Let X be the number of inquiries that arrive per second at the central computer system.

By hypothesis, $X \sim \text{Poisson}(\lambda)$, $\lambda > 0$

$\therefore f_i = $ p.m.f. of $X = P(X = x_i) = P(X = i)$

$$= e^{-\lambda} \cdot \frac{\lambda^i}{i!}, \quad i = 0, 1, 2, \ldots$$

Here λ = average rate of messages per second

$= E(X)$

$= 10$

$$\therefore f_i = P(X = i) = e^{-10} \cdot \frac{10^i}{i!}, \quad i = 0, 1, 2, \ldots$$

The required probability that 15 or fewer inquires arrive in a one-second period $= P(X \le 15)$

$$= \sum_{i=0}^{15} P[X = i]$$

$$= \sum_{i=0}^{15} e^{-10} \cdot \frac{10^i}{i!}$$

$$= e^{-10} \cdot \sum_{i=0}^{15} \frac{10^i}{i!} = 0.95126$$

$\simeq \underline{95}\%$.

$$\Gamma(n) = \int_0^\infty e^{-x} \cdot x^{n-1} \, dx$$

$$\Gamma(n+1) = n \cdot \Gamma(n)$$

$$= n \cdot (n-1) \, \Gamma(n-1)$$

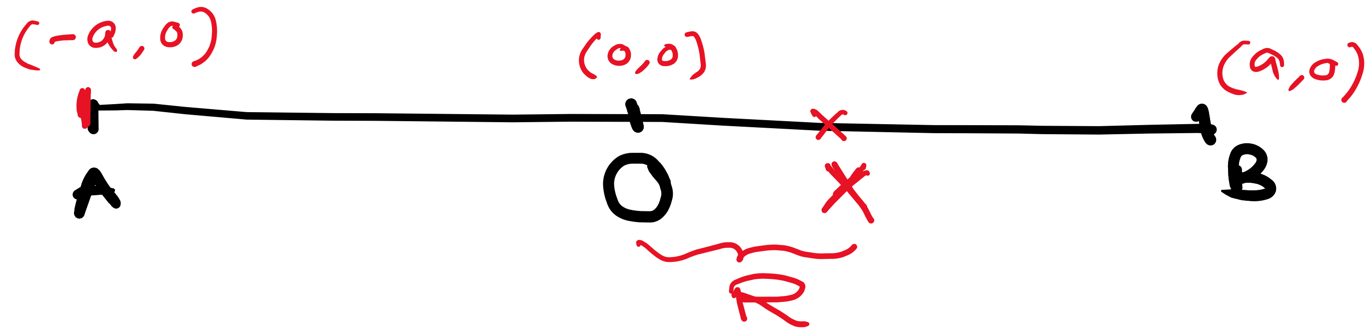
$$\vdots$$

$$= n \cdot (n-1) \cdot (n-2) \cdots 1 \cdot \Gamma(1)$$

$$= n \cdot (n-1)(n-2) \cdots 3 \cdot 2 \cdot 1$$

$$\boxed{\Gamma(n+1) = n!}$$

$\Gamma(1) = 1, \quad \Gamma\left(\frac{1}{2}\right) = \sqrt{\pi}.$



Let $AB = 2a$ and $OX = R$.

Since X can be taken anywhere on AB, R has a uniform distribution in $(-a, a)$.

$\therefore f(r) =$ p.d.f. of R

$$= \begin{cases} \dfrac{1}{a-(-a)} = \dfrac{1}{2a}, & \text{if } -a < r < a \\ 0, & \text{elsewhere.} \end{cases}$$

Now, $AX = AO + OX$

$= a + R$

$BX = OB - OX$

$= a - R$

$AO = a$

AX, BX and AO can form the sides of a triangle, if

(i) $AX + BX > AO$

$\Rightarrow 2a > a$

(ii) $AX + AO > BX$

$\Rightarrow (a+R) + a > a - R$

$\Rightarrow 2a + R > a - R$

$\Rightarrow 2R > -a \Rightarrow \boxed{R > -\frac{a}{2}}$