The flow values have a mean cfs and a standard deviation cfs. If the flow distribution is assumed to be log-normal with cfs and cfs, what is the probability of a flow larger than 10000cfs?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Red | Yellow | Blue | Green | Total |
| #kicks | 300 | 200 | 400 | 100 | 1000 |
| #won | 162 | 138 | 288 | 75 | 663 |

What is probability that randomly selected sample will have won kick but shirt color is not red or blue?  
If randomly selected sample had winning kick, probability that shirt is yellow?  
Is winning kick independent of color worn by goalie?  
Not equal, so NOT independent.

Average of 70% of concrete batches from supplier A meet specs, and average of 80% of batches from B meet specs. Supp A delivers 10 batches on a day. What is the probability that 9 or more of the batches will meet specs?

Contractor orders 50 batches from A and 50 from B. What is probability that total of at least 80 will meet specs?  
 from A,   
   
   
   
   
, same for B so normal approximation to binomial is OK

Ocean particles occur v = 10 particles/m3. Probability that sample with volume V = 0.1m3 will have at least one particle?  
   
   
How to confirm particle frequency (by determining )?  
,   
   
   
Total mass of particles .   
. What is ?

Max bacterial concentration has probability p=0.05 of being higher than max allowable concentration. Concentration of bacteria on different days are independent. What is probability of 2 successive days of violations, then 5 days of no violations?  
Probability of exactly 3 violations in the next 10 days?

Concentration of bacteria formula   
An estimate , , are constant  
The error in can be reduced by making multiple independent measurements of and using the avg of the measurements to compute . What is the number n of measurements necessary to obtain a relative error ?

The load P on a structure is normally distributed with a mean and standard dev . The strength R of the structural element is normally distributed with standard dev . What must the mean strength be so that the probability of failure (P > R) is less than   
,

The annual maximum flow Q in a river is log-normally distributed with and . Flood control structures are designed for a flow . What is the risk R associated with this design flow, where R is probability thkat the design flow will be exceeded at least once in n = 50 years?

There are v = 2 turtles per mile of road. What is the probability that exactly 2 turtles would be found in the second mile of road travelled?  
The record for turtle collection in a day was 7 turtles. If you want to drive =3 miles, what is the probability that more than 7 turtles will be found? Use normal approx. to poisson distrib.

Independent if any are true:  
Binomial Distribution  
Geometric Distribution  
x = #trials til first success, 0< p < 1  
Hypergeometric distribution  
K success, N – K failures, sample size n objects selected without replacement from the N objects  
 Poisson Distribution  
Normal Distribution  
   
 for normal random variable  
 for binomial random variable  
 for poisson random variable  
 Hypergeometric approx. to binomial when n/N < 0.1  
  
Lognormal Distribution X=exp(W)  
Let W have normal distribution: