These exercises deal with **stanine scores**. Stanine scores are used when evaluating a student’s score on a standardized test. They are often reported along with the other measures such as percentiles, averages, and standard deviations. A stanine is defined below.

Stanine, or "standard nine", scores are defined using the properties of the normal curve. The scale is created with nine intervals. The intervals are defined using one-half of a standard deviation of the normal curve. The 5th stanine straddles the midpoint of the distribution, covering the scores that are within one-quarter of a standard deviation on each side of the mean. The 5th stanine contains about 20% of the data under a normal distribution. The 6th, 7th, 8th, and 9th stanines cover scores in succeeding steps of one-half of a standard deviation above the 5th stanine. The 4th, 3rd, 2nd, and 1st stanines cover scores in succeeding steps of one-half of a standard deviation below the 5th stanine. Therefore, a stanine of 5 represents “average” test scores; stanines 6, 7, 8, and 9 cover the top end of the distribution; stanines 4, 3, 2, and 1 fall below the mid-point and represent lower scores. Note that a stanine is not a point on a scale but an interval.

The normal curve below graphically shows the location of each stanine, and the approximate percentage of scores in the 5th stanine.
EXERCISES

1. The scores on a standardized test are normally distributed with a mean of 500 and a standard deviation of 100.
   A. What scores on this test are in each of the nine stanines?
   B. The figure above shows that the 5th stanine contains about 20% of the test scores. Using the normal table, find the actual percentage of scores in this stanine.
   C. What is the percentage of scores on this test in the other eight (other than the 5th) stanines?
   D. If the scores have a normal distribution, what is the percentage of scores in the 7th stanine or higher?
   E. If the scores have a normal distribution, what is the percentage of scores in the 8th stanine or lower?

2. The scores on an achievement test are normally distributed with a mean of 70 and a standard deviation of 5.
   A. One student’s score is reported to have a stanine score of 7. The parent of this student asks you what this means. What would you tell the parent?
   B. One student’s score is reported to be at the 85th percentile. The parent of this student asks you what this means. What would you tell the parent?
   C. Which value, a stanine or a percentile, is a more precise measure of how a student does on a test? Explain.

3. The scores on an aptitude test have a mean of 28 and a standard deviation of 2.5.
   A. A student scores a 34 on this test. What is this student’s stanine score?
   B. A student scores a 27 on this test. What is this student’s stanine score?
   C. A student scores a 24 on this test. What is this student’s stanine score?
   D. If the aptitude test scores are not normally distributed, is it possible to find the percentile scores for the test scores in parts A-C? Explain.