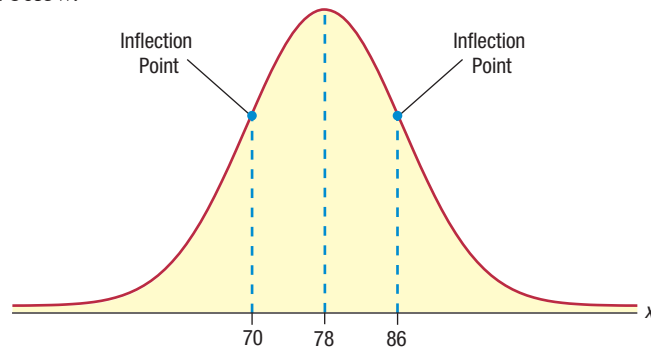


## P Chapter 6 Project

### Curving Grades Using a Normal Distribution

Dr. Smith, a biology professor at Bradford University, has decided to give his classes a standardized biology exam that is nationally normed. This indicates that the normal distribution is an appropriate approximation for the probability distribution of students' scores on this exam. The probability distribution of students' scores on this standardized exam can be estimated using the normal distribution shown below.



1. State the mean of the distribution of the biology exam scores.
2. State the standard deviation of the distribution of the biology exam scores.

#### Grading Curve Option I

Originally, Dr. Smith decides to curve his students' exam grades as follows.

- Students whose scores are at or above the 90<sup>th</sup> percentile will receive an A.
  - Students whose scores are in the 80<sup>th</sup>–89<sup>th</sup> percentiles will receive a B.
  - Students whose scores are in the 70<sup>th</sup>–79<sup>th</sup> percentiles will receive a C.
  - Students whose scores are in the 60<sup>th</sup>–69<sup>th</sup> percentiles will receive a D.
  - Students whose scores are below the 60<sup>th</sup> percentile will receive an F.
3. Find the  $z$ -scores that correspond to the following percentiles.
    - 90<sup>th</sup> percentile
    - 80<sup>th</sup> percentile
    - 70<sup>th</sup> percentile
    - 60<sup>th</sup> percentile
  4. Using that information, find the exam scores that correspond to the curved grading scale. Assume that the exam scores range from 0 to 100. (Round to the nearest whole number.)
 

A: \_\_\_\_\_ – 100

B: \_\_\_\_\_ – \_\_\_\_\_

C: \_\_\_\_\_ – \_\_\_\_\_

D: \_\_\_\_\_ – \_\_\_\_\_

F: 0 – \_\_\_\_\_

5. The following is a partial list of grades for students in Dr. Smith's class. Using the grading scale you just created, find the new curved *letter grades* that the students will receive on their tests given their raw scores.

Biology Exam Grades	
Name	Raw Score / Grade
Adam	82 / B
Bill	77 / C
Susie	91 / A
Troy	86 / B
Sharon	75 / C
Laura	66 / D
Eric	88 / B
Marcus	69 / D
Stephanie	79 / C

### Grading Curve Option II

After reviewing the results, Dr. Smith decides to consider an alternate curving method. He decides to assign exam grades as follows.

- A: Students whose scores are at least two standard deviations above the mean of the standardized test.
  - B: Students whose scores are from one up to two standard deviations above the mean of the standardized test.
  - C: Students whose scores are from one standard deviation below the mean up to one standard deviation above the mean of the standardized test.
  - D: Students whose scores are from two standard deviations below the mean up to one standard deviation below the mean of the standardized test.
  - F: Students whose scores are more than two standard deviations below the mean of the standardized test.
6. Using the previous information, create Dr. Smith's new grading scale. (Round to the nearest whole number.)
- A: \_\_\_\_\_ – 100
- B: \_\_\_\_\_ – \_\_\_\_\_
- C: \_\_\_\_\_ – \_\_\_\_\_
- D: \_\_\_\_\_ – \_\_\_\_\_
- F: 0 – \_\_\_\_\_
7. Using the grading scale you just created, return to the partial list of grades and find the new curved *letter grades* that the students will receive on their tests given their raw scores.
8. Review the grades each student received using the two grading scales. Which grading scale do you feel is fairer? Explain why.