# QUIZ-2

**1.** A man bought 3 boxes of apples, 5 boxes of bananas and 2 boxes of oranges. When he received them, it was found that one box had been lost, but he was clueless as there was no sign of the fruit type on the boxes. Then he opened 2 boxes randomly from the received 9 boxes, and it was found that they were both bananas. Using the latest information, find the probability that the lost box was also bananas.

**2.** In statistical physics, the absolute value $X$ of molecular motion velocity obeys Maxwell distribution:

$$f(x) = \begin{cases} \sqrt{\dfrac{2}{\pi}} x^2 e^{-\frac{x^2}{2}}, & x > 0 \\ \\ 0, & \text{otherwise.} \end{cases}$$

Find $P(X < 1)$. Note: $\Phi(1) = 0.8413$

**3.** The joint PDF of $X$ and $Y$ is given by

$$f(x, y) = \begin{cases} 1, & 0 < x < 1, -x < y < x \\ 0, & \text{otherwise.} \end{cases}$$

Find the two conditional PDFs.

**4.** Let the PDF of $X$ be

$$f(x) = \begin{cases} \dfrac{x+1}{4}, & -1 < x < 1 \\ \dfrac{1}{2}, & 1 \leq x \leq 2 \\ 0, & \text{otherwise.} \end{cases}$$

Find the distribution of $Y = X^2 + 1$.