Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. If we know that $E \cup F$ and EF both occurred, then which one of the following events also occurred?

(a) $\{c, e\}$

(b) $E^c F^c$

(c) $E^c \cup F^c$

(d) EG

(e) FG

(f) $E^c \cup G$

(g) EFG

(h) $\{a, b, d, e\}$

(i) $\{a, e, f\}$

(j) $\emptyset$

(k) None of these

Let $S = \{d, e, f, g, h, i\}$ be a sample space for an experiment and let $U = \{d, e, f\}$, $V = \{f, g, h\}$, and $W = \{d, e, i\}$. If we know that $U \cup V$ and UV both occurred, then which one of the following events also occurred?

(a) $\{f, h\}$

(b) $U^c V^c$

(c) $U^c \cup V^c$

(d) UW

(e) VW

(f) $U^c \cup W$

(g) UVW

(h) $\{d, e, g, h\}$

(i) $\{d, h, i\}$

(j) $\emptyset$

(k) None of these

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $K = \{a, b, c\}$, $L = \{c, d, e\}$, and $M = \{a, b, f\}$. If we know that $K \cup L$ and KL both occurred, then which one of the following events also occurred?

(a) $\{c, e\}$

(b) $K^c L^c$

(c) $K^c \cup L^c$

(d) KL

(e) LM

(f) $K^c \cup M$

(g) KLM

(h) $\{a, b, d, e\}$

(i) $\{a, e, f\}$

(j) $\emptyset$

(k) None of these

Solution: $EF = \{c\}$ so c was the outcome. Thus, $\{c, e\}$ also occurred.

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. If the probability of G is 0.62 and the probability of $E \cup F$ is 0.78, then what is the probability of GE^c ?

(a) 0.22

(b) 0.78

(c) 0.43

(d) 0.57

(e) 0.4

(f) 0.6

(g) 0.97

(h) 0.5

(i) 1

(j) 0

(k) None of these

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. If the probability of G is 0.63 and the probability of $E \cup F$ is 0.77, then what is the probability of GE^c ?

(a) 0.23

(b) 0.77

(c) 0.44

(d) 0.56

(e) 0.4

(f) 0.6

(g) 0.96

(h) 0.5

(i) 1

(j) 0

(k) None of these

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. If the probability of G is 0.6 and the probability of $E \cup F$ is 0.82, then what is the probability of GE^c ?

(a) 0.18

(b) 0.82

(c) 0.45

(d) 0.55

(e) 0.42

(f) 0.58

(g) 0.97

(h) 0.5

(i) 1

(j) 0

(k) None of these

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. If the probability of G is 0.61 and the probability of $E \cup F$ is 0.81, then what is the probability of GE^c ?

(a) 0.19

(b) 0.81

(c) 0.49

(d) 0.51

(e) 0.42

(f) 0.58

(g) 0.93

(h) 0.5

(i) 1

(j) 0

(k) None of these

Solution: $P(GE^c) = P(\{f\}) = P((E \cup F)^c) = 1 - P(E \cup F)$.

Let $S = \{a, b, c, d, e, f\}$ be a sample space for an experiment with equally likely outcomes, and let $E = \{a, b, c\}$, $F = \{c, d, e\}$, and $G = \{a, b, f\}$. What is the probability of EF^cG ?

(a) 1/3

(b) 1/6

(c) 2/3

(d) 5/6

(e) 1/2

(f) 1/4

(g) 1/5

(h) 1

(i) 0

(j) None of these

Solution: $P(EF^cG) = P(\{a, b\}) = 1/3$.