Suppose that 18% of Cal Poly students have received a speeding ticket and 37% have received a parking ticket.

Let \( E \) denote the event that a randomly selected student has received a speeding ticket, and let \( A \) denote the event that a randomly selected student has received a parking ticket.

1) Consider the event that a randomly selected Cal Poly student has received at least one ticket. Express this event with appropriate set notation and operations.

\[ E \cup A \]

2) What is the largest possible value of the probability of the event that a randomly selected Cal Poly student has received at least one ticket? Also explain what would have to be true for this value to be attained.

The largest possible value for \( E \cup A \) occurs when the events are mutually exclusive (which would mean that no student received both kinds of tickets), in which case \( \Pr(E \cup A) = \Pr(E) + \Pr(A) = .18 + .37 = .55 \).

Now suppose further that 12% of Cal Poly students have received both a speeding ticket and a parking ticket.

3) Express this probability and event with appropriate set notation and operations.

\[ E \cap A \]

4) Determine the probability that a randomly selected Cal Poly student has received at least one ticket. Justify your answer.

By the addition rule, \( \Pr(E \cup A) = \Pr(E) + \Pr(A) - \Pr(E \cap A) = .18 + .37 - .12 = .43 \).

5) Determine the probability that a randomly selected Cal Poly student has received no tickets of either type. Justify your answer. Also express this probability in appropriate set notation and operations.

Receiving no tickets of either type is the complement of receiving at least one ticket, so \( \Pr(E^c \cap A^c) = 1 - \Pr(E \cup A) = 1 - .43 = .57 \).