AI1103 - Assignment 3

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Download all latex-tikz codes from

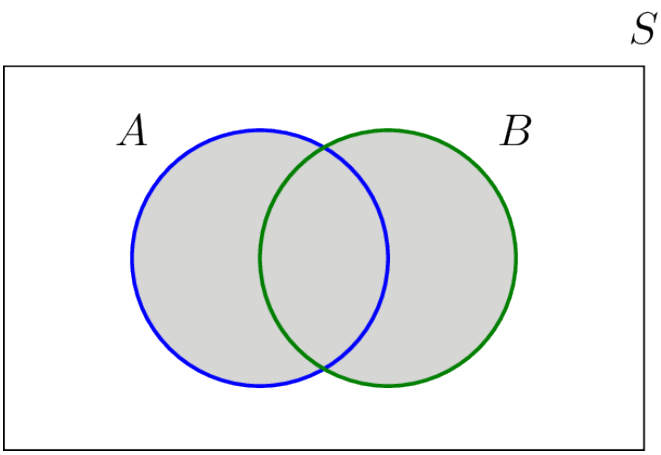
https://github.com/rajasekhar156/assignment−3/blob/main/main.tex

QUESTION:

If A and B are two events and the probability $\Pr(B) \neq 1$,then $\frac{\Pr(A) - \Pr(AB)}{1 - \Pr(B)}$ equals

1) $\Pr\left(\frac{A}{\bar{B}}\right)$
2) $\Pr\left(\frac{A}{B}\right)$
3) $\Pr\left(\frac{\bar{A}}{B}\right)$
4) $\Pr\left(\frac{\bar{A}}{\bar{B}}\right)$

ANSWER:



From the figure

$$S - B = \bar{B} \tag{0.0.1}$$

$$\implies 1 - \Pr(B) = \Pr\left(\bar{B}\right) \tag{0.0.2}$$

$$A - AB = A(1 - B) \tag{0.0.3}$$

$$A - AB = A\bar{B} \tag{0.0.4}$$

$$\implies \Pr(A) - \Pr(AB) = \Pr\left(A\bar{B}\right) \tag{0.0.5}$$

Truth table					
A	B	AB	$\bar{B}$	A-AB	A$\bar{B}$
1	1	1	0	0	0
1	0	0	1	1	1
0	1	0	0	0	0
0	0	0	1	0	0

Using the above equations (0.0.2) and (0.0.5)

$$\frac{\Pr(A) - \Pr(AB)}{1 - \Pr(B)} = \frac{\Pr\left(A\bar{B}\right)}{\Pr\left(\bar{B}\right)} \tag{0.0.6}$$

$$= \Pr\left(\frac{A}{\bar{B}}\right) \tag{0.0.7}$$

Hence, option (1) is correct.