Formulae for Measures of Central Tendency
Assessing Music Learning

Key:
X = a score or continuous value
N = number of values
μ = (mu) mean
$\sum$ = (Sigma) sum
σ = (lowercase sigma) population

Mode -- the most frequently occurring score.

Median -- the score that is the middle, or dividing line of the distribution.

Mean (M or μ) – the average of the scores

$$\mu = \frac{\sum X}{N}$$

Variance

- Variance for complete data sets = $\frac{\sum (X - \mu)^2}{N}$
- Variance for data sets that are subsets from a larger set = $\frac{\sum (X - \bar{X})^2}{n - 1}$

Standard Deviation (SD or σ)

- Standard Deviation for complete data sets $\sigma = \sqrt{\frac{\sum (X - \mu)^2}{N}}$
- Standard Deviation for data sets that are subsets from a larger set $s = \sqrt{\frac{\sum (X - \bar{X})^2}{n - 1}}$

To Calculate using Excel

First highlight the numbers in a column you wish to calculate by selecting them. You will find all necessary functions at the Formulas tab. Here are the steps to get to the formulae you need.

- **Mean** - Go to Formulas > Autosum > Average
- **Maximum/minimum score** - Go to Formulas > Autosum > Max/Min (note: this is two separate operations)
- **Variance** - Go to Formulas > More Functions > Statistical > VAR.S
- **Standard Deviation** - Go to Formulas > More Functions > Statistical > STDEV.S