# Workshop 2 exercises

## Exercise 1

Let $X$ and $Y$ be independent exponential random variables with the same parameter $\lambda$. Find the distribution of their sum: $Z = X + Y$.

## Exercise 2

Let $X$ and $Y$ be independent standard normal random variables. That is, N(0, 1). Find the distribution of the ratio: $Z = Y/X$.

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## Exercise 3

The joint distribution of $X$ and $Y$ is given in the following table.

| | X=0 | X=1 | X=3 |
|---|---|---|---|
| Y=-1 | 0.11 | 0.03 | 0.00 |
| Y=2.5 | 0.03 | 0.09 | 0.16 |
| Y=3 | 0.15 | 0.15 | 0.06 |
| Y=4.7 | 0.04 | 0.16 | 0.02 |

Find $P(Y - X \leq 2)$, $P(2 \leq Y \leq 4 | X = 1)$.

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## Exercise 4

The joint distribution of $X$ and $Y$ is given in the following table:

| | X=-1 | X=-2 | X=2 | X=3 |
|---|---|---|---|---|
| Y=-3 | 0.14 | 0.14 | 0.01 | 0.05 |
| Y=-1 | 0.15 | 0.06 | 0.06 | 0.04 |
| Y=1 | 0.03 | 0.10 | 0.11 | 0.11 |

Find $P(Y + X \leq 0)$, $P(-2 \leq X \leq 2 | Y = -1)$.