

**Solution for exercise 5.1.2 in Pitman**

**Question a)** Let  $X_i$  denote the random value of the result of the  $i$ 'th measurement ( $i = 1, 2$ ). The density of  $X_i$  is given by

$$f(x) = \begin{cases} 5 & l - \frac{1}{10} < x < l + \frac{1}{10} \\ 0 & \text{elsewhere} \end{cases}$$

with cumulative distribution function

$$F(x) = \begin{cases} 0 & x \leq l - \frac{1}{10} \\ 5(x - (l - \frac{1}{10})) & l - \frac{1}{10} < x < l + \frac{1}{10} \\ 1 & l + \frac{1}{10} \leq x \end{cases}$$

We find directly or using

$$P\left(l - \frac{1}{100} < X_i < l + \frac{1}{100}\right) = F\left(l + \frac{1}{100}\right) - F\left(l - \frac{1}{100}\right) = 0.1$$

**Question b)** This is example 3 page 343 with different parameters.

$$1 - 25 \left(\frac{19}{100}\right)^2 = 1 - 0.9025 = 0.0975$$