

Chapter 2

The 68-95-99.7 Rule Also known as the "empirical rule." In the Normal distribution with mean μ and standard deviation σ , (a) Approximately 68% of the observations fall within σ of the mean μ , (b) Approximately 95% of the observations fall within 2σ of μ , and (c) Approximately 99.7% of the observations fall within 3σ of μ .

Cumulative relative frequency graph Used to examine location within a distribution. Cumulative relative frequency graphs begin by grouping the observations into equal-width classes. The completed graph shows the accumulating percent of observations as you move through the classes in increasing order.

Density curve A curve that (a) is always on or above the horizontal axis, and (b) has exactly 1 area underneath it. A density curve describes the overall pattern of a distribution. The area under the curve and above any interval of values on the horizontal axis is the proportion of all observations that fall in that interval.

Mean of a density curve The point at which the curve would balance if made of solid material.

Median of a density curve The point with half the area under the curve to its left and the remaining half of the area to its right.

Normal curves An important class of density curves that are symmetric, single-peaked, and bell-shaped.

Normal distribution Described by a Normal density curve. Any particular Normal distribution is completely specified by two numbers, its mean μ and standard deviation σ . The mean of a Normal distribution is at the center of the symmetric Normal curve. The standard deviation is the distance from the center to the change-of-curvature points on either side. We abbreviate the Normal distribution with mean μ and standard deviation σ as $N(\mu, \sigma)$.

Normal probability plot Used to assess whether a data set follows a Normal distribution. To make a Normal probability plot, (1) arrange the data values from smallest to largest and record the percentile of each observation, (2) use the standard Normal distribution to find the z -scores at these same percentiles, and (3) plot each observation x against the corresponding z . If the points on a Normal probability plot lie close to a straight line, the plot indicates that the data are approximately Normal.

P th percentile The value with p percent of the observations less than it.

Standard Normal distribution The Normal distribution with mean 0 and standard deviation 1.

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Standard Normal table (Table A) A table of areas under the standard Normal curve. The table entry for each value z is the area under the curve to the left of z .

Standardized values (z-scores) If x is an observation from a distribution that has known mean and standard deviation, the **standardized value** of x is $z = \frac{x - \text{mean}}{\text{standard deviation}}$. A standardized value is often called a **z-score**.