

### MITx: 14.310x Data Analysis for Social Scientists

Heli



- Module 1: The Basics of R and Introduction to the Course
- ► Entrance Survey
- Module 2: Fundamentals of Probability, Random Variables, Distributions, and Joint Distributions
- Module 3: Gathering and Collecting Data,
   Ethics, and Kernel
   Density Estimates
- Module 4: Joint,
   Marginal, and
   Conditional
   Distributions &
   Functions of Random
   Variable

Module 5: Moments of a Random Variable, Applications to Auctions, & Intro to Regression > Expectation, Variance, and an Introduction to Regression > Markov Inequality and Chebyshev Inequality - Quiz

### Markov Inequality and Chebyshev Inequality - Quiz

 $\square$  Bookmark this page

### **Question 1**

1/1 point (graded)

Suppose you have a probability distribution for a non-negative random variable X, where the expectation of X is given by E[X]=5. The probability that X is greater than or equal to 10 is

- a. no more than 0.5 🗸
- b. no more than 0.8
- oc. no less than 1.25
- d. exactly 1.25

### **Explanation**

The Markov inequality provides an upper bound for the probability that X is greater than or equal to t. The inequality states that for any t>0,  $P(X\geq t)\leq E[X]/t$ . In other words, the probability that X is greater than or equal to 10 is no more than 5/10=0.5.

 Module 5: Moments of a Random Variable, Applications to Auctions, & Intro to Regression

## Moments of a Distribution and Auctions

Finger Exercises due Oct 31, 2016 at 05:00 IST

# Expectation, Variance, and an Introduction to Regression

Finger Exercises due Oct 31, 2016 at 05:00 IST

### **Module 5: Homework**

Homework due Oct 24, 2016 at 05:00 IST

Exit Survey

Submit

You have used 1 of 2 attempts

✓ Correct (1/1 point)

### **Question 2**

1/1 point (graded)

Now suppose that you have a random variable X, where E[X]=6 and Var[X]=2. The probability that X is greater than 11 or less than 1 is no more than \_\_\_\_\_\_.

Please give your answer to two decimal places.

0.08

**✓ Answer:** 0.08

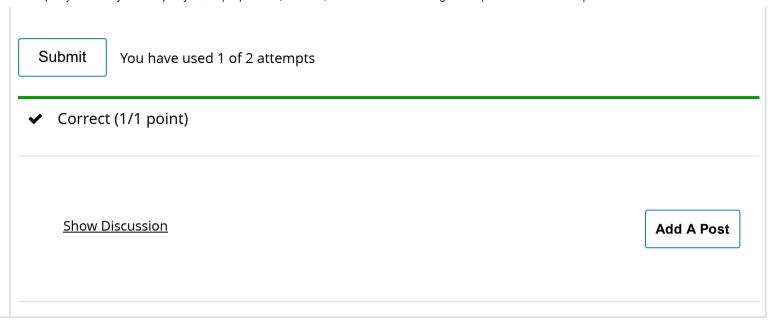
0.08

### **Explanation**

We know that E[X]=6, and we are interested in the probability that X is greater than 11 or less than 1. Hence, we are interested in the case where t=5. Using the Chebyshev Inequality,

$$P(|X-E[X]| \geq t) \leq rac{Var(x)}{t^2}$$

$$P(|X-6| \ge 5) \le \frac{2}{5^2} = \frac{2}{25} = 0.08$$



© All Rights Reserved



© 2016 edX Inc. All rights reserved except where noted. EdX, Open edX and the edX and Open EdX logos are registered trademarks or trademarks of edX Inc.

















