Normal Distributions and Percentiles #2

1. Scores on the Wechsler Adult Intelligence Scale for the 20 to 34 age group are approximately normal with a mean of 110 and standard deviation of 25. How high must a person score to be in the top 10% of all scores?

2. The SAT math has a mean of 500 and standard deviation of 100. What percent of scores are between 400 and 600?

3. The SAT math has a mean of 500 and standard deviation of 100. What percent of scores are between 420 and 610?

4. The serum cholesterol levels in men aged 18 to 24 are normally distributed with $\bar{x} = 178.1$ and $sd = 40.6$
   
   a) How many standard deviations above the mean is a cholesterol level of 200?
   
   b) What percent of males have cholesterol levels of 200 or above?
   
   c) What cholesterol level would a man have such that 25% of all men have lower cholesterol than he does?

5. a) Sketch a standard normal curve (label and shade in) that represents $Z > -1.34$. What is the area of the shaded region?
   
   b) Sketch a standard normal curve (label and shade in) that represents $-.84 < Z < 1.26$. What is the area of the shaded region?
6. IQ scores are normally distributed with a mean of 100 and a standard deviation of 16.

   a) Draw a normal density curve on which this mean and standard deviation are correctly located.

   b) Between what values do the middle 95% of all IQ scores fall?

   c) What percent of IQ scores are less than 90?

   d) What percent of IQ scores are greater than 132?

   e) If a particular IQ score is reported as the 20th percentile, what is the IQ score?

   f) What percent of people have IQ scores between 90 and 130?

7. The heights of American men aged 18 to 24 are approximately normally distributed with mean 68 inches and standard deviation 2.5 inches. Half of all young men are shorter than

   (a) 65.5 inches (b) 68 inches (c) 70.5 inches

   (d) Can’t tell because the median height is not given

   (e) None of the above

8. 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

   (a) 65.5 inches to 70.5 inches (b) 63 inches to 73 inches

   (c) 60.5 inches to 75.5 inches (d) 58 inches to 78 inches

   (e) none of the above
9. A normal density curve has which of the following properties?

(a) It is symmetric.
(b) Its peak is at the mean.
(c) The spread of the curve is proportional to its standard deviation.
(d) All of the above answers (a–c) are correct.
(e) None of the above are correct.

10. The batting average of major-league baseball hitters in recent years has followed roughly the normal distribution with mean .265 and standard deviation .035. In 2000, Nomar Garciaparra of the Boston Red Sox and Todd Helton of the Colorado Rockies led the major leagues with batting averages of .372.

(a) About what percent of hitters bat .230 or lower?
   (Sketch a normal curve to illustrate and use the 68-95-99.7 rule.)
(b) What is the standard score for Garciaparra and Helton?
(c) What percent of hitters bat .372 or higher?

11. For a normal distribution with mean 20 and standard deviation 5, approximately what percent of the observations will be between 5 and 35?

(a) 50%        (b) 68%        (c) 95%        (d) 99.7%       (e) 100%

12. Scores on the American College Testing (ACT) college entrance exam follow the normal distribution with mean 18 and standard deviation 6. Wayne's standardized score on the ACT was -0.7. What was Wayne's actual ACT score?

(a) 4.2        (b) -4.2       (c) 13.8       (d) 22.2       (e) 9.6
13. On the driving range, Tiger Woods hits golf balls with his driver. The distance traveled by the golf balls follows a normal distribution with a mean of 300 yards and a standard deviation of 7 yards.

(a) Sketch a normal curve to illustrate the distance traveled by Tiger’s golf balls. Be sure to mark the mean and the points one, two, and three standard deviations away from the mean.

(b) Use the 68-95-99.7 rule to estimate the percent of Tiger’s drives that travel between 286 yards and 307 yards.

(c) On a particular hole, a small creek is 290 yards away from the tee. What percent of Tiger’s drives exceed 290 yards?

(d) What distance would a golf ball travel to be at the 25th percentile of Tiger Wood’s driving length distribution?