11.1: Facts About the Chi-Square Distribution

The notation for the **chi-square distribution** is:

$$\chi \sim \chi^2_{df}$$

where df = degrees of freedom which depends on how chi-square is being used. (If you want to practice calculating chi-square probabilities then use $df = n - 1$. The degrees of freedom for the three major uses are each calculated differently.)

For the χ^2 distribution, the population mean is $\mu = df$ and the population standard deviation is $\sigma = \sqrt{2(df)}$.

The random variable is shown as χ^2.

The random variable for a chi-square distribution with k degrees of freedom is the sum of k independent, squared standard normal variables.

$$\chi^2 = (Z_1)^2 + (Z_2)^2 + \ldots + (Z_k)^2$$

1. The curve is non-symmetrical and skewed to the right.
2. There is a different chi-square curve for each df (11.1.1).
3. The test statistic for any test is always greater than or equal to zero.
4. When $df > 90$, the chi-square curve approximates the normal distribution. For $\chi \sim \chi^2_{1,000}$ the mean, $\mu = df = 1,000$ and the standard deviation, $\sigma = \sqrt{2(1,000)} = 44.7$. Therefore, $\chi \sim N(1,000, 44.7)$, approximately.
5. The mean, μ, is located just to the right of the peak.

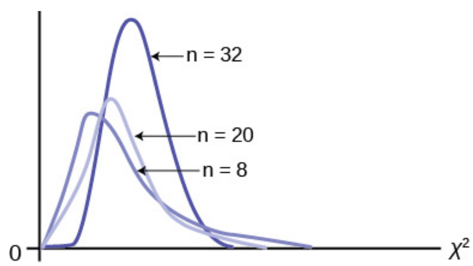

Figure 11.1.1