[nex96] Sum and product of uniform distributions

Consider two independent random variables X_1, X_2, both uniformly distributed on the interval $0 < x_1, x_2 < 1$: $P(x_i) = \theta(x_i)\theta(1 - x_i)$, $i = 1, 2$, where $\theta(x)$ is the Heaviside step function. Use transformation relations from [nln49] to calculate range and probability distribution of
(a) the random variable $Y = X_1 + X_2$,
(b) the random variable $Z = X_1 X_2$.
Check the normalization in both cases. Plot $P_Y(y)$ and $P_Z(z)$.

Solution: