

Warm-up Problems - April 17, 2006

Solutions

1. For the pdf's below:

- Find the cdf, $F(x) = \int_{-\infty}^x f(t) dt$
- Find the mean, $\mu = E(X) = \int_{-\infty}^{\infty} xf(x) dx$
- Find the median $\int_{-\infty}^m f(x) dx = \frac{1}{2}$.
- Find the standard deviation. $\sigma = \sqrt{V(X)}$, $V(X) = \int_{-\infty}^{\infty} x^2 f(x) dx - \mu^2$

(a)

$$f(x) = \begin{cases} 0 & \text{if } x < 1 \\ \frac{1}{5} & \text{if } 1 \leq x \leq 6 \\ 0 & \text{if } x > 6 \end{cases}$$

$$F(x) = \begin{cases} 0 & \text{if } x < 1 \\ \frac{x-1}{5} & \text{if } 1 \leq x \leq 6 \\ 1 & \text{if } x > 6 \end{cases}$$

$$\mu = \frac{7}{2}$$

$$m = \frac{7}{2}$$

$$\sigma = \frac{6}{\sqrt{12}}$$

(b)

$$f(x) = \begin{cases} 0 & \text{if } x < 0 \\ 5e^{-5x} & \text{if } x \geq 0 \end{cases}$$

$$F(x) = \begin{cases} 0 & \text{if } x < 0 \\ 1 - e^{-5x} & \text{if } x \geq 0 \end{cases}$$

$$\mu = \frac{1}{5}$$

$$m = \frac{\ln 2}{5}$$

$$\sigma = \frac{1}{5}$$