According to some investors, foreign stocks have the potential for high yield, but the variability in their dividends may be greater than what is typical for American companies. If we believe that foreign stock prices are distributed similarly (normal with the same mean and variance) to American stock prices, how likely is it that a sample of 10 foreign stocks would produce a standard deviation which is 50% bigger than American stocks?

**Solution:**

\[
P\left(\frac{\hat{\sigma}}{\sigma} > 1.5\right) = ?
\]

\[
\frac{\sum (X_i - \bar{X})^2}{\sigma^2} \sim \chi^2_{n-1} \quad \text{(normality assumption)}
\]

\[
\frac{\sum (X_i - \bar{X})^2}{\sigma^2} = n \frac{\sum (X_i - \bar{X})^2/n}{\sigma^2} = \frac{n\hat{\sigma}^2}{\sigma^2}
\]

\[
P\left(\frac{\hat{\sigma}}{\sigma} > 1.5\right) = P\left(\frac{n\hat{\sigma}^2}{\sigma^2} > 1.5^2\right)
= P\left(n\hat{\sigma}^2 / \sigma^2 > n1.5^2\right)
= 1 - \chi^2_{n-1}(n1.5^2)
= 1 - \chi^2_{n-1}(22.5) < .01 \quad \text{(see table pg 774-775)}
\]