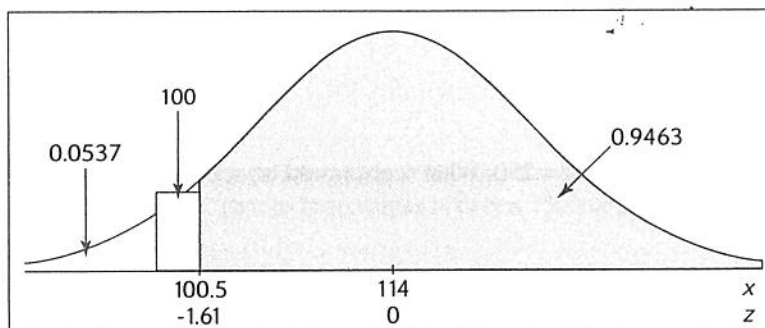


Since the problem asked for “more than 100,” exclude the bar valued at 100 and begin at 100.5.

$$z = \frac{x - \mu}{\sigma} = \frac{100.5 - 114}{8.4} = -1.61$$



This z-score corresponds to a probability of 0.0537. This represents the probability for less than or equal to 100 successes. Subtract from 1 to get the correct answer of 0.9463.

Compare this value with the more accurate value of 0.9468 obtained from the TI-83/4 using  $1 - \text{binomcdf}(300, 0.38, 100)$ .

## Review Questions and Answers

### Multiple Choice Questions

**Directions:** Solve each of the following problems. Decide which is the best of the choices given.

1. Which of the following are true about the normal distribution?

- I. The total area under the standard normal curve is equal to 1.
- II. The total area under a nonstandard normal curve is equal to 1.
- III. Every normal distribution can be standardized.

- A. I only
- B. III only
- C. I and II
- D. I and III
- E. I, II, and III

2. Which of the following are true about the normal distribution?

- I. The standard deviation gets smaller as  $z$  increases.
- II. Approximately 68% of the area under a normal curve lies within one variance of the mean.
- III. Normal distributions are asymmetric about the mean.

- A. I and II
- B. I and III
- C. II and III
- D. All of the statements are true.
- E. None of the statements is true.

3. What is the probability that a randomly selected member of a normally distributed population will lie more than 1.8 standard deviations from the mean?
- A. 0.0359
  - B. 0.0718
  - C. 0.1841
  - D. 0.8159
  - E. 0.9641
4. A standardized test has  $\mu = 100$  and  $\sigma = 250$ . What score would be necessary to score at the 85th percentile?
- A. 740
  - B. 1040
  - C. 1250
  - D. 1260
  - E. 1900
5. Which of the following are true about the normal distribution?
- I. It is symmetric about the mean; the mean, median, and mode are all the same; more than 90% of the distribution is within 2 standard deviations of the mean.
  - II. The normal density curve is defined by its mean and standard deviation and nothing else; there is no largest or smallest data value.
  - III. An interval  $x$  units wide and centered about the mean represents more data values than any other interval  $x$  units wide.
- A. I only
  - B. I and II
  - C. I and III
  - D. II and III
  - E. I, II, and III
6. Using a normal distribution, find two positive  $z$ -scores such that the  $z$ -scores differ by 0.10, and the probabilities to their left differ by 0.01. What is the larger of the two  $z$ -scores?
- A. 0.705
  - B. 1.615
  - C. 1.715
  - D. 1.960
  - E. 2.760
7. In a normal distribution with  $\mu = 4$  and  $\sigma = 1$ , where would the points of inflection be located?
- A.  $z = \pm 1$
  - B.  $z = 4 \pm 1$
  - C.  $z = 1 \pm 4$
  - D.  $z = 4 \pm 4$
  - E. None of the above is a correct response to the question.

8. The ERA of starting pitchers is normally distributed with a mean of 3.82 and a standard deviation of 1.14. What proportion of pitchers have ERAs between 3 and 4?
- A. 0.24
  - B. 0.33
  - C. 0.56
  - D. 0.72
  - E. 0.88
9. You are given a very large normal distribution with  $\mu = 200$  and  $\sigma = 85$ . A sample of 500 is drawn from the population. How many would you expect to have values between 150 and 250?
- A. 0.7224
  - B. 139
  - C. 222
  - D. 361
  - E. 372
10. Given the graph of a normal distribution, what happens to the shape of the curve if  $\mu$  increases and  $\sigma$  decreases?
- A. The curve will move to the right and get taller.
  - B. The curve will move to the right and get shorter.
  - C. The curve will move to the left and get taller.
  - D. The curve will move to the left and get shorter.
  - E. Cannot tell since the distribution is not standardized.
11. Which of the following are true about the normal distribution?
- I. The area in the range of  $z = -2$  to  $z = -1$  is less than half of the area in the range of  $z = 0$  to  $z = 1$ .
  - II. The area to the left of  $z = 2$  is equal to the area to the right of  $z = -2$ .
  - III. If  $z = -1$  represents the 40th percentile, then  $z = -2$  represents the 30th percentile.
- A. II only
  - B. I and II
  - C. I and III
  - D. II and III
  - E. I, II, and III
12. Jack scored 82 on a test in which  $\mu = 76$  and  $\sigma = 7$ . Jill scored 85 on a test in which  $\mu = 78$  and  $\sigma = 8$ . If both sets of scores are normally distributed, who scored better on their test relative to the rest of their class?
- A. Jack, since his  $z$ -score was higher
  - B. Jack, since the standard deviation was smaller
  - C. Jill, since her  $z$ -score was higher
  - D. Jill, since the standard deviation is greater
  - E. Cannot tell since the distributions are not compatible
13. What is the difference in percentiles associated with the  $z$ -scores of  $z = -2.34$  and  $z = 2.34$ ?
- A. 50%
  - B. 86%
  - C. 96%
  - D. 98%
  - E. 99%