

## Solution for exercise 5.1.6 in Pitman

**Question a)** Define  $A_1$  and  $A_2$  as the arrival times of Jack and Jill respectively. The probability in question is

$$P(A_2 > A_1 + 2) = \frac{1}{2} \left( \frac{13}{15} \right)^2 = \frac{169}{450} = 0.3756$$

**Question b)** As in the textbook we will denote  $A_{(1)}$  as the smallest and  $A_{(10)}$  as the largest of the ten arrival times. The probability in question is  $P(A_{(1)} < 5, 10 < A_{(10)})$ . This probability has been analyzed in exercise 4.6.3 d) page 330. From that exercise we derive

$$\begin{aligned} P(A_{(1)} < 5, 10 < A_{(10)}) &= 1 - (1-x)^n - y^n + (y-x)^n = 1 - \left(\frac{2}{3}\right)^{10} - \left(\frac{2}{3}\right)^{10} + \left(\frac{1}{3}\right)^{10} \\ &= 1 - \frac{1}{3^{10}}(2^{11} - 1) \end{aligned}$$

can be solved this way using E.4.6.3, I am looking for a shortcut before finishing the solution. However 4.6.3 is scheduled two weeks before this one.