HW4 参考解答

3.14 (a) $P(X < 0.2) = F(0.2) = 1 - e^{-1.6} = 0.7981;$

(b) $f(x) = F'(x) = 8e^{-8x}$. Therefore, $P(X < 0.2) = 8\int_0^{0.2} e^{-8x}\,dx = -e^{-8x}\Big|_0^{0.2} = 0.7981.$

3.49 (a)

x	1	2	3
$g(x)$	0.10	0.35	0.55

(b)

y	1	2	3
$h(y)$	0.20	0.50	0.30

(c) $P(Y = 3 \mid X = 2) = \frac{0.1}{0.05+0.10+0.20} = 0.2857.$

3.63 (a) $g(x) = \int_0^\infty ye^{-y(1+x)}\,dy = -\frac{1}{1+x}ye^{-y(1+x)}\Big|_0^\infty + \frac{1}{1+x}\int_0^\infty e^{-y(1+x)}\,dy$

$= -\frac{1}{(1+x)^2}\,e^{-y(1+x)}\Big|_0^\infty$

$= \frac{1}{(1+x)^2}$, for $x > 0$.

$h(y) = ye^{-y}\int_0^\infty e^{-yx}\,dx = -e^{-y}\,e^{-yx}\Big|_0^\infty = e^{-y}$, for $y > 0$.

(b) $P(X \geq 2, Y \geq 2) = \int_2^\infty \int_2^\infty ye^{-y(1+x)}\,dx\,dy = -\int_2^\infty e^{-y}\,e^{-yx}\Big|_2^\infty\,dy = \int_2^\infty e^{-3y}dy$

$= -\frac{1}{3}e^{-3y}\Big|_2^\infty = \frac{1}{3e^6}.$