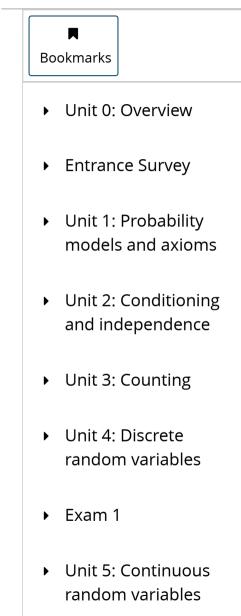


## MITx: 6.041x Introduction to Probability - The Science of Uncertainty



Unit 9: Bernoulli and Poisson processes > Lec. 21: The Bernoulli process > Lec 21 The Bernoulli process vertical6

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## Exercise: Splitting

(1/1 point)

For each exam, Ariadne studies with probability 1/2 and does not study with probability 1/2, independently of any other exams. On any exam for which she has not studied, she still has a 0.20 probability of passing, independently of whatever happens on other exams. What is the expected number of total exams taken until she has had 3 exams for which she did not study but which she still passed?

30

**~** 

Answer: 30

## Answer:

The sequence of exams for which she does not study and passes can be modeled as follows. We look at the exams for which she has not studied (a Bernoulli process with parameter 1/2) and "split" it according to whether she passes or not. This creates a new Bernoulli process for the exams for which she does not study and passes, with parameter  $(1/2) \cdot 0.20 = 0.10$ . The expected time until 3 successes in this process is 3/0.10 = 30.

 Unit 6: Further topics on random variables

You have used 1 of 2 submissions

- Unit 7: Bayesian inference
- ▶ Exam 2
- Unit 8: Limit theorems and classical statistics
- ▼ Unit 9: Bernoulli and Poisson processes

Unit overview

## Lec. 21: The Bernoulli process

Exercises 21 due May 11, 2016 at 23:59 UTC

Lec. 22: The Poisson process

Exercises 22 due May 11, 2016 at 23:59 UTC

Lec. 23: More on the Poisson process

Exercises 23 due May 11, 2016 at 23:59 UTC

Solved problems

Additional theoretical material

**Problem Set 9** 

Problem Set 9 due May 11, 2016 at 23:59 UTC

(A)

**Unit summary** 

Unit 10: Markov chains

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