STA 291
Lecture 28

- Final exam: CB 106

  May 6 Thursday 6:00pm – 8:00pm

Exam II curve: conversion formula

- If your original score is 83 or above, then converted score = 90+(x-83)10/17
- If your original score is 71 → 82, then converted score = 80+(x-71)9/11
- If your original score is 59 → 70, then converted score = 70+(x-59)9/11
- If your original score is 48 → 58, then converted score = 60+(x-48)9/10
- If your original score is 1 → 47, then converted score = x 59/47

Final Exam, Thursday, May 6

- **When: 6:00PM - 8:00PM**
- **Where:** CB 106

- **Make-up exam:**
  - **Only by prior arrangement:**
  - **Friday May 7, 10:00am - 12:00noon**
  - **come to 8th floor POT for room assignment**

Last homework

- **Online homework assignment**

New materials after Exam II

- Chapter 11: 11.1 – 11.9
- Chapter 12: 12.5
- Chapter 13: 13.1 — 13.3
- Chapter 14: 14.1, 14.2, 14.3, 14.4

Final Exam

- You bring a calculator.
- Will be given a formula sheet/table
- Any technology that can receive/transmit information wirelessly is ***not*** permitted during the exam

- Turn off cell phone etc.

- Get prepared by reviewing
  - The midterm exams
  - Online homework questions
  - Suggested homework questions
  - Lecture notes
  - Material from lab sessions
  - Textbook

Introduction to Linear Models -- a preview of What's next in statistics

- More Confidence intervals and
- More Testing hypothesis

plus

- Statistical ***models*** for more complex setting (beyond one/two samples)

More than two samples

- Three groups (three populations):

no drug, 10mg/day, 20mg/day

35 subjects in each group. Do blood pressure decrease as dosage increase?

We postulate a ***Model***: the average decrease of blood pressure is linearly related to the dosage.

In this example, this assumes the effect must be doubled in the 20mg group compared to 10mg group

- Modeling the parameter, mu – the average blood pressure for certain drug dose.

As how mu is related to the dosage.

Example of a linear model

$$m = b_0 - 1.3 \times (dosage)$$

- Here b_0 is the placebo effect, those taking a pill of corn starch, will decrease blood pressure by b_0
- Group with 10mg will further decrease 13=1.3x10
- Group with 20mg will further decrease 26=1.3x20

- Notice this same model could be describing 4 groups:
- No drug, 10mg, 20mg, 25mg, etc

- Or 5 groups or any groups…

- The number -1.3 in the previous page is just for example. In reality we need to estimate that number (called slope). (estimator mostly produced by a computer, we fed data into a program…)

- Construct confidence interval for the slope
- Test hypothesis that slope =0; -- equivalent to testing no effect of drug

- The parameters here:
- Slope (-1.3) and the intercept (b_0)
- Confidence interval/testing for these two parameters, etc

- Models can be more and more complicated….
- But we always test a hypothesis about the parameters in the model.
- Construct a confidence interval about (an all important slope of) the model.

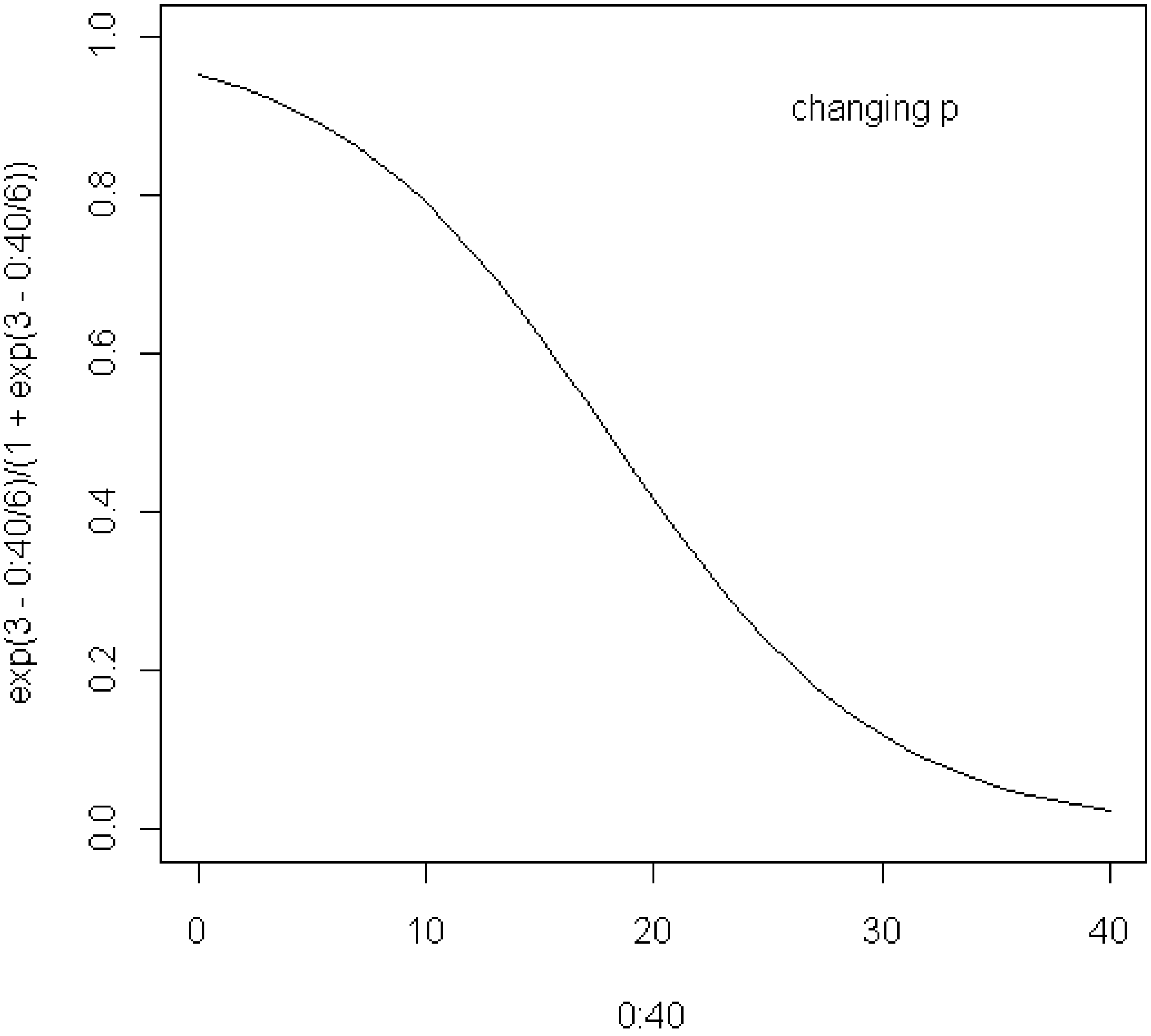
- Once the model is established, it can be very useful: use the model to predict…….

Another model

- The proportion of hitting the basket decreases as the distance from hoop increases.

- Model : p = f(distance)

- How fast it decreases?


changing p
1.0
0.8
0.6
0.4
0.2
0.0
exp(3 - 0:40/6)/(1 + exp(3 - 0:40/6))
0
10
20
30
40
0:40

- Estimate the “slope” or speed of decreasing….

- Two player may have two different curve, but both decreasing.
- Is there a favorable spot of shooting?

more examples:

- Kentucky Utility need to predict the electricity usage,   as how it changes as temperature change.

- Financial modeling

- No matter how complicated the model is,
- No matter how many parameters it involves,

- the correspondence between confidence interval and p-value of testing hypothesis is always there

Today's Q

- Your name/ID and 291 section number
- A: Sta291 is my last Statistics course in college.
- B: I will be taking another statistics course. (Which one?)