Assignment 1

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Download all python codes from

https://github.com/sachinkarumanchi/probability_and_random_variables/blob/assignment1/assignment1.py

and latex-tikz codes from

https://github.com/sachinkarumanchi/probability_and_random_variables/blob/assignment1/Assignment1.tex

1 Problem

If A and B are two events such that P(A)=$\frac{1}{4}$,P(B)=$\frac{1}{2}$ and P(AB)=$\frac{1}{8}$.find P(not A and not B).

2 Solution

P(not A and not B) is equivalent to $P(A'B')$.
from De-morgan's law,

$$(A'B') = (A+B)' \tag{2.0.1}$$

$$\tag{2.0.2}$$

So, $P(A'B') = P((AB)')$

$$P((A+B)') = 1 - P(AB) \tag{2.0.3}$$

$$= 1 - (P(A) + P(B) - P(AB)) \tag{2.0.4}$$

$$= 1 - \left(\frac{1}{4} + \frac{1}{2} - \frac{1}{8}\right) \tag{2.0.5}$$

$$= \frac{3}{8} \tag{2.0.6}$$

$$\tag{2.0.7}$$

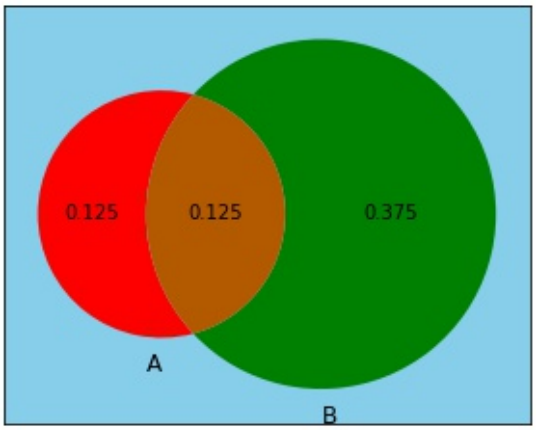
Therefore,

$$P((A+B)') = \frac{3}{8} \tag{2.0.8}$$

$$\Rightarrow P(A'B') = \frac{3}{8} \tag{2.0.9}$$

$$\tag{2.0.10}$$

So, P(not A and not B)=$\frac{3}{8}$



Here the sky blue colored region is the required and that is P(not A and not B)