Moore SCC 8e

Chapter 13

1. The total area under a density curve is:

*a. 1

b. 100

c. Dependent upon the data set

d. None of the choices are correct.

A. Correct. We set up curves to show the *proportion* of observations in any region by areas under the curve. The total area under a density curve is 1.
B. Incorrect. We set up curves to show the *proportion* of observations in any region by areas under the curve. The total area under a density curve is 1.
C. Incorrect. The total area under a density curve is 1.
D. Incorrect. The total area under a density curve is 1.

Text Reference: Section 13.1: Density curves

2. The mean of a density curve is:

a. The point that divides the area under the curve in half

*b. The balance point or center of gravity

c. Both the point that divides the area under the curve in half and the balance point or center of gravity

d. None of the choices are correct.

A. Incorrect. Think of the mean as the center point on a see-saw. The mean is the balance point or center of gravity.
B. Correct. The center of gravity typically refers to the mean.
C. Incorrect. Think of the mean as the center point on a see-saw. The mean is the balance point or center of gravity. It does not necessarily have to be the point where it divides the curve in half.
D. Incorrect. Think of the mean as the center point on a see-saw. The mean is the balance point or center of gravity.

Text Reference: Section 13.2: The center and spread of a density curve

3. The median of a density curve is:

*a. The point that divides the area under the curve in half

b. The balance point or center of gravity

c. Both the point that divides the area under the curve in half and the balance point or center of gravity

d. None of the choices are correct.

A. Correct. The median is the middle number and on the density curve it is the place where it divides the curve in half.
B. Incorrect. The median is the middle number and on the density curve it is the place where it divides the curve in half.
C. Incorrect. The median is the middle number and on the density curve it is the place where it divides the curve in half.
D. Incorrect. The median is the middle number and on the density curve it is the place where it divides the curve in half.

Text Reference: Section 13.2: The center and spread of a density curve

4. Which of the following are properties of Normal curves?

a. They can be described by giving their mean and standard deviation.

b. The mean is at the center of symmetry of the curve.

c. They describe the distribution of statistics like sample proportions and sample means.

*d. All of the choices are correct.

e. None of the choices are correct.

A. Incorrect. Normal curves describe the distribution of statistics by using the mean and standard deviation. All three statements are correct.
B. Incorrect. Normal curves describe the distribution of statistics by using the mean and standard deviation. All three statements are correct.
C. Incorrect. Normal curves describe the distribution of statistics by using the mean and standard deviation. All three statements are correct.
D. Correct. Normal curves describe the distribution of statistics by using the mean and standard deviation.
E. Incorrect. Normal curves describe the distribution of statistics using mean and standard deviation. All three statements are correct.

Text Reference: Section 13.3: Normal distributions

5. What percent of observations are between the mean and two standard deviations above the mean in a Normal distribution?

*a. 47.5%

b. 68%

c. 95%

d. 99.7%

A. Correct. This is the percent of observations two standard deviations *above* the mean.

B. Incorrect. The percent of observations two standard deviations *above* the mean is 47.5% (1/2 of 95%.)
C. Incorrect. The percent of observations two standard deviations *above* the mean is 47.5% (1/2 of 95%.)
D. Incorrect. The percent of observations two standard deviations *above* the mean is 47.5% (1/2 of 95%.)

Text Reference: Section 13.4: The 68-95-99.7 rule

6. A local sub shop lists the carbohydrate content in each of its "healthy choice sandwiches." The distribution of carbohydrate content is approximately Normal with mean 40 carbohydrates and a standard deviation of 2 carbohydrates.

Between which carbohydrate amounts do the middle 68% of sandwiches fall?

a. 38 and 40 carbohydrates

*b. 38 and 42 carbohydrates

c. 40 and 42 carbohydrates

d. 36 and 44 carbohydrates

A. Incorrect. This would only account for 34%. Add 2 carbohydrates to the mean of 40 and then subtract 2 to get the range of 38 to 42 carbohydrates.
B. Correct. Add 2 carbohydrates to the mean of 40 and then subtract 2 to get the range of 38 to 42 carbohydrates.
C. Incorrect. This would only account for 34%. Add 2 carbohydrates to the mean of 40 and then subtract 2 to get the range of 38 to 42 carbohydrates.
D. Incorrect. This would account for 95% of the data set. We only want 68%. Add 2 carbohydrates to the mean of 40 and then subtract 2 to get the range of 38 to 42 carbohydrates.

Text Reference: Section 13.4: The 68-95-99.7 rule

7. A local sub shop lists the carbohydrate content in each of its “healthy choice sandwiches.” The distribution of carbohydrate content is approximately Normal with mean 40 carbohydrates and a standard deviation of 2 carbohydrates.

What percentage of healthy choice sandwiches are less than 38 grams of carbohydrates?

a. 13.5%

*b. 16%

c. 27%

d. 36%

e. 50%

A. Incorrect. Take a look at the 68-85-99.7 rule again. Less than 38 grams would be 16% of the healthy choice sandwiches.
B. Correct. Using the 68-95-99.7 rule, this would be 16% of the healthy choice sandwiches.
C. Incorrect. Take a look at the 68-85-99.7 rule again. Less than 38 grams would be 16% of the healthy choice sandwiches.
D. Incorrect. Take a look at the 68-85-99.7 rule again. Less than 38 grams would be 16% of the healthy choice sandwiches.
E. Incorrect. This is not half the data set. Take a look at the 68-85-99.7 rule again. Less than 38 grams would be 16% of the healthy choice sandwiches.

Text Reference: Section 13.4: The 68-95-99.7 rule

8. Standard scores are used to:

a. Express observations in terms of the number of standard deviations above or below the mean

b. Compare values of different distributions

c. Compare roughly symmetrical distributions with different means and standard deviations

*d. All of the choices are correct.

e. None of the choices are correct.

A. Incorrect. Although correct, so are statements b and c.
B. Incorrect. Although correct, so are statements a and c.
C. Incorrect. Although correct, so are statements a and b.
D. Correct. All these statements reflect standard scores.
E. Incorrect. Statements a, b, and c are all correct.

Text Reference: Section 13.5: Standard scores

9. Scores on the Math or Verbal part of the SAT test are Normally distributed with a mean score of 500 and a standard deviation of 100.

If a person scores 700 on the Math part of the SAT, what is his standard score?

a. 1 standard deviation above the mean

*b. 2 standard deviations above the mean

c. .5 standard deviations above the mean

d. 0.25 standard deviations above the mean

A. Incorrect. The standard score is $\frac{observation - mean}{st.dev.}$ or $\frac{700-500}{100} = \frac{200}{100} = 2$ or 2 standard deviations above the mean.
B. Correct.
C. Incorrect. The standard score is $\frac{observation - mean}{st.dev.}$ or $\frac{700-500}{100} = \frac{200}{100} = 2$ or 2 standard deviations above the mean.
D. Incorrect. The standard score is $\frac{observation - mean}{st.dev.}$ or $\frac{700-500}{100} = \frac{200}{100} = 2$ or 2 standard deviations above the mean.

Text Reference: Section 13.5: Standard scores

10. Scores on the Math or Verbal part of the SAT test are Normally distributed with a mean score of 500 and a standard deviation of 100.

How high must a student score on the Math SAT to fall within the top 15% of all scores?

a. 550

*b. 600

c. 650

d. 700

A. Incorrect. Look at Table B in the back of your book for the percentiles close to 85 (top 15%). You see that the standard score 1.0 is the 84.13 percentile and standard score 1.1 is the 86.43 percentile. The percentile in the table closest to 85 is 84.13, so we conclude that a standard score of 1.0 is approximately the 85th percentile of any Normal distribution. Using observation = mean + standard score x deviation = 500 + (1.0)(100) = 600. A score of 600 or higher will be in the top 15%.
B. Correct.
C. Incorrect. Look at Table B in the back of your book for the percentiles close to 85 (top 15%). You see that the standard score 1.0 is the 84.13 percentile and standard score 1.1 is the 86.43 percentile. The percentile in the table closest to 85 is 84.13, so we conclude that a standard score of 1.0 is approximately the 85th percentile of any Normal distribution. Using observation = mean + standard score x deviation = 500 + (1.0)(100) = 600. A score of 600 or higher will be in the top 15%.
D. Incorrect. Look at Table B in the back of your book for the percentiles close to 85 (top 15%). You see that the standard score 1.0 is the 84.13 percentile and standard score 1.1 is the 86.43 percentile. The percentile in the table closest to 85 is 84.13, so we conclude that a standard score of 1.0 is approximately the 85th percentile of any Normal distribution. Using observation = mean + standard score x deviation = 500 + (1.0)(100) = 600. A score of 600 or higher will be in the top 15%.

Text Reference: Section 13.6: Percentiles of Normal distributions*