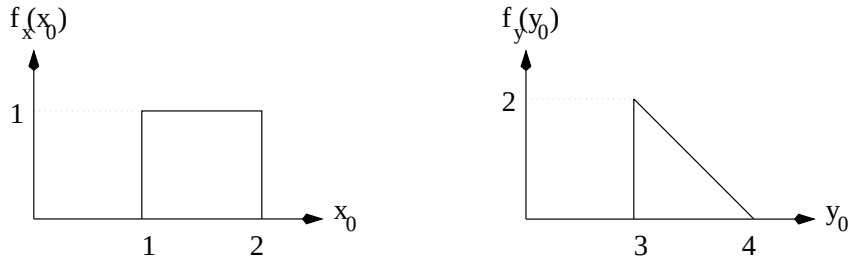
Tutorial 6
Week of March 14, 2005

1. The independent random variables X and Y have the PDFs shown in the figure:



   (a) Let $R = X + Y$. Determine the PDF $f_R(r)$ by performing the convolution graphically.

   (b) Let $Z = X + 2Y$. Determine the PDF $f_Z(z)$ by performing the convolution graphically.

2. Consider random variable Z with transform

$$M_Z(s) = \frac{a - 3s}{s^2 - 6s + 8}.$$

   (a) Find the numerical value for the parameter a.

   (b) Find $\mathbf{P}(Z \geq 0.5)$.

   (c) Find $\mathbf{E}[Z]$ by using the probability distribution of Z.

   (d) Find $\mathbf{E}[Z]$ by using the transform of Z and without explicity using the probability distribution of Z.

   (e) Find $\text{var}(Z)$ by using the probability distribution of Z.

   (f) Find $\text{var}(Z)$ by using the transform of Z and without explicity using the probability distribution of Z.