**Answers to Poisson Examples**

**Example 1:** There is an average of 2.25 births per day at a local hospital. What is the probability that on any given day there are a) no births, b) 3 births, c) at least three births?

a) p(0) = 0.105

b) p(3) = 0.20

c) p(x>2) = 0.391

**Example 2:** A shopping mall has an incident of shoplifting (on average) once every three hours. The mall is open from 10:00 a.m. to 9 p.m. What is the probability that during a single business day there is/are a) at least one shoplifting incident, b) no shoplifting incidents?

a) µ = (1/3 incidents/hr)(11 hr) = 11/3 incidents per day, p (x1) = 0.974

b) p(0) = 0.026

**Transportation Example 1:** A traffic study counted 650 cars arriving at a certain intersection during rush hour. Intersection geometry allows seven cars to back up at a red light. If the light stays red for 35 seconds, what is the probability that the platoon becomes too long for the intersection?

λ = 650 veh/3600 sec = 0.18 veh/sec, t = 35 sec

p (x > 7) = 0.30

**Transportation Example 2:** Data for a road shows that rush hour traffic volume is 1500 vehicles per hour (Poisson distribution). How many of the 1500 gaps are expected to be 4 seconds or longer during rush hour?

λ = 1500/3600 = 0.417 veh/sec

p (h4) = 0.189

**Transportation Example 3:** A vehicle pulls out onto a highway that has a flow rate of 300 veh/hr (Poisson distributed). The driver does not look for oncoming traffic. Road conditions and vehicle speeds on the highway are such that it takes 1.7 seconds for the oncoming vehicle to stop once the breaks are applied. If driver perception/reaction time is 2.5 seconds what is the probability that the vehicle pulling out will get in an accident with an oncoming vehicle?

λ = 300/3600 = 1/12 veh/sec

gap needs to be 1.7 + 2.5 = 4.2 sec

p (h4.2) = 0.705

p (accident) = 1 - 0.705 = 0.295