

## Extra Assigned Problems, Poisson and Exponential

- 1 Earthquakes occur in a Poisson process with  $\lambda =$  2 /week. What is the probability that at least 3 earthquakes will occur during the next 2 weeks?

2 A radioactive source emits alpha particles according to a Poisson process at mean rate of 15 particles per minute.

a) What is the probability that more than 5 seconds will pass before the next alpha particle is emitted?

b) What is the mean waiting time?

c) What is probability that the wait time will exceeds 10 seconds?

d) If I take readings for 0.25 seconds 3 different times chosen at random over the day, what is the probability that the wait time will be less than 0.25 seconds 3 of the 3 times?

3 The number of hits on a website is assumed to follow a Poisson process with a rate of 3 hits per minute. What is the probability that:

a) greater than 1 minute goes by without a hit?

- 4 Given a Poisson process for which  $\lambda =$  0.25 /mm
- a) What is the mean diameter
- b) What is the standard deviation of the diameters?
- c) What proportion of the diameters are less than 3 mm?

d) What proportion of diameters are greater than 11 mm?

e) What is the median diameter?

f) What is the 75% of diameters?