

Name:

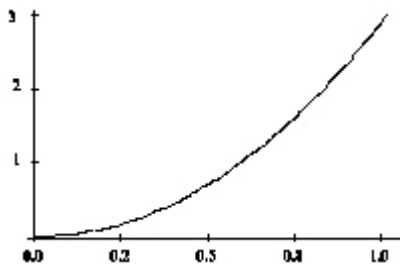
AP Statistics - Chapter 2 MC Study Guide

Multiple Choice

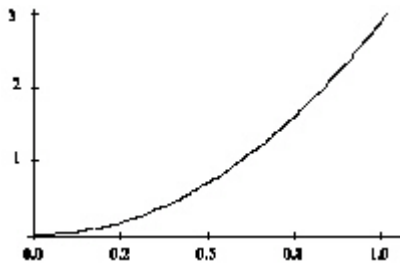
Identify the choice that best completes the statement or answers the question.

1. The heights of American men aged 18 to 24 are approximately normally distributed with mean 68 inches and standard deviation 2.5 inches. Only about 5% of young men have heights outside the range
- 65.5 inches to 70.5 inches
 - 63 inches to 73 inches
 - 60.5 inches to 75.5 inches
 - 58 inches to 78 inches
 - none of the above

2. For the density curve shown below, which statement is true?



- The density curve is symmetric.
 - The density curve is skewed right.
 - The area under the curve between 0 and 1 is 1.
 - The density curve is normal.
 - None of the above is correct.
3. For the density curve shown below, which statement is true?



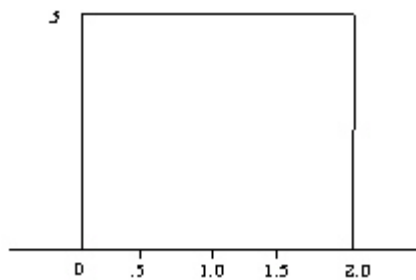
- The mean and median are equal.
 - The mean is greater than the median.
 - The mean is less than the median.
 - The mean could be either greater than or less than the median.
 - None of the above is correct.
4. The area under the standard normal curve corresponding to $-0.3 < Z < 1.6$ is
- 0.3273
 - 0.4713
 - 0.5631
 - 0.9542
 - None of the above

5. Suppose that sixteen-ounce bags of chocolate chips cookies are produced with an actual mean weight of 16.1 ounces and a standard deviation of 0.1 ounce. The percentage of bags that will contain between 16.0 and 16.1 ounces is

- a. 10
- b. 16
- c. 34
- d. 68
- e. none of the above

6. A company produces packets of soap powder labeled "Giant Size 32 Ounces." The actual weight of soap powder in a box has a normal distribution with a mean of 33 oz. and a standard deviation of 0.8 oz. What proportion of packets are underweight (i.e., weigh less than 32 oz.)?
- a. 0.159
 - b. 0.212
 - c. 0.106
 - d. 0.841
 - e. 0.115

7. For the density curve below, what percent of the observations lie between 0.5 and 1.2?



- a. 25%
- b. 35%
- c. 50%
- d. 68%
- e. 70%

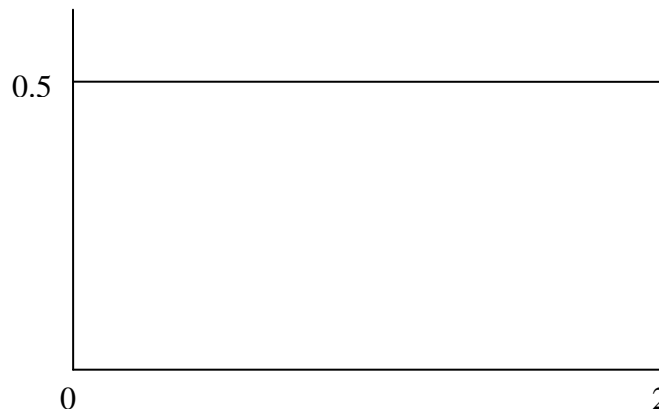
8. If the heights of 99.7% of American men are between 5'0" and 7'0", what is your estimate of the standard deviation of the height of American men?
- a. 1"
 - b. 3"
 - c. 4"
 - d. 6"
 - e. 12"

9. Suppose that the distribution of math SAT scores from your state this year is normally distributed with mean 480 and standard deviation 100 for males, and mean 440 and standard deviation 120 for females. If someone who scores 780 or higher on math SAT can be considered a genius, what is the proportion of geniuses among the male SAT takers?
- a. 26%
 - b. 13%
 - c. 3%
 - d. 1.3%
 - e. 0.13%

10. The average yearly snowfall in Chillyville is normally distributed with a mean of 55 inches. If the snowfall in Chillyville exceeds 60 inches in 15% of the years, what is the standard deviation?
- a. 4.81 inches
 - b. 5.18 inches
 - c. 6.04 inches
 - d. 8.93 inches
 - e. The standard deviation cannot be computed from the given information.

AP Statistics Chapter 2 Practice Test

1. The density curve below is uniform from $(0, 0.5)$ to $(2, 0.5)$.



- a) Verify that the area below this density curve is 1.
b) What proportion of observations in this density curve are less than 0.75?
c) What proportion of observations in this density curve are greater than 1.5?
2. In a study of elite distance runners, the mean weight was reported to be 63.1 kilograms (kg), with a standard deviation of 4.8 kg.

- a) Assuming that the distribution of weights is normal, sketch the density curve of the weight distribution, with the horizontal axis marked in kilograms.

Using your sketch and the 68-95-99.7 rule, answer the following:

- b) What range represents the middle 68% of runner's weights?
c) What percentage of runner's weights are less than 58.3 kg?
d) What percentage of runners weighs between 63.1 kg and 72.7 kg?
3. A lunch stand in the business district has a mean daily gross income of \$520 with a standard deviation of \$50. Assume that the daily gross income is normally distributed.
- a) In what proportion of days is the gross income less than \$400?
b) In what proportion of days is the gross income more than \$600?
c) In what proportion of days is the gross income between \$400 and \$600?
d) What does the gross income need to be for a day to be in the top 10% of all days?

Name:

Score: 0 / 10 points (0%)

AP Statistics - Chapter 2 MC Study Guide

Multiple Choice

Identify the choice that best completes the statement or answers the question.

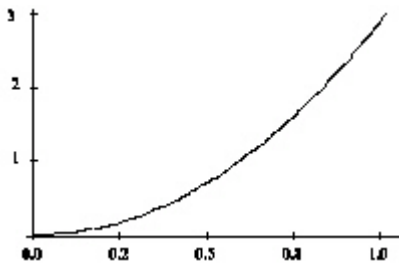
1. The heights of American men aged 18 to 24 are approximately normally distributed with mean 68 inches and standard deviation 2.5 inches. Only about 5% of young men have heights outside the range
- 65.5 inches to 70.5 inches
 - 63 inches to 73 inches
 - 60.5 inches to 75.5 inches
 - 58 inches to 78 inches
 - none of the above

ANSWER: B

The *68-95-99.7 Rule* tells us that the middle 95% of the data in a normal distribution lies within 2 standard deviations of the mean. So the other 5% lies outside 2 standard deviations. Since the mean is 68 and the standard deviation is 2.5, the middle 95% will be in the interval $68 \pm 2(2.5) = 68 \pm 5 = 63$ inches to 73 inches.

POINTS: 0 / 1

2. For the density curve shown below, which statement is true?



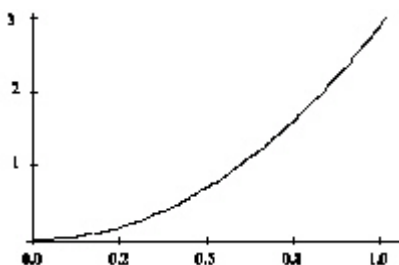
- The density curve is symmetric.
- The density curve is skewed right.
- The area under the curve between 0 and 1 is 1.
- The density curve is normal.
- None of the above is correct.

ANSWER: C

The area under all density curves is 1. Since this curve resides between 0 and 1, the area in that region must be 1. Also, the curve shown is skewed to the left, so answers **a** and **b** do not apply. Lastly, it is certainly not a normal curve as it is NOT symmetric.

POINTS: 0 / 1

3. For the density curve shown below, which statement is true?




- The mean and median are equal.
- The mean is greater than the median.
- The mean is less than the median.
- The mean could be either greater than or less than the median.
- None of the above is correct.

ANSWER: C

Since this curve is skewed to the left, the mean will be pulled lower than the median. Thus, the mean will be lower than the median.


POINTS: 0 / 1

-  4. The area under the standard normal curve corresponding to $-0.3 < Z < 1.6$ is
- 0.3273
 - 0.4713
 - 0.5631
 - 0.9542
 - None of the above

ANSWER: C

The area in question can be found by subtracting the area to the left of $Z = -0.3$ from the area to the left of $Z = 1.6$. Using Table A, we find the area to left of $Z = -0.3$ is **.3821** and the areas to the left of $Z = 1.6$ is **.9452**. So the area we need is $.9452 - .3821 = .5631$.


POINTS: 0 / 1

-  5. Suppose that sixteen-ounce bags of chocolate chips cookies are produced with an actual mean weight of 16.1 ounces and a standard deviation of 0.1 ounce. The percentage of bags that will contain between 16.0 and 16.1 ounces is
- 10
 - 16
 - 34
 - 68
 - none of the above

ANSWER: C

This is the area under the normal curve between the center and the first standard deviation to the left. This is exactly half of the middle 68% of the data (according to the *68-95-99.7 rule*) so it is 34%.

POINTS: 0 / 1

-  6. A company produces packets of soap powder labeled "Giant Size 32 Ounces." The actual weight of soap powder in a box has a normal distribution with a mean of 33 oz. and a standard deviation of 0.8 oz. What proportion of packets are underweight (i.e., weigh less than 32 oz.)?
- 0.159
 - 0.212
 - 0.106
 - 0.841
 - 0.115

ANSWER: C

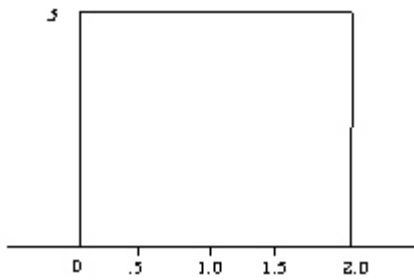
This question asks to find the proportion of data to the left of 32 in a normal distribution with a mean and standard deviation of 33 and 0.8 respectively. To determine this, we must first get a z-score:

$$z = \frac{x - \mu}{\sigma} = \frac{32 - 33}{0.8} = -1.25$$

So, from Table A, we see that the proportion of the data for $z < -1.25$ is 0.1056 or 0.106 when rounded to 3 decimal places.

POINTS: 0 / 1

7. For the density curve below, what percent of the observations lie between 0.5 and 1.2?



- a. 25%
- b. 35%
- c. 50%
- d. 68%
- e. 70%

ANSWER: B

Note first that the height of this rectangular density curve is 0.5 and its width is 2. Its area is then $0.5 \times 2 = 1$ (as should be the case for a density curve). Note also that the answer to the question here is the area of the rectangle between 0.5 and 1.2. The width of that rectangle is 0.7 and its height is also 0.5, so the area is $0.7 \times 0.5 = .35$ or 35%.

POINTS: 0 / 1

8. If the heights of 99.7% of American men are between 5'0" and 7'0", what is your estimate of the standard deviation of the height of American men?

- a. 1"
- b. 3"
- c. 4"
- d. 6"
- e. 12"

ANSWER: C

The 68-95-99.7 rule tells us that 99.7% of the data in a normal distribution lies within 3 standard deviations of the mean (that's 3 standard deviations to the left and 3 to the right, for a total interval consisting of 6 standard deviations). The width of the interval here is 2 feet (5 feet to 7 feet) or 24 inches. Since this interval consists of 6 standard deviations, the standard deviation must be $24 \div 6 = 4$ inches.

POINTS: 0 / 1

9. Suppose that the distribution of math SAT scores from your state this year is normally distributed with mean 480 and standard deviation 100 for males, and mean 440 and standard deviation 120 for females. If someone who scores 780 or higher on math SAT can be considered a genius, what is the proportion of geniuses among the male SAT takers?

- a. 26%
- b. 13%
- c. 3%
- d. 1.3%
- e. 0.13%


ANSWER: E

Begin with the Z-score:

$$z = \frac{x - \mu}{\sigma} = \frac{780 - 480}{100} = \frac{300}{100} = 3.00$$

So, from Table A, we see that the proportion of the data for $Z < 3.00$ is 0.9987. Thus the proportion greater than that is $1 - .9987 = .0013$ or .13%.

POINTS: 0 / 1

-  10. The average yearly snowfall in Chillyville is normally distributed with a mean of 55 inches. If the snowfall in Chillyville exceeds 60 inches in 15% of the years, what is the standard deviation?
- 4.81 inches
 - 5.18 inches
 - 6.04 inches
 - 8.93 inches
 - The standard deviation cannot be computed from the given information.

ANSWER: A

Begin by finding the z-score that determines the upper 15% in a normal distribution (area to the left of that z-score must be 85% or .8500). From Table A, we see that the z-score must be 1.04. So substituting all of the know values into the z-score formula:

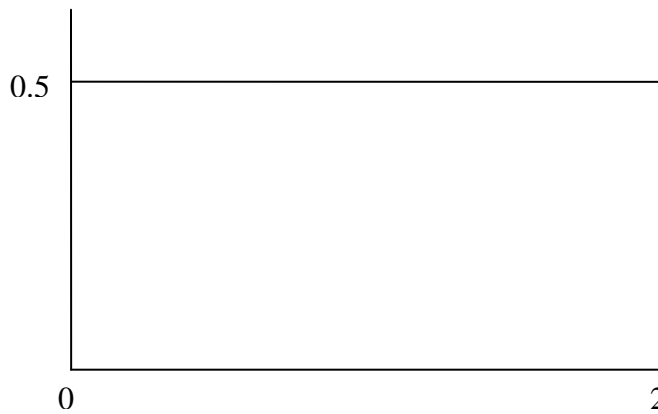
$$z = \frac{x - \mu}{\sigma} \text{ and } 1.04 = \frac{60 - 55}{\sigma} \text{ the only unknown is } \sigma, \text{ the standard deviation.}$$

$$\text{Solving for } \sigma, \text{ we get } \sigma = \frac{60 - 55}{1.04} = \frac{5}{1.04} = 4.808 \approx 4.81.$$

POINTS: 0 / 1

AP Statistics Chapter 2 Practice Test - ANSWERS

1. The density curve below is uniform from (0, 0.5) to (2, 0.5).



- a) Verify that the area below this density curve is 1. (**Area = $2 \times 0.5 = 1$**)
- b) What proportion of observations in this density curve are less than 0.75? (**.375**)
- c) What proportion of observations in this density curve are greater than 1.5? (**.25**)
2. In a study of elite distance runners, the mean weight was reported to be 63.1 kilograms (kg), with a standard deviation of 4.8 kg.
- a) Assuming that the distribution of weights is normal, sketch the density curve of the weight distribution, with the horizontal axis marked in kilograms. (**Sketch**)
- Using your sketch and the 68-95-99.7 rule, answer the following:**
- b) What range represents the middle 68% of runner's weights? (**58.3 – 67.9**)
- c) What percentage of runner's weights are less than 58.3 kg? (**16%**)
- d) What percentage of runners weighs between 63.1 kg and 72.7 kg? (**47.5%**)
3. A lunch stand in the business district has a mean daily gross income of \$520 with a standard deviation of \$50. Assume that the daily gross income is normally distributed.
- a) In what proportion of days is the gross income less than \$400? (**.0082**)
- b) In what proportion of days is the gross income more than \$600? (**.0548**)
- c) In what proportion of days is the gross income between \$400 and \$600? (**.9370**)
- d) What does the gross income need to be for a day to be in the top 10% of all days? (**\$584**)