STAT 270 Lecture 23
Fall 2015
2 November 2015

- I made normal approximations to Binomials, introduced the exponential density, computed its mean and standard deviation and defined the Gamma function.
- We are finished up to slide 62 of "Continuous Distributions".
- Problems from text: 5.19, 5.20. At my STAT 101 page look for the 2004 Midterm problem 5 and the Midterm Solutions problem 3.
- We have covered up to page 95 in the text
- Handwritten slides.
- Key jargon, ideas:
  - If X has a Binomial(n, p) distribution then we approximate
  $$P(k_1 \le X \le k_2)$$
  by converting $k_1 = 1/2$ and $k_2 + 1/2$ to standard units.
  - We use $\mu = np$ and $\sigma = \sqrt{np(1-p)}$ to convert.
  - The 1/2s come from recognizing where the bars end in a probability histogram.
  - The exponential density with rate λ is
  $$f(x) = \begin{cases} \lambda e^{-\lambda x} & x \ge 0 \\ 0 & x < 0 \end{cases}.$$
  - If X has an Exponential(λ) distribution then
  $$\mathrm{E}(X) = \frac{1}{\lambda}$$
  and
  $$\sigma_X = \sqrt{Var}(X) = \frac{1}{\lambda}/$$
  - For $\alpha > 0$ we defined the Gamma function, Γ, by
  $$\Gamma(\alpha) = \int_0^\infty x^{\alpha-1} e^{-x}\, dx.$$
  - The Gamma function satisfies
  $$\Gamma(\alpha + 1) = \alpha\Gamma(\alpha).$$
  - In particular if $n \ge 1$ then
  $$\Gamma(n) = (n-1)!.$$