Biology 4605/7220   Name _____
Quiz #3a   25 September 2007

1. Construct the frequency distribution F(Y=k) and the cumulative relative frequency
distribution RF(Y≤k) for the cumulative frequency distribution F(Y≤k) of moss shoots on
on 126 quadrats, where k = number of moss shoots per quadrat on china clay residues
(from Sokal and Rohlf 1995, Box 5.5).

k	F(Y=k)	F(Y≤k)	RF(Y≤k)	
0	_____	100	_____	[2]
1	_____	109	_____	[2]
2 or more	_____	126	_____	[2]

2. The expected number of events k during time t, if events are rare and random, follows
a Poisson distribution. The expected frequency of events Pr(X=k) for a Poisson
distribution is calculated as:

$$Pr(X=k) = e^{-\mu} \, \mu^k / k! \qquad k = 0,1,2,3 \; etc$$

where $\mu = \lambda \, t$,
e is approximately 2.71828, any number to the zero power is 1,
and k! (k factorial) is   0! = 1, 1! = 1, 2! = 2*1, 3! = 3*2*1, etc.

If the death rate due to malaria in a population is λ = 4.6/year, what is the probability of
zero deaths Pr(X=0) in t = 0.5 year ?

        Beneath the equation, write the equation with the numbers you plan to use. [1]

    Compute the probability of finding zero deaths Pr(X=0) if t = 0.5 year _____[1]

3. If the probability of an outcome is some percentage p, then the odds in favour of the
outcome are defined as Odds = p/q where q = 1 - p. The odds against that outcome are
thus q/p. Odds are expressed relative to a value of 1.
Read the expression (Odds = 4 : 1) as "odds are 4 to 1."

If the probability of no cases of malaria had been 40%,
                        what are the odds of no cases of malaria ? _____ [1]

                    what are the odds of at least one case of malaria ? _____ [1]