MATH 5010 – Quiz 4

Name:

Date:

2.9 A retail establishment accepts American express and VISA credit cards. A total of 24 percent of its customers carry an American Express card, 61 percent carry a VISA card, and 11 percent carry both cards.

1. A customer is selected at random. What is the probability that this customer carries a credit card that the establishment will accept?

\[ P(A \cup V) = P(A) + P(V) - P(A \cap V) = 0.24 + 0.61 - 0.11 = 0.74 \]

2. Prove that \( P(\emptyset) = 0 \) using only the axioms.

Let \( E_i = S \) for \( i \geq 2, 3, \ldots \)

Then \( 1 = P(S) = P(\bigcup E_i) = \sum P(E_i) = P(S) + \sum P(E_i) \)

\[ = 1 + \sum P(\emptyset) \]

\[ \Rightarrow P(\emptyset) = 0 \quad \text{since} \quad P(\emptyset) \geq 0 \quad \text{and} \quad \sum P(\emptyset) = 0 \]