Probability Assignment-II

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I. Problem

Given that the events A and B are such that P(A)=$\frac{1}{2}$, P(A + B)=$\frac{3}{5}$ and P(B)=p. Find p if they are
(i)mutually exclusive
(ii)independent

II. Solution

(i)mutually exclusive
Given A and B are mutually exclusive events, then,

P(A + B) =P(A) + P(B)

$\frac{3}{5} = \frac{1}{2} + p$

$\therefore p = \frac{1}{10}$

(ii)independent
Given A and B are independent events, then,

P(A + B) =P(A) + P(B) - P(A B)

P(A + B) =P(A) + P(B) - P(A)P(B)

$\frac{3}{5} = \frac{1}{2} + p - \frac{p}{2}$

$\therefore p = \frac{1}{5}$