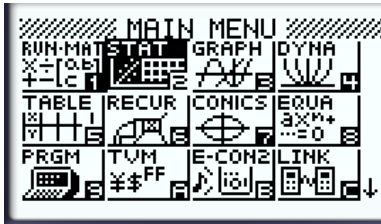
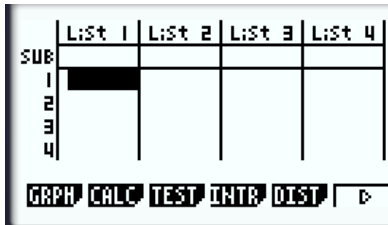


Answers using Casio 9750 GII:

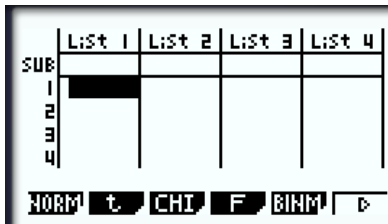
Choose STAT menu:



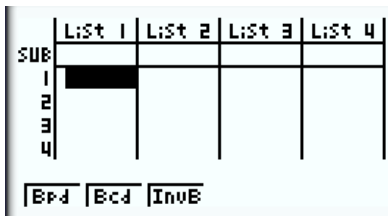
Then, F5 for DIST:



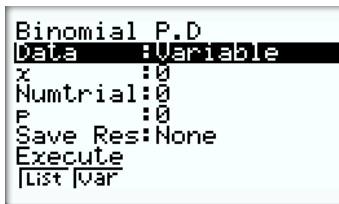
Again F5 for BINM:



Choose F1 for Bpd ( This is the same function as binomial pdf):



It looks like this:



For 1a enter  $x = 7, N = 10, p = \frac{1}{4}$

```
Binomial P.D
Data :Variable
x :7
Numtrial:10
P :0.25
Save Res:None
Execute
Home LIST
```

Press EXE:

```
Binomial P.D
P=3.0899E-03
```

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

Repeat steps for 1a with  $x = 0, N = 10, p = \frac{1}{4}$ .

```
Binomial P.D
P=0.05631351
```

Then press MENU, and choose RUN-MAT:

Proceed on the main screen to substitute the values into the formula:

At last one correct =  $1 - P$  no correct (zero correct) =  $1 - 0.0563 = 0.9437$

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.

	List 1	List 2	List 3	List 4
SUB				
1				
2				
3				
4				

BPd Bcd InvE

For Binomial CDF, choose Bcd; then for  $x = 2, N = 10, p = \frac{1}{4}$ .

1d. “At most” means from zero to a number  $x$ , in this case 1. Therefore, we use binomial cdf, Bcd in Casio.

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:

Bpd  $N = 10, p = \frac{1}{4}, x = 10$ .

1g. All wrongs is equivalent to zero correct. Binomial pdf:

Bpd  $N = 10, p = \frac{1}{4}, x = 0$ .

1h. Means of the binomial distribution

$\mu = n \cdot p = 10 \cdot \frac{1}{4} = 2.5$

$$1i. \sigma = \sqrt{n \cdot p \cdot q} = \sqrt{10 \cdot \frac{1}{4} \cdot \frac{3}{4}} = 1.37$$

**Note:**  $q = 1 - p = 1 - \frac{1}{4} = \frac{3}{4}$ .

**1j.** The minimum usual value is given by  $\mu - 2\sigma : 2.50 - 2(1.37) = -0.24$

The interpretation of this result: if someone answers 10 questions at random, with a probability of  $\frac{1}{4}$  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 than zero correct.

The maximum usual value is given by  $\mu + 2\sigma : 2.50 + 2(1.37) = 2.5 + 2 \cdot 1.37 = 5.24$ . 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).