1. Use the Poisson Distribution Formula $P(x) = \dfrac{\mu^x e^{-\mu}}{x!}$ to find the probability that a customer service agent will receive 9 calls in one hour, given that the mean is 12 calls per hour.

2. Suppose that a city planner records over several days how many cars pass under an overpass during rush hour. She finds that on average 375 cars pass under the overpass during rush hour.

(a) Find the probability that 375 cars will pass under the overpass during rush hour on any given day.

(b) Find the probability that 360 cars will pass under the overpass during rush hour on any given day.

(c) Find the probability that 400 cars will pass under the overpass during rush hour on any given day.

3. Suppose that a microbiologist finds the incidence of a certain type of bacteria to be 200 colony-forming units per 100 mL of water in a certain stream.

(a) If a person takes a 100 mL sample of water from the stream, what is the probability that it contains 250 colony-forming units?

(b) If a person takes a 100 mL sample of water from the stream, what is the probability that it contains at most 250 colony-forming units?

(c) If a person takes a 100 mL sample of water from the stream, what is the probability that it contains more than 250 colony-forming units?

4. After a rough winter and many new potholes, it is found that an average of 2 cars per day will get a flat tire driving on a particularly bad stretch of North Ave.

(a) Construct a probability distribution table and histogram for this distribution.
[Include all the values of x until $P(x) \approx 0$.]

(b) Find the probability that on a given day 5 cars will get a flat tire driving on this piece of road.

(c) Find the probability that at most 5 cars get flat tires on a given day.

(d) Find the probability that more than 5 cars get flat tires on a given day.

(e) Find the probability that during a given ***week***, 5 cars will get a flat tire.
[Hint: What is the mean number of cars ***per week*** that you expect to get flat tires?]

(f) Find the probability that during a given week, at most 5 cars will get a flat tire.

(g) Find the probability that during a given week, more than 5 cars will get a flat tire. Compare this answer with part (d) and explain why it makes sense.