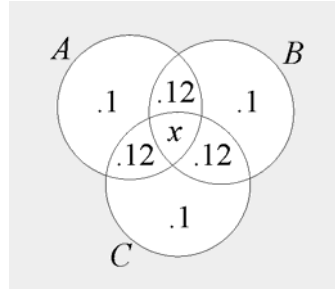


13. Solution: C

The Venn diagram below summarizes the unconditional probabilities described in the problem.



In addition, we are told that

$$\frac{1}{3} = P[A \cap B \cap C | A \cap B] = \frac{P[A \cap B \cap C]}{P[A \cap B]} = \frac{x}{x + 0.12}$$

It follows that

$$x = \frac{1}{3}(x + 0.12) = \frac{1}{3}x + 0.04$$

$$\frac{2}{3}x = 0.04$$

$$x = 0.06$$

Now we want to find

$$\begin{aligned} P\left[(A \cup B \cup C)^c | A^c\right] &= \frac{P\left[(A \cup B \cup C)^c\right]}{P\left[A^c\right]} \\ &= \frac{1 - P[A \cup B \cup C]}{1 - P[A]} \\ &= \frac{1 - 3(0.10) - 3(0.12) - 0.06}{1 - 0.10 - 2(0.12) - 0.06} \\ &= \frac{0.28}{0.60} = 0.467 \end{aligned}$$