

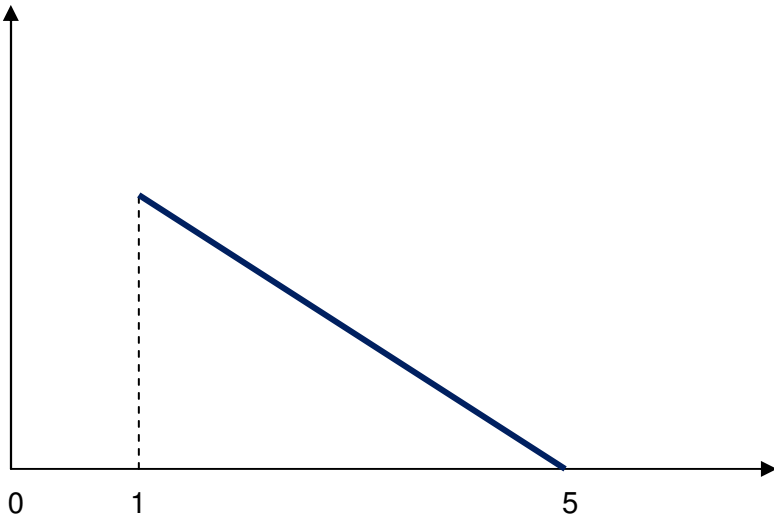
ECO220 Homework 8

Readings: Chapter 9, section 9.10

Exercises: 44, 46, 56, 57, 62, 65, 67, 68

Problems:

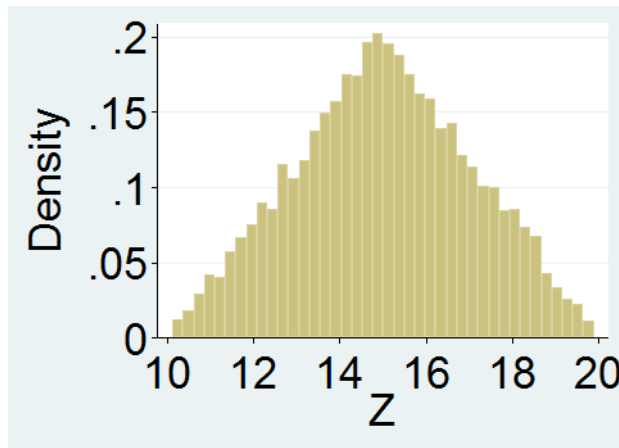
(1) Consider the following probability density function. Find the probability that $X < 3$.



(2) Create a standard uniform distribution that has a mean of 0 and standard deviation of 1. What are the parameters of that distribution? Sketch it. (Hint: parameters of the uniform distribution are not the mean and variance)

(3) Consider test scores of two randomly selected students. One student received a score 65 and is in the bottom 5th percentile; another student received a score of 105 and is in 75th percentile. What are the approximate mean and standard deviation of the test scores (assume score to be normally distributed)?

(4) To the nearest integer, find the approximate standard deviation of the following histogram. (Hint: Do not try to use the Empirical Rule or Chebychev's Theorem. Instead use what you know about a distribution of this shape with the parameters that can be estimated from the graph.)



(5) Refer to the distribution above. What are the parameters of the underlying uniform distribution? What are the mean and variance? (Approximate)

(6) Scores on an IQ test are normally distributed with a mean of 100 and a standard deviation of 15. What is the probability that a randomly selected person has an IQ above 120? Above 140? Above 150? One psychologist has estimated that Galileo had an IQ of 185 and that Goethe had an IQ of 210. How often can we expect to find people with such high IQs?

(7) Joanna is a new professor who wants to grade strictly by the curve. But, to keep up with grade inflation, she doesn't want to give as many Fs as As and as many Ds as Bs. Instead, she wants to give, on average, 20 percent As, 30 percent Bs, 35 percent Cs, 10 percent Ds and 5 percent Fs. If her numerical scores are normally distributed, which standardized values should be graded A, B, C, D and F? Sketch Joanna's grade distribution.

(8) A manufacturer uses an acceptance sampling rule that a batch of products is rejected if 10 percent of a sample is found to be defective. What is the probability that a batch that is 2 percent defective will be rejected if the size of the sample is 10? 20? 200? (Hint: use normal approximation to Binomial distribution)