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During this outage period, we recommend that learners and staff do not attempt to enter responses or assessments in ORA assignments. When maintenance is completed, learners and staff can enter responses or assessments as usual. Data that was saved prior to the outage will not be affected.



## 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

### Unit 4: Discrete random variables > Problem Set 4 > Problem 4 Vertical: Joint PMF



Bookmark

## Problem 4: Joint PMF

(5/5 points)

The joint PMF,  $p_{X,Y}(x, y)$ , of the random variables  $X$  and  $Y$  is given by the following table:

$y = 1$	$4c$	$0$	$2c$	$8c$
$y = 0$	$3c$	$2c$	$0$	$2c$
$y = -1$	$2c$	$0$	$c$	$4c$
	$x = -2$	$x = -1$	$x = 0$	$x = 1$

1. Find the value of the constant  $c$ .

$$c = \boxed{1/28}$$



2. Find  $p_X(1)$ .

$$p_X(1) = \boxed{1/2}$$



3. Consider the random variable  $Z = X^2Y^3$ . Find  $\mathbf{E}[Z \mid Y = -1]$ .

$$\mathbf{E}[Z \mid Y = -1] = \boxed{-12/7}$$



4. Conditioned on the event that  $Y \neq 0$ , are  $X$  and  $Y$  independent?

Yes ▼



5. Find the conditional variance of  $Y$  given that  $X = 0$ .

$$\text{var}(Y \mid X = 0) = \boxed{8/9}$$



You have used 3 of 3 submissions

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

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**

## DISCUSSION

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