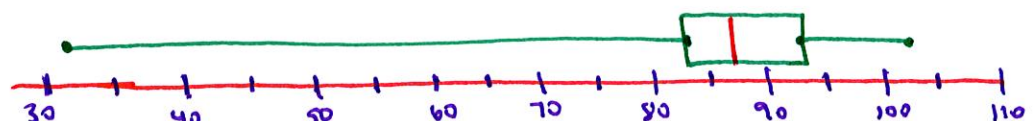
a. What is the mean? 83.7

b. What is the IQR? 9

c. What is the Standard Deviation? 18.17

d. Draw a box and whisker graph for this data.

min = 32 max = 103
 $Q_1 = 84$
 Med = 87.5
 $Q_3 = 93$



e. Are there any outliers? If so, how do they affect the mean and standard deviation?

$$3(18.17) = 54.51$$

$$83.7 - 54.51$$

$$29.19$$

No Outlier because 32 is not 3 standard deviations outside mean

14. A random survey of 25,000 Arkansas football fans found that 85% prefer to keep Bret Belieima as their football coach.

a. What is the Margin of Error?

$$MOE = \pm \sqrt{\frac{1}{25000}}$$

$$MOE = \pm 0.632\%$$

b. Give an interval that is likely to contain the exact percent of LSU football fans who prefer to keep Les Miles as their football coach.

$$84.367\% \text{ to } 85.632\%$$

15. A random survey of 2,200 Cobb County School District high school seniors found that 70% had attended CCSD schools their entire school career.

a. What is the Margin of Error?

$$MOE = \pm \sqrt{\frac{1}{2200}}$$

$$MOE = \pm 2.13\%$$

b. Give an interval that is likely to contain the exact percent of CCSD high school seniors that attended CCSD schools their entire school career.

$$67.87\% \text{ to } 72.13\%$$

16. Given the margin of error, calculate the sample size:

a. $\pm 6.25\%$

$$n = \frac{1}{MOE^2}$$

$$n = \frac{1}{(.0625)^2}$$

$$n = 256$$

b. $\pm 1.5\%$

$$n = \frac{1}{MOE^2}$$

$$n = \frac{1}{(.015)^2}$$

$$n \approx 4,444$$

c. Range of 64% to 72%. Find the sample size.

$$\begin{aligned} &68\% \\ &\pm 4\% \end{aligned}$$

$$n = \frac{1}{(.04)^2}$$

$$n \approx 625$$