Solutions to Homework 5

1) a) $F(x) = \begin{cases} 0 & \text{if } x \le 0 \\ \frac{x^2}{4} & \text{if } 0 < x < 2 \\ 1 & \text{if } x \ge 1 \end{cases}$

b) $P\{X > \frac{3}{2}\} = 1 - P\{X \le \frac{3}{2}\} = 1 - \frac{(\frac{3}{2})^2}{4} = 1 - \frac{9}{16} = \frac{7}{16}$

2) a) $\left(\frac{1}{2}\right)^3 \left(\frac{1}{4}\right)^2$

b) $\binom{3}{1}\left(\frac{1}{2}\right)^3\left(\frac{1}{4}\right)^2 + \binom{2}{1}\left(\frac{1}{4}\right)\left(\frac{3}{4}\right)\left(\frac{1}{2}\right)^3$

c) $\binom{3}{1}\left(\frac{1}{2}\right)^3\left(\frac{3}{4}\right)^2 + \binom{2}{1}\left(\frac{1}{4}\right)\left(\frac{3}{4}\right)\left(\frac{1}{2}\right)^3$

3) $F(x) = 1 - e^{-\lambda x}$ as we derived in class

$P\{X > \frac{2}{\lambda}\} = 1 - F\left(\frac{2}{\lambda}\right) = e^{-2}$

4) $f(x) = \begin{cases} 6x - 6x^2 & 0 < x < 1 \\ 0 & \text{otherwise} \end{cases}$