Name_____ Date _____

Tell the type of sample each situation represents.

You are interested in finding out if students at your school think that fine arts programs are receiving enough funding. You decide to:

1. use a written survey that you give to people sitting at your lunch table.

Convenience

2. put a table at the entrance to the cafeteria with a sign directing students to complete the survey if they want to and drop it in the box.

self-selected

3. randomly selected students from each of the 4 grades.

Stratified

4. ask all the juniors and freshmen.

Cluster

5. put all names in a hat and draw ½ the names out to ask.

random

6. Dr. Jones wants to see whether the gender of members in a tribe in the Amazon plays a role in the order in which they are served their meals. Is this an observational study or experiment?

Observational → no treatment given.

7. Dr. Jones also wants to see whether the monkeys in the area grow larger when eating their native diet or when given manufactured monkey pellets. Is this an experiment or observational study? What are the treatment group, control group, and treatment?

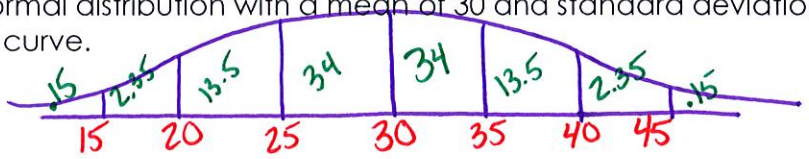
Experimental;

Treatment → getting manufactured pellets

Treatment group → monkey given the pellets

Control group → monkeys eating native diet

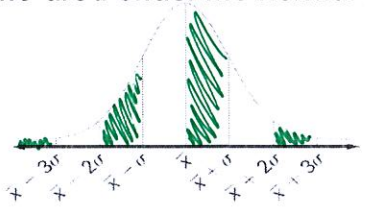
8. Draw a normal curve for a normal distribution with a mean of 30 and standard deviation of 5. Label all the areas under the curve.



Give the percent of the area under the normal curve represented by the shaded region:

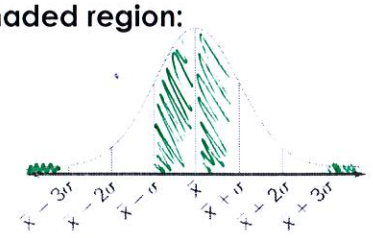
9. 50%

.15 + 13.5 + 34 + 2.35



10. 68.3%

.15 + 34 + 34 + .15

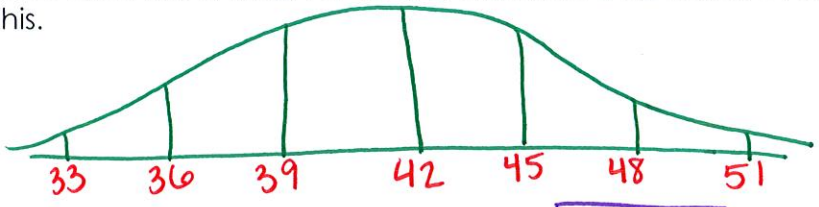


11. One hundred students out of 1200 at a school were surveyed. Fourteen said they had an after school job. Predict the number of students in the population that would answer similarly.

$$\frac{14}{100} = \frac{X}{1200}$$

X = 168 students

12. A normal distribution has a mean of 42 and a standard deviation of 3. Draw a normal curve to represent this.



a) What percentage of values lie between 33 and 45? 83.85%

$P(33 \le x \le 45) = 2.35 + 13.5 + 34 + 34$

b) What percentage lie above 48? 2.5%

$P(x > 48) = 2.35 + .15$

c) What percentage lie below 35? .98%

$P(x < 35) = \text{normcdf}(-1E99, 35, 42, 3)$

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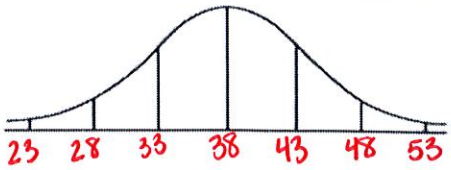
13. The high temperatures for days in January are normally distributed with a mean of 38°F and a standard deviation of 5 degrees.



a) What is the probability that the high temperature for a day will be at most 46°?

$P(x \le 46) = \text{normcdf}(-1E99, 46, 38, 5) =$ ~~.9452~~ .9452

b) What is the probability that the high temperature will be a least 36°?

$P(x \ge 36) = \text{normcdf}(36, 1E99, 38, 5) =$ .6554

c) What is the probability that the high temperature will be between 32 and 44 degrees?

$P(32 \le x \le 44) = \text{normcdf}(32, 44, 38, 5) =$ .7699

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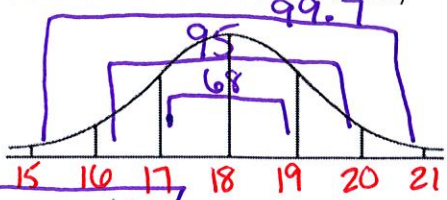
14. The mean age of reading the War of the Worlds is 18 with a standard deviation of 1 in the city of Fargo North Dakota that has a population of 10,000.



a) How many people would have read the book between the ages of 17 and 19?

$P(17 \le x \le 19) = 34 + 34 = (.68) \cdot 10{,}000 =$ 6,800 people

b) How many people would have read the book between the ages of 16 and 20?

$P(16 \le x \le 20) = 13.5 + 68 + 13.5 = 95\%$ $(.95)10{,}000 =$ 9,500 people

c) How many people would have read the book between the ages of 15 and 21?

$P(15 \le x \le 21) = 2.35 + 13.5 + 34 + 34 + 13.5 + 2.35 = 99.7\%$ → also could do... $\frac{99.7}{100} = \frac{x}{10{,}000}$

= 9,970 people

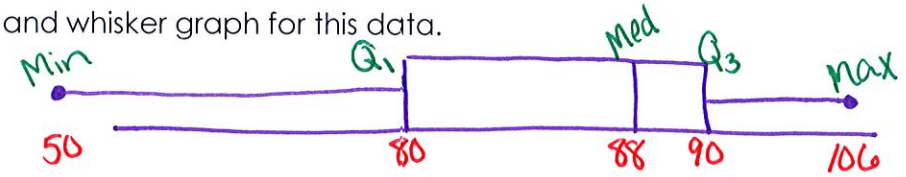
15. The average on the tests in my class and Mrs. Merrill's class were normally distributed on the last advanced algebra test we gave. The average in my class was 86 with a standard deviation of 3. The average on Mrs. Merrill's test was 82 with a standard deviation of 4. If you made an 88 on my test and your friend made 85 on Merrill's test, who had the better score in comparison to the rest of their class?

you: $z = \frac{88-86}{3} = .67$ { Friend: $\frac{85-82}{4} = .75$

Your z score= .67 Your friend's z score= .75 Who did better? Your Friend!

16. Given these test scores for my class. 81 80 90 99 106 50 89 90 78 87

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



b) Find the IQR 90 - 80 = 10

c) Are there any outliers? Show your work. $\bar{x}=85$ $\sigma = 14.2$

$85 - 3(14.2) = 42.4$
$85 + 3(14.2) = 127.6$

No outliers

d) If you take the 50 and 106 out of the list, are there any outliers with either calculation?

$\bar{x} = 86.75$ $\sigma = 6.4$

$86.75 - 3(6.4) = 67.55$
$86.75 + 3(6.4) = 105.95$

NO

17)

a) What is the margin of error when you survey 8,674 people?

$MOE = \pm \frac{1}{\sqrt{8674}} = \pm 1.1\%$

b) If you survey 923 people with an 81% "yes" response, what is the range of likely outcomes?

$MOE = \pm \frac{1}{\sqrt{923}} = \pm 3.3\%$

Between 77.7% - 84.3%

c) If you have a margin of error of ±3.2% , how many people did you survey?

$n = \frac{1}{.032^2}$

n = 977 people

18) Describe what each part of the formula means: ${}_4C_3\left(\frac{4}{5}\right)^3\left(\frac{1}{5}\right)^1$

4 - # trials

3 - # successes

1 - # failures

$\frac{4}{5}$ - probability of success

$\frac{1}{5}$ - probability of failure

19) **Free Throws** In his NBA career, Larry Bird made 89% of his free throws. Assume that each free throw that Bird takes is independent of any other. IF he shoots 14 free throws in a game, answer the following:

$n = 14$ $p = .89$

a. What is the probability that he makes 14 of his free throws?

$P(X=14) = \text{binompdf}(14, .89, 14) = \boxed{.1956}$

b. What is the probability that he makes 12 or 13 of his free throws?

$P(X=12) = \text{binompdf}(14, .89, 12) = .2720$

$P(X=13) = \text{binompdf}(14, .89, 13) = .3385$ + $\boxed{.6105}$

c. What is the probability that he makes no more than 10 free throws?

$P(X \leq 10) = \text{binomcdf}(14, .89, 10) = \boxed{.0594}$

d. What is the probability that he makes more than 12 free throws?

$P(X > 12) = 1 - \text{binomcdf}(14, .89, 12) = \boxed{.5342}$

e. What is the probability that he makes at least 10 free throws?

$P(X \geq 10) = 1 - \text{binomcdf}(14, .89, 9) = \boxed{.9863}$

Calculate the probability of *k* successes for a binomial experiment:

20) $k \leq 3, n = 6, p = 0.3$

$P(K \leq 3) = \text{binomcdf}(6, .3, 3)$

$= \boxed{.9295}$

21) $k > 6, n = 10, p = 0.55$

$P(K > 6) = 1 - \text{binomcdf}(10, .55, 6)$

$= \boxed{.26600}$