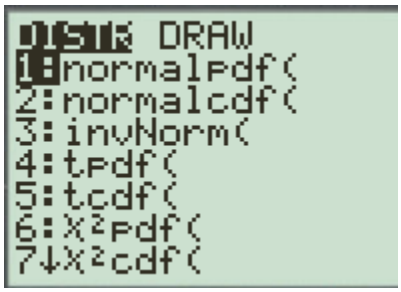
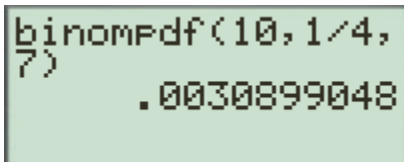
Answers using TI 83:

1a. 2nd VARS (DISTR)



0:Select binompfd(10, ¼,7) # comment: the format is (n, p, x)



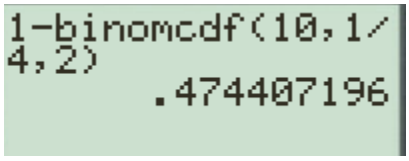
1b. At last one correct = 1 – P no correct (zero correct)

Type 1 – then repeat steps for 1a:

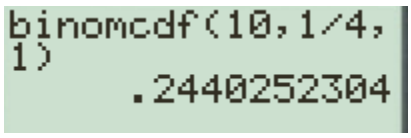
1- binompfd(10, ¼,0)

1c. P at least 3 questions correct = 1- [P(0)+P(1)+P(2)]

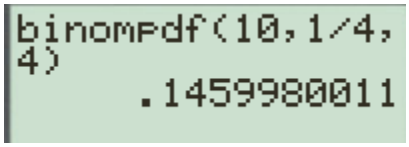
In this case, we use binomial cdf, which is the "cumulative" value from zero up to a given X, in this case 2.



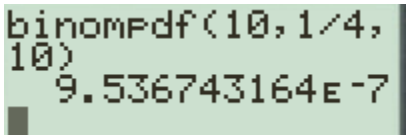
1d. "At most" means from zero to a number x, in this case 1. Therefore, we use binomial cdf:



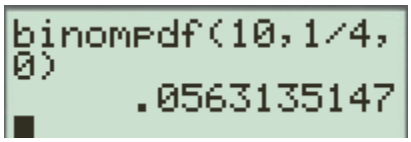
1e. Same as 1d, just set x = 4.



1f. For all questions correct, set x = 10. That is 10 out of 10 correct, binomial pdf:



1g. All wrongs is equivalent to zero, no question correct.
Binomial pdf: n= 10, p=1/4, x=0.



1h. Means of the binomial distribution
μ = n . p = 10*1/4 = 2.5

1i. σ = $\sqrt{n\,.\,p\,.\,q}$ = $\sqrt{10\,.\frac{1}{4}.\,3/4}$ = 1.37

Note: q = 1 – p = 1- ¼ = ¾.

1j. The minimum usual value is give by μ - 2 σ : 2.50 – 2 (1.37) = -0.24

The interpretation of this result: if someone answer 10 questions at random, with a probability of ¼ of being correct on each instance, it will be "usual" getting all questions wrong (zero correct). The value -0.24 doesn't have a physical meaning, since no one can go lower of zero correct.

The maximum usual value is give by μ + 2 σ : 2.50 + 2 (1.37) = 2.5+2*1.37 = 5.24 So the test taker may expect up to 5 questions correct. Anything above that result will be "unusual" or exceptionally high.

1k. Six questions correct would be an unusual high number of correct answers under the conditions of this experiment. (Results in 1j show that the range of usual values is from 0 to 5).