P1. The absolute difference between two independent standard uniform variables (uniform on (0,1)) has a particular triangular distribution (see https://en.wikipedia.org/wiki/Triangular_distribution):

a) **Use this particular distribution to generate a sample for the absolute difference between two independent standard uniform variables**
b) **Can you generate a sample for the absolute difference between two independent standard uniform variables directly (without using the triangular distribution)?**

P2. Try putting in extreme values for our observations in the cheating example. What happens if we observe 25 affirmative responses? 10? 50?

P3. The following exercises are based on the model and the code presented in the lecture 2:

1. **Run the programs presented in the lecture.**
2. **What is the mean of λ_1 given that we know τ is less than 45. That is, suppose we have been given new information that the change in behaviour occurred prior to day 45. What is the expected value of λ_1 now? (You do not need to redo the PyMC part. Just consider all instances where tau_samples < 45.)**
3. **Extend the previous model to consider two switch points.**

P4. Write a (complete) PyMC program to solve the following problem:
We have two Web site designs, called **A** and **B**. When a user lands on our Web site, we randomly show them design **A** or **B**, and record this assignment. After enough visitors have done this, we join this dataset against some metric of interest (typically, for Web sites, we are interested in a purchase or signup, call it conversion). For example, consider the following numbers:

```
visitors_to_A = 1300
visitors_to_B = 1275

conversions_from_A = 120
conversions_from_B = 125
```

What we are really interested in is the probability of conversion, given site **A** or **B**. As a business, we want this probability to be as high as possible. So, our goal is to determine which site, **A** or **B**, has a high probability of conversion.