

Solution for exercise 5.1.4 in Pitman

Question a) This is Example 3 page 343 with different numbers

$$P(|Y - X| \leq 0.25) = 1 - 2 \frac{1}{2} \left(\frac{3}{4}\right)^2 = \frac{7}{16}$$

Question b) We see that the probability can be rewritten This is example 2 page 343 with different values. We get

$$1 - \frac{1}{2} \frac{3}{4} - \frac{1}{2} \frac{4}{5} = \frac{9}{40}$$

Question c)

$$\begin{aligned} P(Y \geq X | Y > 0.25) &= \frac{P(Y \geq X, Y > 0.25)}{P(Y > 0.25)} = \frac{P(Y \geq X) - P(Y \geq X, Y \leq 0.25)}{P(Y > 0.25)} \\ &= \frac{\frac{1}{2} - \frac{1}{2} \left(\frac{1}{4}\right)^2}{\frac{3}{4}} = \frac{5}{8} \end{aligned}$$