confidence level	90%	95%	99%
$z_{\alpha/2}$	1.645	1.96	2.575

STA 291, Section 001-006, Spring 2010, Prof. Zhou
Formulas for Exam 2

- Sample size n necessary for margin of error B when estimating a population ...

  ... mean: $n = \sigma^2 \cdot \left(\frac{z}{B}\right)^2$ ... proportion: $n = \hat{p} \cdot (1-\hat{p}) \cdot \left(\frac{z}{B}\right)^2$

- Large sample confidence interval for the population proportion

  $$\hat{p} \pm z \cdot \frac{\sqrt{\hat{p} \cdot (1-\hat{p})}}{\sqrt{n}} \;; \qquad \text{assume} \quad np > 10 \text{ and } n(1-p) > 10$$

- Confidence interval for the population mean, μ, when σ is ...

  ... known: $\bar{X} \pm z \cdot \frac{\sigma}{\sqrt{n}}$ ... unknown: $\bar{X} \pm t \cdot \frac{s}{\sqrt{n}}$ $df = n - 1$

- z-Score for an individual observation

  $$z = \frac{x - \mu}{\sigma} \qquad x = \mu + z \cdot \sigma$$

- Sample mean $\bar{X}$

  $$\bar{X} = \frac{\sum_{i=1}^{n} x_i}{n} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

- Sample variance s^2

  $$s^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{X})^2}{n-1} = \frac{(x_1 - \bar{X})^2 + (x_2 - \bar{X})^2 + \cdots + (x_n - \bar{X})^2}{n-1}$$

- Sample standard deviation s

  $$s = \sqrt{\text{sample variance}}$$

- If n observations are ordered in ascending order, median is the $\frac{n+1}{2}$th observation.
- Population mean μ
- Population variance σ^2
- Population standard deviation σ