

Answer on Question #53690 – Math – Statistics and Probability

The probability that A, B and C can solve a problem are $\frac{4}{5}$, $\frac{2}{3}$ and $\frac{3}{7}$ respectively. The probability of problem being solved by A and B is $\frac{8}{15}$, B and C is $\frac{2}{7}$, A and C is $\frac{12}{15}$. The probability of problem being solved by all three is $\frac{8}{35}$. Find the probability that problem is not solved by anyone

Given:

$$p(A) = \frac{4}{5} \quad p(B) = \frac{2}{3} \quad p(C) = \frac{3}{7}$$

$$p(A \cap B) = \frac{8}{15} \quad p(B \cap C) = \frac{2}{7} \quad p(A \cap C) = \frac{12}{15}$$

$$p(A \cap B \cap C) = \frac{8}{35}$$

Find: $p(\overline{A \cup B \cup C})$

Solution

$$p(A \cup B \cup C) = p(A) + p(B) + p(C) - p(A \cap B) - p(A \cap C) - p(B \cap C) + p(A \cap B \cap C) = \frac{4}{5} + \frac{2}{3} + \frac{3}{7} - \frac{8}{15} - \frac{2}{7} - \frac{12}{15} + \frac{8}{35} = \frac{2}{15} + \frac{1}{7} + \frac{8}{35} = \frac{2}{15} + \frac{13}{35} = \frac{53}{105}$$

$$p(\overline{A \cup B \cup C}) = 1 - p(A \cup B \cup C) = 1 - \frac{53}{105} = \frac{52}{105}$$

Answer: $\frac{52}{105}$.