Answer on Question #52391 – Math – Statistics and Probability

Customers arrive at a particular store at the rate of 30 customers per hour.

The Poisson distribution with mean m = 30 per hour = 2.5 per 5 min = 10 per 20 min.

$$P[k] = e^{-m} \frac{m^k}{k!}$$

a. P[3] = .2138 <-----

- b. P[≥3] = 1 P[≤2] = .4562 <-----
- c. P[0] = .0821

1. What is the probability of 15 customers arriving in an hour?

- a. .500
- b. .001
- c. .617
- d. .100

Solution

$$P[15] = e^{-30} \frac{30^{15}}{15!} = 0.001$$

Answer: b. .001.

- 2. What is the probability of 10 customers arriving in a 20-minute interval?
- a. .500
- b. .000
- c. .125
- d. 1.00

Solution

$$P[10] = e^{-10} \frac{10^{10}}{10!} = 0.125.$$

Answer: c. .125.

3. What is the probability of at least 2 customers arriving in a 5-minute interval?

a. .257

b. .713

c. .743

d. .287

Solution

$$P[k \ge 2] = 1 - P[k < 2] = 1 - P[0] - P[1].$$
$$P[k \ge 2] = 1 - e^{-2.5} \frac{2.5^0}{0!} - e^{-2.5} \frac{2.5^1}{1!} = 0.713.$$

Answer: b. .713.

4. What is the probability of 3 customers arriving in a 5-minute interval?

- a..000
- b. .214
- c. .500
- d. .100

Solution

$$P[3] = e^{-2.5} \frac{2.5^3}{3!} = 0.214.$$

Answer: b. .214.