Normal Distribution

Standard Normal N(0,1) $P(a < Z < b) = P(Z < b) - P(Z < a)$

$P(Z > z) = 1 - P(Z < z)$

Normal Distribution $N(\mu,\sigma^2)$ $Z = \dfrac{X - \mu}{\sigma}$ $P(a < X < b) = P(Z_a < Z < Z_b) = P(Z_b) - P(Z_a)$

Central Limit Theorem

Normal Distribution $N(\mu,\sigma^2)$ Sample Size = n

Mean : $\mu_{\overline{X}} = \mu$ Variance : $\sigma_{\overline{X}}^2 = \sigma^2/n$ Standard Deviation : $\sigma_{\overline{X}} = \sigma/\sqrt{n}$ $Z = \dfrac{\overline{X} - \mu}{\sigma/\sqrt{n}}$

Sampling Distribution:

$Z = \dfrac{\overline{X} - \mu}{s/\sqrt{n}}$ $P(a < \overline{X} < b) = P(Z_a < Z < Z_b) = P(Z_b) - P(Z_a)$

Estimate Population Parameters μ and σ (Based on Sample X, s, n)

$\sigma = s$ $\mu = \overline{X} \pm (Z_{\alpha/2})s/\sqrt{n}$ $\overline{X} - (Z_{\alpha/2})s/\sqrt{n} < \mu < \overline{X} + (Z_{\alpha/2})s/\sqrt{n}$

Minimum Sample Size

Minimum Sample Size $= \left[\dfrac{s\, Z_{\alpha/2}}{E}\right]^2$

Small Sample Size (Student-t Distribution)
For small samples sizes (n < 30), use the Student-t Distribution rather than the Normal Distribution as appropriate for each of the above situations.

Suggested Review Examples and Exercise Problems (Central Limit Theorem and Sampling Distributions)

M & R 5ᵗʰ Edition **M & R 6ᵗʰ Edition**
Page 228, Example 7-1 Page 245, Example 7-1
Page 230, Problems 7-3, 7-5, 7-7 Page 247, 7-3, 7-5, 7-7

Finding Confidence Intervals & Estimating Population Parameters (Mean and Standard Deviation)
 Homework #6
  Estimating Population Mean
  Confidence Intervals

Small Sample Size (Student-t Distribution)
 Page 264, Example 8-5

Minimum Sample Sizes
There were no homework problems per se regarding minimum sample size, only those examples that were explained and demonstrated in class.

Note:
For the test, you will be given the sample size, mean, and standard deviation as needed;
you will NOT be required to calculate these sample statistics from a set of raw data.