Ex: Find the PDF of $Y = g(X) = X^2$ in terms of the PDF of X, $f_X(x)$.

Ex: Show that, if $Y = aX + b$, where X has PDF $f_X(x)$, and $a \neq 0$ and b are scalars, $f_Y(y) = \frac{1}{|a|} f_X(\frac{y-b}{a})$. Note the following special case: $f_{-X}(x) = f_X(-x)$.

Ex: Show that a linear function of a Normal random variable is Normal. (exercise.)

4.1.1 Functions of Two Random Variables

Ex: Let X and Y be both uniformly distributed in $[0,1]$ and independent. Let $Z = XY$. Find the PDF of Z.

Ex: Let X and Y be two independent discrete random variables. Express the PMF of $Z = X + Y$ in terms of the PMFs $p_X(x)$ and $p_Y(y)$ of X and Y. Do you recognize this expression?

Ex: Let X and Y be two independent continuous random variables. Show that, similarly to the discrete case, the PDF of $Z = X + Y$ is given by the "convolution" of the PDFs $f_X(x)$ and $f_Y(y)$ of X and Y.