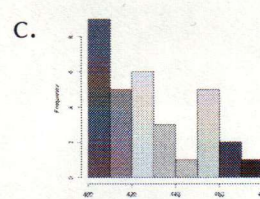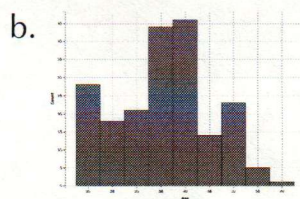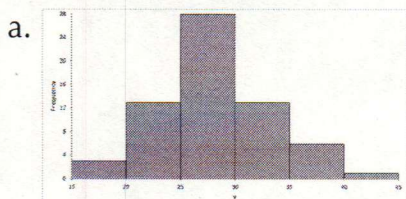Name_____

Unit 9 Review
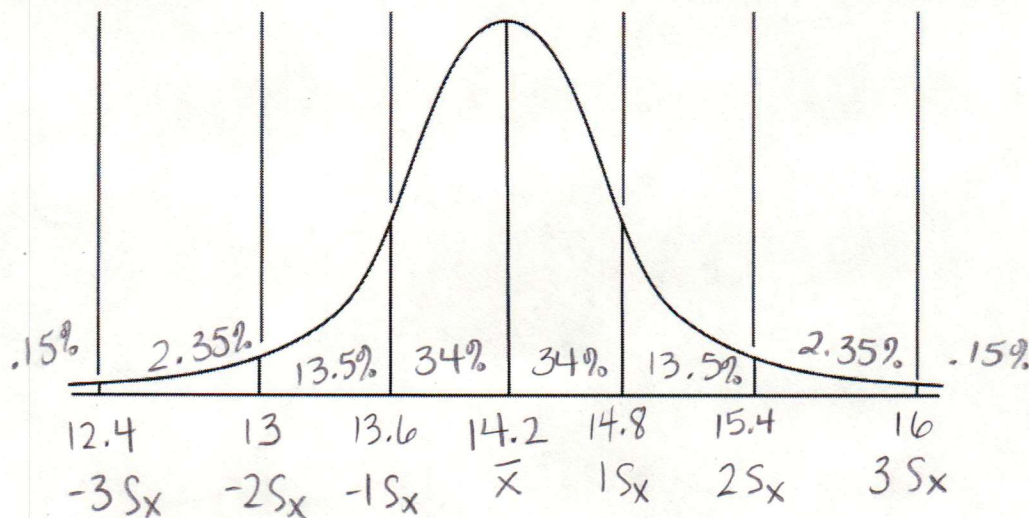
1. Be able to describe and label a normal distribution.

2. Which of these histograms most closely resembles a normal distribution? Why?

a.

b.

c.

a. It is unimodal any roughly symmetric, making an approximate bell curve shape.

3. The mean circumference of a newborns head is 14.2 inches, and the standard deviation is 0.6 inches.

Fill in the values on the given normal distribution and then use them to answer the questions.

.15% 2.35% 13.5% 34% 34% 13.5% 2.35% .15%

| 12.4 | 13 | 13.6 | 14.2 | 14.8 | 15.4 | 16 |
| -3 Sx | -2Sx | -1Sx | x̄ | 1Sx | 2Sx | 3 Sx |

a. What percent of newborns have a head circumference above 14.8 inches?

$50 - 34 = 16\%$

b. What percent of newborns have a head circumference between 13.⬛ inches and 14.2 inches?

$34 + 13.5 = 47.5\%$

c. If a baby is born with a head circumference of 12.8 inches, would that be considered an outlier? How do you know?

Yes, any head circumference below 13 inches is more than 2 standard deviations below the mean, making it an outlier.

4. The mean weight of apples grown at Johnny Apple Orchards is 185 grams with a standard deviation of 11 grams. The stores he sells to likes to have similar sized apples because they sell by number of apples, not weight.

a. What percent of apples weight less than 165 grams?

$$\frac{165-185}{11} = -1.82 \qquad .0344 \qquad \boxed{3.44\%}$$

b. What percent of apples are between 180 and 190 grams?

$$\frac{180-185}{11} = -.45 \qquad \frac{190-185}{11} = .45 \qquad 67.36 - 32.64 = \boxed{34.72\%}$$

c. What percent of apples weigh more than 210 grams?

$$\frac{210-185}{11} = 2.27 \qquad .9884 \qquad 100-98.84 = \boxed{1.16\%}$$

d. What percent of apples are between 190 and 215 grams?

$$\frac{190-185}{11} = .45 \qquad \frac{215-185}{11} = 2.73 \qquad 99.68 - 67.36 =$$
$$67.36\% \qquad\qquad 99.68 \qquad\qquad \boxed{32.32\%}$$

5. A restaurant has found that their mean wait time for a group of 4 on a Saturday night is 19 minutes with a standard deviation of 2 minutes.

a. What is the probability that a group will wait less than 13 minutes?

$$\frac{13-19}{2} = -3 \qquad .0013 \qquad \boxed{.13\%}$$

b. What is the probability that group will wait for less than 30 minutes?

$$\frac{30-19}{2} = 5.5 \qquad \text{Basically } 100\%$$

c. What wait times would be considered outliers for this restaurant on a Saturday night?

Less than 15 minutes or more than 23 minutes

6. The Butler twins each have one pet. Kendra has a bulldog that weighs 43 pounds. The average weight of an English bulldog is 51 pounds with a standard deviation of 2.1 pounds. Her brother, James, has a Siamese cat that weighs 17 pounds. The average weight of a Siamese cat is 12 pounds with a standard deviation of 1.3 pounds. Whose pet is the more unusual in size? Explain how can you tell?

$$\frac{43-51}{2.1} = -3.81 \qquad\qquad \frac{17-12}{1.3} = 3.85$$

The cat is more unusual because it is farther from the mean than the dog.

7. A furniture maker buys hardwood in batches. The supplier is supposed to dry the wood before shipping (so it will hold its size and shape). The furniture maker chooses 5 pieces of wood from each batch and tests the moisture content. The entire batch is sent back if the moisture content exceeds 12%. Identify the population, sample, and parameter of interest.

Population: A batch of hardwood

Sample: 5 pieces of wood from the batch

Parameter of Interest: moisture content of wood, < 12%

8. A department store mails a customer satisfaction survey to people who made credit card purchases at their store. This month 45,000 people made purchases and 1000 were chosen at random to receive the survey. Identify the population, sample, and parameter of interest.

Population: Store customers who made credit card purchases

Sample: 1000 of the customers

Parameter of Interest: customer satisfaction

9. A student designed a survey about how much sleep students get at his high school. The student chose to survey the first 100 students to arrive at school on one particular day. These students reported an average of 7.2 hours of sleep the previous night. This is an example of what kind of sampling? Do you think the results of this survey are a good representation of the whole population? Explain.

Convenience, because they asked the first students who arrived. The results are less likely to be representative of the whole student population since it may be students from one bus or only students who are getting dropped off.

10. The management company of a local mall with 21 stores plans to randomly survey all of the employees at 3 stores about mall security. This is an example of what kind of sampling? Do you think the results of this survey are a good representation of the whole population? Explain.

Cluster Random Sampling, because they are asking a whole group from one random selection. It is unlikely to be representative because different size stores will have different needs, or some employees may not really deal with security.

11. Surveys of high school dropouts showed that a primary reason was not seeing a connection between school study and future plans. Researchers developed a program called CareerStart, where teachers showed how current topics relate to future careers. Seven of the 14 schools in Forsyth County, North Carolina were randomly selected to use the CareerStart program, and the other seven used the existing curriculum. This is an example of what method of data collection? Do you think the resulting data will be useful? Explain.

An experiment, this data will likely be useful since they can compare schools, but also with previous data.

12. Ninety residents of a retirement community were selected at random. Each person was asked a number of questions, including questions about exercise and blood pressure. Residents who reported they exercised were often less likely to have high blood pressure. This is an example of what method of data collection? Do you think the resulting data will be useful? Explain.

Observational study, this data won't necessarily show that exercise lowers blood pressure, but may show that these residents are healthier. They may have other causes for their lower blood pressure.

13. You have been put in charge of choosing a new beverage options to include at The Pond. You need to gather data to help you make the best choice. Describe how will you choose your sample? Explain. What method will you use to gather the data? Explain.

Make sure you thoroughly explain your choices.