

Given :-

Arrival rate(λ) = 30 per hours.

Service rate (μ) = 45 per hours.

$$\rho = \frac{\lambda}{\mu}$$
$$= \frac{30}{45} = 0.6666$$

Hence,

Probability of having "n" customers is

$$P = \rho^n (1 - \rho)$$
$$= (0.666)^n (1 - 0.666)$$
$$= (0.666)^n (0.3333)$$

1) What is the probability of having "zero" customer in the system

Hence, "0" customer have

$$P = (0.666)^0 (0.3333)$$
$$P = 0.333$$

2) What is the probability of having "8" customer in the system

Hence, 8 customer have

$$P = (0.666)^8 (0.3333)$$
$$P = 0.012889$$

3) What is the probability of having "12" customer in the system

Hence, 12 customer have

$$P = (0.666)^{12} (0.3333)$$
$$P = 0.00025382013$$

