Worksheet 4

Let's Revise!

Disease 2.0: Suppose the current **positivity rate** is 3%, i.e. that out of everyone who gets tested, **3% test positive**. We are considering doing batch testing. Find the probability that the test will come back negative for the following sizes of batches:

Probability that a person will test **negative** =

20 tests in a batch:

15 tests in a batch:

12 tests in a batch:

10 tests in a batch:

8 tests in a batch:

5 tests in a batch:

PMF 2.0: You are given the pmf table below: Determine the mean.

X	100	120	140	160	180	200
F(X)	0.1	0.1	0.1	0.2	0.4	0.1

μ =

Batch Testing: Suppose a certain disease has a positivity rate of 1.5%. We have a test to determine if a person has a disease or not. Suppose we are doing batch testing with batches of size 8.

What is n?

What is the value of n?

What is the probability of a person testing positive?

What is the probability of a person testing negative?

What is the probability of the batch testing negative?

Continued Batch Testing: Given the same problem as above, answer the following questions.

How many tests will we need to do, if the batch tests are negative?

How many tests will we need to do, if the batch tests positive?

μ = E[X] =

One more time!

Suppose we know that the positivity rate of a certain disease is 5%. The probability of a batch of size 8 testing negative is 0.6634. Determine the expected value of the number of tests.

μ =

Moving Forward.

DNA Problem: Suppose we have 2 machines which can analyze DNA and provide the results which are required by the City Hospital. Each machine can complete analysis of 1 DNA per day. Thus, we can perform 2 DNA analyses per day. We are considering buying a 3rd machine. Fill in the distribution below and determine the expected value of the 3rd machine.

Jobs	0	1	2	3	4 or more
F(X)	0.1	0.15	0.25	0.4	0.1
X					

What is the expected value of the income made by the 3rd machine?