

Fall 2009 : STAT - 1
HANDOUT - CHAPTERS 6, 7 & 8

- Chapter 6 deals with $z \sim N(0, 1)$ and $x \sim N(\mu, \sigma)$.
- Read the properties of $N(0, 1)$ and $N(\mu, \sigma)$. Learn the use of Table 3 to find $P(z \leq b)$, $P(z \geq a)$, $P(a \leq z \leq b)$. Then use this knowledge to calculate $P(x \leq d)$, $P(x \geq c)$, $P(c \leq x \leq d)$ by using the conversion $z = \frac{(x-\mu)}{\sigma}$. Go over worked examples 6.3, 6.4, 6.5, 6.6, 6.7 and 6.8. 6.9 and 6.10 were discussed in class.

HW Practice: 6.5, 6.7, 6.9, 6.11, 6.12, 6.13, 6.15, 6.19, 6.21, 6.23.

- The normal approximation to $B(n, p)$ and using continuity correction is discussed in 6.4. We briefly discussed this in class. If you need to use this in a higher level course you will refer to this section.
- Chapter 7 discusses the sampling distributions of the sample mean \bar{x} and the sample proportion \hat{p} . Section 7.2 deals with the definition of *simple random sample*, *stratified random sample*, *cluster sample*, *systematic random sample* and *nonrandom sampling*. Note that the inference techniques we study are based on (simple) random samples.
- Section 7.3 defines *statistic* and *sampling distribution of a statistic*. The two statistics we are interested are the sample mean \bar{x} and the sample proportion \hat{p} . The Central Limit Theorem (CLT) on p.265 is the basis for inference techniques. Read the discussion on p.266. On page 267 we have the CLT applied to the sample mean stating that $\bar{x} \approx N(\mu, \frac{\sigma}{\sqrt{n}})$. Note that $\frac{\sigma}{\sqrt{n}}$ is called the Standard Error of the Mean of $SE(\bar{x})$. Go over Examples 7.4. and 7.5.

HW Practice: 7.19, 7.25, 7.30, 7.31, 7.33.

- Section 7.4 treats the sampling distribution of the sample proportion \hat{p} . The CLT applied to the sample proportion states that, for large sample size n , $\hat{p} \approx N(p, \sqrt{\frac{pq}{n}})$ (see p.276 for details). So $SE(\hat{p}) = \sqrt{\frac{pq}{n}}$. Go over Example 7.6 and 7.7.

HW Practice: 7.37, 7.38, 7.39, 7.41, 7.43, 7.47.

- In Chapter 8 we begin our study of Interval Estimation techniques. Read section 8.2. You should learn about *estimator, estimate, point estimator, interval estimator, confidence interval (CI), unbiased estimator, and error of estimation*. Go over example 8.5.
- Section 8.5 treats Large sample CI for a Population Mean μ (p.310), Large Sample CI for a Population Proportion p (p. 314-315) and Interpreting the CI (p.311-312). Go over Examples 8.6, 8.7 and 8.8.
HW Practice: 8.23, 8.24, 8.27, 8.28, 8.29, 8.33, 8.35, 8.37, 8.38.
- Section 8.6 considers CI for the difference in two population means ($\mu_1 - \mu_2$) based on large samples (p. 318-319), Examples 8.9 and 8.10 applying this technique.
HW Practice: 8.39, 8.41, 8.43, 8.45, 8.47.
- In section 8.7 we study CI for the difference in two population proportions ($p_1 - p_2$) based on large samples (p.324-325). Follow example 8.11 to apply this technique.
HW practice: 8.51, 8.55, 8.57, 8.61.
- One sided confidence bounds (Section 8.8, p.328) and Choosing appropriate sample size (section 8.9 , p. 329 to 333) follow. The sample size formulas for various situations are derived. Go over examples 8.13 and 8.14. Table 8.7 (p.333) summarizes in a list the formulas.
HW practice: 8.68, 8.69, 8.72, 8.74, 8.75, 8.115.