> 1. A person is selected at random from the population of Verizon wireless subscribers. Let A be the event that the chosen subscriber has friends or family added to his/her plan, and B denote the event that the subscriber has unlimited text messaging. Extensive records suggest that P(A) = 0.37, P(B) = 0.23, and P(A ∪ B) = 0.47. Find P(A ∩ B).

Events:

- A: chosen subscriber has friends or family added to his/her plan
- B: subscriber has unlimited text messaging

Given:

$P(A) = 0.37$

$P(B) = 0.23$

$P(A \cup B) = 0.47$

Find:

$P(A \cap B)$

Assume: $P(A)$ is independent of $P(B)$

$$P(A \cap B) = P(A)P(B) = (0.37)(0.23) = 0.0851$$

Check Assumption:

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

$$P(A \cap B) = P(A) + P(B) - P(A \cup B) = 0.37 + 0.23 - 0.47$$

$$P(A \cap B) = 0.13$$

$0.13 \neq 0.0851 \Rightarrow P(A)$ is not independent of $P(B)$

$$\boxed{P(A \cap B) = 0.13}$$