Probability and Random Processes

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Q)If A and B are such that
$\Pr(A' \cup B') = \frac{2}{3}$ and $\Pr(A \cup B) = \frac{5}{9}$
then $\Pr(A') + \Pr(B') =$
Solution: Using de morgan's law and axioms of probability.

$$\Pr(A'B') = \Pr((A + B)') \tag{1}$$
$$\Pr(A' + B') = \Pr(A') + \Pr(B') - \Pr(A'B') \tag{2}$$

We have,

$$\Pr(A'B') = \Pr((A + B)') \tag{3}$$
$$\Pr(A'B') = 1 - \Pr(A + B) \tag{4}$$
$$= 1 - \frac{5}{9} \tag{5}$$
$$= \frac{4}{9} \tag{6}$$
$$\Pr(A' + B') = \Pr(A') + \Pr(B') - \Pr(A'B') \tag{7}$$
$$\Pr(A') + \Pr(B') = \Pr(A' + B') + \Pr(A'B') \tag{8}$$
$$= \frac{2}{3} + \frac{4}{9} \tag{9}$$
$$= \frac{10}{9} \tag{10}$$