

18.01A Problem Set 4

(due Wed., Oct. 17)

Part I (15 points)

TB = Simmons; SN = 18.01A Supplementary Notes (all have solutions) The problems marked 'other' are not to be handed in.

Class 14 (Thurs., Oct. 11 **pset 3 due**) Intro. to probability, discrete random variables.

Read: SN: P section 1

Hand in: 8A/1, 3, 4, 6, 7, 8

Others:

Class 15 (Mon., Oct. 15) Continuous random variables, standard deviation.

Read: SN: P sections 2,3

Hand in: 8B/2, 3, 5; 8C/1

Others: 8B/1, 4

Class 16 (Tues., Oct. 16) Normal distributions.

Read: SN: P section 4

Hand in: 8D/1bd, 2, 3

Others: 8D/1ac, 4

Continuation: (Wed., Oct. 17) Discussion, review and catch up. **pset 4 due**

Exam: (Thurs., Oct. 18) **Exam 3** (covers 12-16)

Part II (21 points)

Directions: Try each problem alone for 20 minutes. If, after this, you collaborate, you must write up your solutions independently.

Problem 0 (Class 13, 4 pts: 2,2)

a) Work 473/28. b) Work 494/3a.

Problem 1 (Class 15, 4 pts: 2,2)

a) Work 8C/2a ($E(X)$ only). b) Work 8C/2b (σ only).

Problem 2 (Class 16, 5 pts: 3,2)

a) Work 8D/5. b) Work 8D/7.

Problem 3 (Class 16, 8 pts: 2,2,2,2) Let $f(x) = C \frac{1}{(1+x^2)^2}$.

a) Find the value of C so that $f(x)$ is a probability density function on the whole x -axis.

b) Using this value of C , find its mean and standard deviation.

c) Sketch the graph of $f(x)$.

d) For what values of the parameter k will there be a probability density function on the entire x -axis of the form $g(x) = C \frac{1}{(1+x^2)^k}$?

For what values of k will it have a finite standard deviation?