MTH 23.5 LECTURE NOTES (Ojakian)

Topic 18: Continuous Distributions

OUTLINE

References (**Algebra Book**: None; **Statistics Book**: 5.1, 5.2, 6.1, 6.2)

1. Continuous Distributions

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1. The Plane and Points
   (a) x and y axis
   (b) points and coordinates
2. Graphs
   (Stick to functions defined everywhere, but may hit zero)
   (a) Functions
   (b) Graphing Functions
3. Area
   (a) Area of rectangle
   (b) Area under graph
4. Continuous Probability Distributions
   Discrete probability distributions versus Continuous probability distributions
   (a) Both: Never negative.
   (b) Sum to 1 versus Area is 1
   (c) Sum to find probability versus Area to find probability

5. Examples

PROBLEM 1. *Consider the uniform continous distribution U between 0 and 5.*

- *Check that it is a valid continuous distribution.*
- $P(U \leq 2)$
- $P(U > 2)$
- $P(1.5 \leq U \leq 4)$

PROBLEM 2. *Consider the continous distribution X whose graph looks like this: A line going from (0,0) to (1,1), then from (1,1) to (2,0). Find the following:*

- *Check that it is a valid continuous distribution.*
- $P(X \leq 1)$
- $P(X > 2)$
- $P(0.5 \leq X \leq 1)$

6. Discrete versus Continuous

PROBLEM 3.

Describe the uniform distribution for real numbers choosen at random between 0 and 2.

Describe a discrete uniform distribution for some real numbers choosen between 0 and 2.

Describe the difference between a discrete and continuous probability distribution.

Definition 1. *From section 6.1 (5th edition), do: 1*