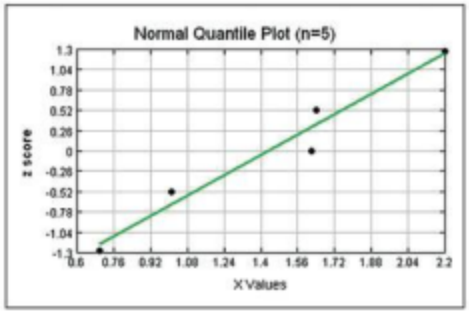
Step 1: First, sort the data by arranging them in order. We get 0.70, 1.01, 1.62, 1.64, 2.20.

Step 2: With a sample of size $n = 5$, each value represents a proportion of $1/5$ of the sample, so we proceed to identify the cumulative areas to the left of the corresponding sample values. The cumulative left areas, which are expressed in general as $\frac{1}{2n}, \frac{3}{2n}, \frac{5}{2n}$, and so on, become these specific areas for this example with $n = 5$: $\frac{1}{10}, \frac{3}{10}, \frac{5}{10}, \frac{7}{10}$, and $\frac{9}{10}$. The cumulative left areas expressed in decimal form are 0.1, 0.3, 0.5, 0.7, and 0.9.

Step 3: We now use technology (or Table A-2) with the cumulative left areas of 0.1000, 0.3000, 0.5000, 0.7000, and 0.9000 to find these corresponding z scores: -1.28, -0.52, 0, 0.52, and 1.28.

Step 4: We now pair the original sorted earthquake magnitudes with their corresponding z scores. We get these (x, y) coordinates, which are plotted in the accompanying STATDISK display: (0.70, -1.28), (1.01, -0.52), (1.62, 0), (1.64, 0.52), (2.20, 1.28).

STATDISK



Interpretation

We examine the normal quantile plot in the STATDISK display. Because the points appear to lie reasonably close to a straight line and there does not appear to be a systematic pattern that is not a straight-line pattern, we conclude that the sample of five earthquake magnitudes appears to come from a normally distributed population.

Ryan-Joiner Test The Ryan-Joiner test is one of several formal tests of normality, each having their own advantages and disadvantages. STATDISK has a feature of **Normality Assessment** that displays a histogram, normal quantile plot, the number of potential outliers, and results from the Ryan-Joiner test. Information about the Ryan-Joiner test is readily available on the Internet.

Example 3 Earthquake Magnitudes

Example 2 used only the first five earthquake magnitudes listed in Data Set 16 from Appendix B. If we include all 50 magnitudes, we can use the **Normality Assessment** feature of STATDISK to get the accompanying display.