Assignment 3

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Download all latex-tikz codes from

https://github.com/ImNamitaKumari/Probability-and-Random-Variables/blob/main/Assignment3/Assignment3.tex

1 Problem

Let P(E) denote the probability of the event E. Given P(A)=1, P(B)=$\frac{1}{2}$, the values of P(A|B) and P(B|A) respectively are

1) $\frac{1}{4}, \frac{1}{2}$
2) $\frac{1}{2}, \frac{1}{4}$
3) $\frac{1}{2}, 1$
4) $1, \frac{1}{2}$

2 Solution

Applying Boolean Logic,

$$P(A) = 1 \implies A = 1 \tag{2.0.1}$$

$$P(A|B) = \frac{P(AB)}{P(B)} \tag{2.0.2}$$

Using (2.0.1),

$$P(A|B) = \frac{P(1 \times B)}{P(B)} \tag{2.0.3}$$

$$= \frac{P(B)}{P(B)} = 1 \tag{2.0.4}$$

$$P(B|A) = \frac{P(AB)}{P(A)} \tag{2.0.5}$$

$$= \frac{P(B)}{P(A)} = \frac{\frac{1}{2}}{1} = \frac{1}{2} \tag{2.0.6}$$

Hence the correct answer is option 4).