Revision Excersises Week 6

Excercise 1

Suppose that X and Y are independent continuous random variables with pdfs $f_X(x)$ and $f_Y(y)$ respectively. Show that the pdf of the random variable $Z = X + Y$ is given by

$$f_Z(z) = \int_{-\infty}^{+\infty} f_X(w) f_Y(z - w) \mathrm{d}w$$

Excercise 2

Let X_1 and X_2 be independent Poisson random variables with means λ_1 and λ_2 respectively. Find

(a) $\Pr(X_1 = 3 \quad \& \quad X_2 = 5)$

(b) $\Pr(X_1 + X_2 = 1)$.

Excercise 3

Let Z have a standard normal distribution, $\mathrm{N}(0, 1)$. Find the distribution of Z^2 and name the distribution.