08/TPJC/II/11.

i) Let X be the number of domestic flight delays, out of 10 randomly chosen domestic flights.

$$X \sim B(10, \tfrac{1}{20})$$

$$P(X<2) = P(X \leq 1) = 0.91386164 \simeq 0.914 \text{ (3sf)}$$

ii) Let Y be the number of domestic flight delays, out of 60 randomly chosen domestic flights.

$$Y \sim B(60, \tfrac{1}{20})$$

Arriving on time.	Flight delays.
56	4
57	3
58	2
59	1
60	0

Since n is large, $np = 3 < 5$

$Y \sim Po(3)$ approx

Required probability

$= P(Y \leq 4) = 0.81526 \simeq 0.815$ (3sf)

iii) Let D be the number of flight delays in 30 days.

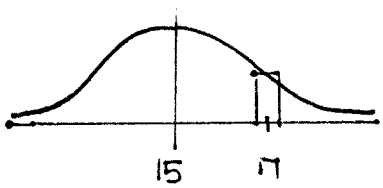
$$D \sim Po(15)$$

Since $\lambda > 10$, $D \sim N(15, 15)$ approx

$P(D>16)$

$= P(D \geq 17) \rightarrow P(D > 16.5)$ by c.c.

$\simeq 0.349$ (3sf) ※



iv) Let $\bar{A}$ be the mean number of international flight delays in a period of 60 days.

Since n is large, by Central Limit theorem,

$$\bar{A} \sim N(0.5, \tfrac{0.5}{60}) \text{ approx.}$$

$P(\bar{A} < 0.7) \simeq 0.986$ (3sf) ※