

1. 0.6
2. (a) 0.832228 (b) 0.64  
 $0 \quad x < 0$
3. (a) 4 (b)  $x^4 \quad 0 \quad x < 1$  (c) 1/256 (d) 0.8409  
 $1 \quad x \quad 1$
4. 0.08030
5. (a)  $\begin{matrix} 0 & x < 0 \\ 1 - e^{-0.5x} & x \geq 0 \end{matrix}$  (b)  $\begin{matrix} 0 & x < 0 \\ 0.5e^{-0.5x} & x \geq 0 \end{matrix}$  (c) 2.5
6. (a) 0.743 (b) 0.17347 (c) (10/121, 90/121, 21/121)  
 $0.03 \times 0.9^x \quad x = 0, 1, 2, \dots, \quad y = 0.1$
7. (a)  $p_{(X,Y)}(x,y) = \begin{matrix} 0.1 \times 0.8^x & x = 0, 1, 2, \dots, \quad y = 0.2 \\ 0.1 \times 0.5^x & x = 0, 1, 2, \dots, \quad y = 0.5 \end{matrix}$   
 (b)  $0.03 \times 0.9^x + 0.1 \times 0.8^x + 0.1 \times 0.5^x \quad x=0, 1, 2, \dots$  (c) 4.9  
 (d) values of Y  $\begin{matrix} 0.1 & 0.2 & 0.3 \\ \text{prob} & 0.21447 & 0.56487 & 0.22066 \end{matrix}$
8.  $f_{X+Y}(z) = \begin{matrix} z^4 e^{-z} / 4! & z \geq 0 \\ 0 & z < 0 \end{matrix}$
9. 0, 0.1, yes
10. 0.6325
11. (a) 0.01033 (b) 240, 240 (c) 0.0984
12. (a)  $c=3 \times 10^{-6}$ , (b) 1/8, (c) 75/2
13. (a) N(160, 225), (b) .2525, (c) 0.1587
14. (a)  $\frac{25}{24(1-25t)} - \frac{1}{24(1-t)}$ , (b)  $E(X+Y)^k = \frac{k!(25^{k+1} - 1)}{24}$   
 $1 \quad p \quad 0.5$
15. *extinction probability* =  $\frac{1-p}{p} \quad p > 0.5$