⑨ Let E^c denote the complement of an event E.

Let E_1, E_2 and E_3 be any pair-wise independent events with $P(E_1) > 0$ and $P(E_1 \cap E_2 \cap E_3) = 0$. Then $P(E_2^c \cap E_3^c / E_1)$ is equal to

<u>soln:</u>

$$P(E_2^c \cap E_3^c / E_1) = \frac{P(E_2^c \cap E_3^c \cap E_1)}{P(E_1)}$$

$$= \frac{P(E_1) - P(E_1 \cap E_2) - P(E_1 \cap E_3) + P(E_1 \cap E_2 \cap E_3)}{P(E_1)}$$

$$= \frac{P(E_1) - P(E_1)P(E_2) - P(E_1)P(E_3)}{P(E_1)} = 1 - P(E_2) - P(E_3)$$

$$= [1 - P(E_3)] - P(E_2)$$

$$= P(\bar{E_3}) - P(E_2).$$