



## MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Bookmarks

- ▶ Unit 0: Overview
- ▶ Entrance Survey
- ▶ Unit 1: Probability models and axioms
- ▶ Unit 2: Conditioning and independence
- ▶ Unit 3: Counting
- ▼ Unit 4: Discrete random variables

## Unit overview

## Lec. 5: Probability mass functions and expectations

Exercises 5 due Mar 02, 2016 at 23:59 UTC

## Lec. 6: Variance; Conditioning on an event; Multiple r.v.'s

Exercises 6 due Mar 02, 2016 at 23:59 UTC

## Lec. 7: Conditioning on a random variable; Independence of r.v.'s

Unit 4: Discrete random variables &gt; Problem Set 4 &gt; Problem 1 Vertical: Tosses of a biased coin



Bookmark

## Problem 1: Tosses of a biased coin

(9/9 points)

Consider 10 independent tosses of a biased coin with the probability of Heads at each toss equal to  $p$ , where  $0 < p < 1$ .

1. Let  $A$  be the event that there are 6 Heads in the first 8 tosses. Let  $B$  be the event that the 9th toss results in Heads.

Find  $P(B | A)$  and express it in terms of  $p$  using standard notation .

p



2. Find the probability that there are 3 Heads in the first 4 tosses and 2 Heads in the last 3 tosses. Express your answer in terms of  $p$  using standard notation . Remember not to use factorials or combinations in your answer.

 $12 * p^5 * (1-p)^2$ 

3. Given that there were 4 Heads in the first 7 tosses, find the probability that the 2nd Heads occurred at the 4th toss. Give a numerical answer.

9/35



4. We are interested in calculating the probability that there are 5 Heads in the first 8 tosses and 3 Heads in the last 5 tosses. Give the numerical values of  $a$ ,  $b$ ,  $c$ ,  $d$ ,  $e$ , and  $f$  that would match the answer  $ap^7(1-p)^3 + bp^c(1-p)^d + ep^f(1-p)^f$ .

 $a =$  15 $b =$  60 $c =$  6 $d =$  4

Exercises 7 due Mar  
02, 2016 at 23:59 UTC

Solved problems

Additional  
theoretical  
material

### Problem Set 4

Problem Set 4 due Mar  
02, 2016 at 23:59 UTC

Unit summary

- ▶ Unit 5:  
Continuous  
random  
variables

$$e = 10$$



$$f = 5$$



*You have used 2 of 3 submissions*

Printable problem set available here .

## DISCUSSION

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