Homework 1.5: [530]

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Exercise 2.80 (a) $P(x < 16) = P(z < -.2) = .4207$

Exercise 2.80 (b) $P(16 < x < 16.5) = P(-.2 < z < .8) = .7881 - .4207 = .3674$

Exercise 2.80 (c) $Z = -1.28$ Z*σ+μ = 15.460

Exercise 2.82 (a) E[X]-E[Y] = .001 Var[X]+Var[Y] = .00000025 sd = .0005 $X - Y \ N(0.001, 0.0005)$

Exercise 2.82 (b) $P(Y < X) = P(X - Y > 0) = .9772$

Exercise 2.82 (c) P(X=x) = $\binom{n}{x}p^x(1-p)^{n-x}$ p = .9772, n=10 $P(X \geq 9) = .9793$

Exercise 2.87 (a) $f_{X1,X_2} = \frac{1}{\sqrt{2\pi}^2} e^{-\frac{1}{2}x_1^2+x_2^2}$ $Y_1 = \frac{X_1}{X_2}, Y_2 = X_2$ $X_1 = Y_1Y_2, X_2 = Y_2$ $J = \begin{matrix} Y_2 & Y_1 \\ 0 & 1 \end{matrix}$ $\|J\| = Y_2$ $f_{Y_1,Y_2} = \frac{Y_2}{\sqrt{2\pi}^2} e^{y_2^2(1+y_1^2)}$

Exercise 2.87 (b) $Y_1 \sim \frac{e^{-x_1^2}/2}{\sqrt{2\pi}} / \frac{e^{-x_2^2/2}}{\sqrt{2\pi}}$ $Y_1 \sim \frac{1}{\pi(y_1+1)}$