

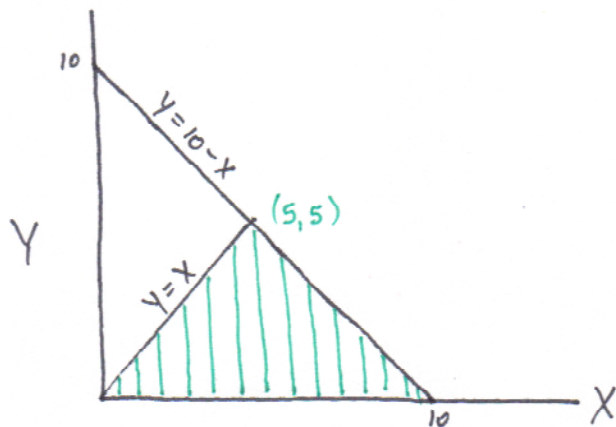
Problem 138

$$Z = \max[X, Y]$$

$$Z = \begin{cases} X & x \geq y \\ Y & x < y \end{cases}$$

$$Z = X \cdot I(x \geq y) + Y \cdot I(x < y)$$

$$E(Z) = E(X|x \geq y) \cdot p(x \geq y) + E(Y|x < y) \cdot p(x < y)$$



$$\begin{aligned} X > 0 \\ Y > 0 \\ X + Y < 10 \\ X \geq Y \end{aligned}$$

$$E(X|x \geq y) = 5$$

$$\text{Also, } E(Y|x < y) = 5$$

$$\begin{aligned} E(Z) &= 5 \cdot p(x \geq y) + 5 \cdot p(x < y) \\ &= 5 [ \underbrace{p(x \geq y) + p(x < y)}_1 ] = \underline{\underline{5}} \end{aligned}$$

1D