

# 6.2, 6.4, 6.5 Inference About Means

## Math 261

# Outline

- Formulas for Standard Errors
- Introduction to the  $t$  distribution
- $t$ -based Inference for Means

# Central Limit Theorem

*For random samples with a sufficiently large sample size, the distribution of sample statistics for a mean or a proportion is approximately normal.*

- For means, “sufficiently large” is often  $n \geq 30$
- If the data are normal, smaller  $n$  will be sufficient
- If the data are skewed and/or have outliers,  $n$  may have to be much higher than 30

# Sample Standard Error Formulas

Parameter	Distribution	Standard Error
Proportion	Normal	$\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$
Difference in Proportions	Normal	$\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$
Mean	$t, df = n - 1$	$\sqrt{\frac{s^2}{n}}$
Difference in Means	$t, df = \min(n_1, n_2) - 1$	$\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$

## SE of a Mean

The standard error for a sample mean can be calculated by

$$SE = \frac{\sigma}{\sqrt{n}}$$