

# Statistical Concepts

## A Basic Program

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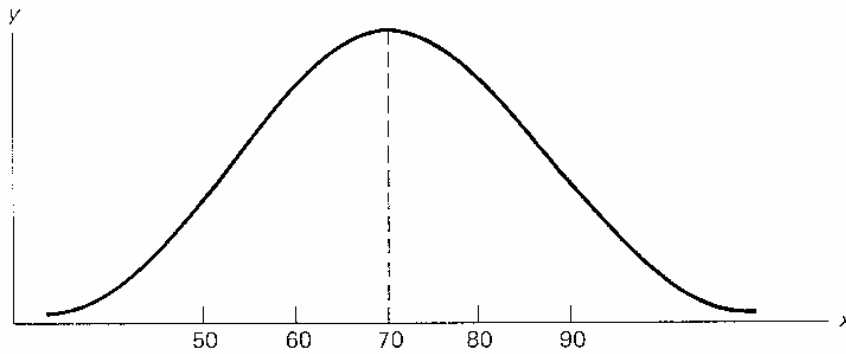
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63. The bell-shaped curve illustrated below approximates what the statisticians call a normal curve. Note the following properties:
- a. It is symmetrical.
  - b. The mean, median, and mode have the same value (in this instance, 70).
  - c. There are thus an equal number of scores on either side of the mean (central axis).
  - d. It is composed of infinitely large numbers of \_\_\_\_\_.
  - e. The tails of the curve are \_\_\_\_\_ to the abscissa (baseline).

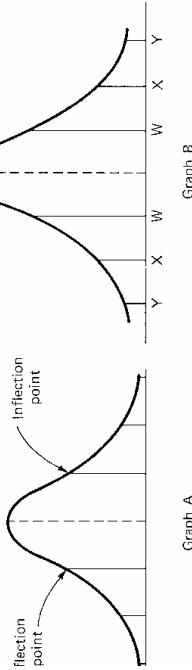


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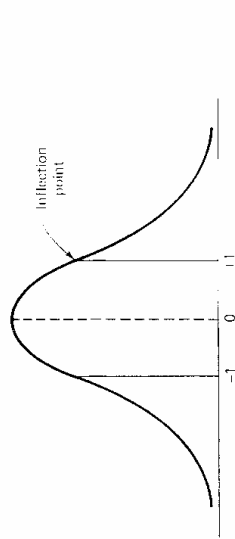
**Cases      Asymptotic**

cave. These points are points of inflection (see Graph A). Are the inflection points on Graph B at lines W, lines X, or lines Y?



Graph A  
Graph B  
Lines W

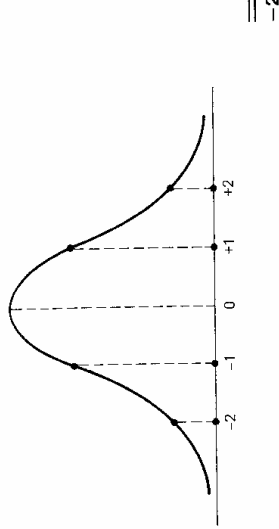
65. Perpendicular lines drawn from the abscissa to the points of inflection may be regarded as marking off *one unit* of distance or deviation from the mean (or central axis). If one uses this distance as a *standard*, a uniform method of dividing the baseline into equal segments (standard deviations) can be established. If the central axis is designated as zero, the line one standard deviation to the right would be plus one and the line one standard deviation to the left would be \_\_\_\_\_.



-1

66. Mathematically, the points -1 and +1 are situated one unit of distance or standard deviation from the central axis or values (the mean, median, and mode). These two points are designated

as +1 (read as plus and minus one). Two units of distance or deviation from the central axis are labeled as +2 and \_\_\_\_\_.



-2

67. Using the unit of distance established by constructing a perpendicular line from the point of inflection to the abscissa as a standard, we can divide the baseline into several equal segments. Since the normal curve is asymptotic with respect to the abscissa, one could divide the baseline into equal parts indefinitely. All segments would be a uniform or standard distance. The unit of distance was established by constructing a perpendicular line from the point of \_\_\_\_\_ to the abscissa.

Inflection

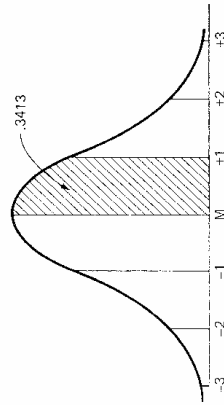
68. The proportion of cases beyond  $\pm 3$  standard deviations from the center of the normal curve is so small that they are generally ignored. It is thus common practice to illustrate only those cases contained between the arbitrary limits of +3 and \_\_\_\_\_ standard deviations.

-3

69. The number of standard deviations a case is above or below the mean is called the z score for that case. If the case is above the mean, the z score is plus, minus, if a mean was 100 and the standard deviation was 16, a raw score of 116 would be \_\_\_\_\_ standard deviation(s) \_\_\_\_\_ the mean and would have a z score of \_\_\_\_\_.

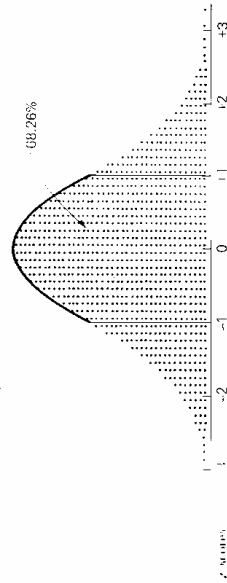
one above +1,

70. The total area under the normal curve may be said to equal 1 or only between the mean and 1 standard deviation to the right of the mean is .3413 of the total area. Thus the area from the mean to 1 standard deviation contains 34.13 percent of the total cases. Since 1 unit of deviation is equal in area to +1 unit of deviation, \_\_\_\_\_ percent of the total cases lie in the area between a z score of -1 and the mean.



34.13

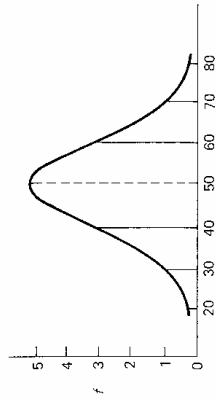
71. The symmetry and massing of scores around the central values of a group, little more than  $\frac{2}{3}$  ( $2 \times 34.13$  percent = 68.26 percent) of the total frequencies between z scores of +1 and -1. If a normal distribution has a total frequency of 1000 scores, approximately 341 scores (34.13 percent of 1000) are located between the mean and a z score of -1 and approximately 341 scores are located between the mean and +1. How many scores are located between z scores of -1 and +1?



683 (682.6)

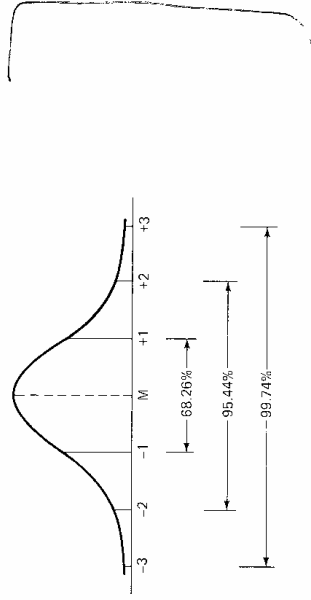
26

72. In this frequency distribution the z scores, -1 and +1, mark off the middle \_\_\_\_\_ percent of the total scores. They occur at the scores of 40 and \_\_\_\_\_.



68.26 (or 68)     60

73. Although the normal curve extends indefinitely to the left and to the right, the end points of the curve approach the baseline so closely that over 95.44 percent (see graph below) of the area or frequencies are included between the limits -2 and +2 and 99.74 percent of the cases are included between the limits \_\_\_\_\_ and \_\_\_\_\_.



3     3

74. The percentage of cases contained between the mean (central axis) of a normal curve and a z score of +3 is 49.87 percent

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