If A and B are mutually exclusive events, P (A) = 0.35 and P (B) = 0.45, find
(a) P (A′)
(b) P (B′)
(c) P (A ∪ B)
(d) P (A ∩ B)
(e) P (A ∩ B′)
(f) P (A′∩ B′)

Solution:

Given that P (A) = 0.35 and P (B) = 0.45

∵ The events A and B are mutually exclusive then P (A ∩ B) = 0

(a) To find (a) P (A′)

We know that,

P (A) + P (A') = 1

⇒ 0.35 + P(A') = 1 [given]

⇒ P (A') = 1 – 0.35

⇒ P (A') = 0.65

(b) To find (b) P (B′)

We know that,

P (B) + P (B') = 1

⇒ 0.45 + P (B') = 1

⇒ P (B') = 1 – 0.45

⇒ P (B') = 0.55

(c) To find (c) P (A ∪ B)

We know that,

P (A ∪ B) = P (A) + P (B) – P (A ∩ B)

$\Rightarrow$ P (A $\cup$ B) = 0.35 + 0.45 − 0 [given]

$\Rightarrow$ P (A $\cup$ B) = 0.80

(d) To find (d) P (A $\cap$ B)

It is given that A and B are mutually exclusive events.

$\therefore$ P (A $\cap$ B) = 0

(e) To find (e) P (A $\cap$ B')

P (A $\cap$ B') = P (A) − P (A $\cap$ B)

= 0.35 − 0

= 0.35

(f) To find (f) P (A' $\cap$ B')

P (A' $\cap$ B') = P (A $\cup$ B)'

= 1 − P (A $\cup$ B)

= 1 − 0.8 [from part (c)]

= 0.2