

Exponential and Poisson

Exponential

Exponentially distributed random variables are (circle one!)

continuous discrete

Poisson

Poisson random variables are (circle one!)

continuous discrete

Write a sentence or two describing one of these in terms of *waiting times* and the other in terms of *number of events* in a given time.

Write the pdf and cdf for exponentially distributed random variables:

Write the pmf for Poisson random variables:

What are the units for λ ? Write the expected value and variance for each type of random variable in terms of λ .

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Arrivals of calls to a call center occur as a Poisson process, with exponentially distributed wait times between call arrivals. Graph this: on the vertical axis, plot number of calls, and on the horizontal axis, plot time between calls. This will be a discontinuous, piecewise-constant, weakly increasing graph.

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Poisson

The theorem that relates exponential random variables and Poisson random variables says:

Reina is waiting for a bus. The buses come on average every 15 minutes.

- a) If Reina has been waiting since 2 pm, how long should she expect to wait? Why?
- b) Reina's friend will come to join her in 5 minutes. What is the probability that the bus will come before he arrives?
- c) What is the probability that 2 buses will arrive within 2 minutes?

Make sure you can explain in each question why you used the exponential or the Poisson distribution.