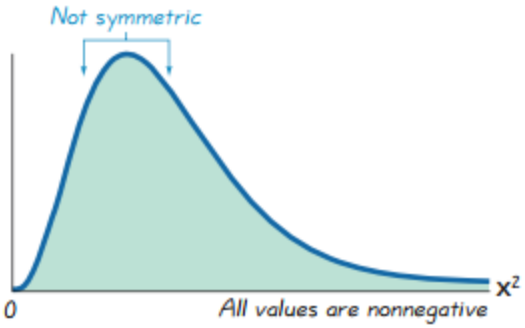


Figure 8-9 Properties of the Chi-Square Distribution

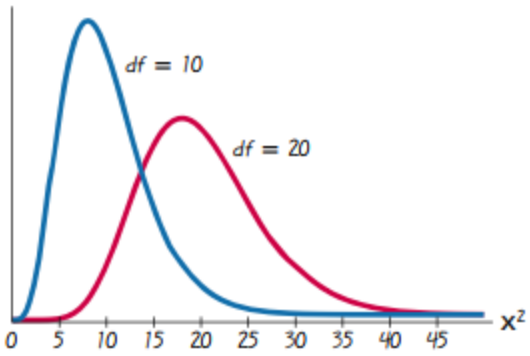


Figure 8-10 Chi-Square Distribution for df = 10 and df = 20

CAUTION Table A-2 for the standard normal distribution provides cumulative areas from the *left*, but Table A-4 for the chi-square distribution uses cumulative areas from the *right*. See Example 1 in Section 7-4.

Example 1 Supermodel Heights

Listed below are the heights (inches) for the simple random sample of supermodels Lima, Bundchen, Ambrosio, Ebanks, Iman, Rubik, Kurkova, Kerr, Kroes, and Swanepoel. Consider the claim that supermodels have heights that have much less variation than heights of women in the general population. We will use a 0.01 significance level to test the claim that supermodels have heights with a standard deviation that is less than 2.6 in. for the population of women.

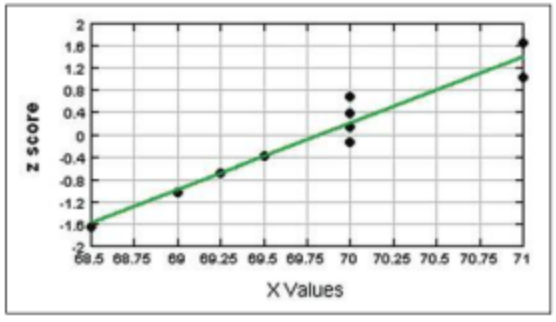
70 71 69.25 68.5 69 70 71 70 70 69.5

Solution

Requirement check (1) The sample is a simple random sample. (2) In checking for normality, we see that the sample has no outliers, the accompanying normal quantile plot shows points that are reasonably close to a straight-line pattern, and there is no other pattern that is not a straight line. Both requirements are satisfied. ✔

Technology A test of the claim that $\sigma < 2.6$ in. is equivalent to a test of the claim that $\sigma^2 < 6.76$ in.^{2} (because $2.6^2 = 6.76$). Technology capable of conducting this test will typically display the *P*-value. The TI-83/84 Plus calculator can be used as described at the end of this section, and the result will be as shown in the accompanying display. The third line of the display shows that the test statistic is $\chi^2 = 0.851516185$, the last line shows that the *P*-value is 0.0002897435436 when expressed in standard form, and after rounding we have *P*-value = 0.0003.

STATDISK



TI-83/84 PLUS