(16.) $\because$ Given:- $E = EF \cup EF^c$

$E \cup F = E \cup FE^c$

$\therefore P(E) = P(EF \cup EF^c) = P(EF) + P(EF^c)$ ($\because$ they are mutually exclusive)

$\therefore P(F) = P(FE \cup FE^c) = P(FE) + P(FE^c)$ (" ")

$\therefore P(E \cup F) = P(E \cup FE^c) = P(E) + P(FE^c)$ (" ")

$\because$ We have to proof :-

$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

$$\Rightarrow P(E \cap F) = P(E) + P(F) - P(E \cup F)$$

From R.H.S :-

$$P(E) + P(F) - P(E \cup F)$$

$$= P(EF) + P(EF^c) + P(FE) + \cancel{P(FE^c)} - P(E) - \cancel{P(FE^c)}$$

$$\cancel{= P(E) + 2P(EF) + 2P(FE^c) + P(EF^c)}$$

$$= 2P(EF) + P(EF^c) - P(E)$$

$$= 2P(EF) + P(EF^c) - [P(EF) + P(EF^c)]$$

$$= 2P(EF) \cancel{+ P(EF^c)} - P(EF) - \cancel{P(EF^c)}$$

$$= P(EF) = \text{L.H.S}$$

Hence proved