



TECHNOLOGY CORNER

13. Binomial Probability on the HP Prime

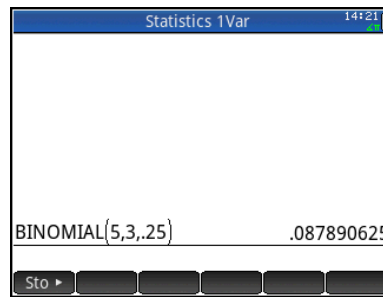
There are two handy commands on HP Prime for finding binomial probabilities: `BINOMIAL()` and `BINOMIAL_CDF()`. The inputs for both commands are the number of trials n , the values of interest for the binomial random variable X , and the success probability p .

`BINOMIAL(n, k, p)` computes $P(X = k)$

`BINOMIAL_CDF(n, p, k)` computes $P(X \leq k)$

Let's use these commands to confirm our answers in the previous example. Remember that the probability that a child from a particular set of parents has type O blood is 0.25.

- (a) Find the probability that exactly 3 of the 5 children from a particular set of parents have type O blood.
- Press H to enter the Home view. Press D and tap **Math** to open the Math menu.
- Tap *Probability*, then *Density*, and select *Binomial*.



These results agree with our previous answer using the binomial probability formula: 0.08789.

- (b) Should the parents be surprised if more than 3 of their children have type O blood?

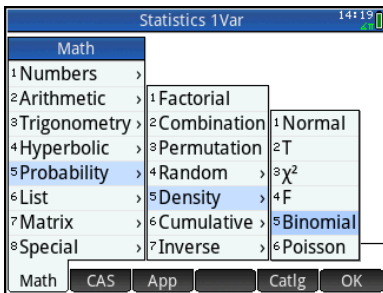
To find $P(X > 3)$, use the complement rule:

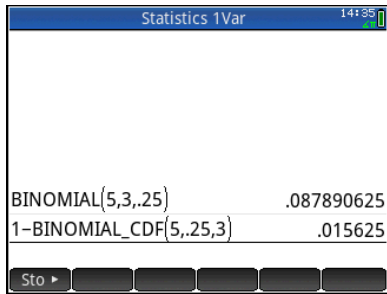
$$P(X > 3) = 1 - P(X \leq 3)$$

$$P(X > 3) = 1 - \text{BINOMIAL_CDF}(5, 0.25, 3)$$

- Complete the command `BINOMIAL(5, 3, 0.25)` and press E.

- Enter x w
- Press D and tap **Math** to open the Math menu.
- Tap *Probability*, then *Cumulative*, and select *Binomial*.
- Complete the command `1 - BINOMIAL_CDF(5, 0.25, 3)` and press E.





The screenshot shows the TI-84 Plus calculator's Statistics 1Var screen. The title bar reads "Statistics 1Var" and the battery level is at 144%. The screen displays two rows of data:

Function	Result
$\text{BINOMIAL}(5,3,.25)$.087890625
$1-\text{BINOMIAL_CDF}(5,.25,3)$.015625

At the bottom of the screen, there is a "Sto" button followed by five empty slots for storing data.

This result agrees with our previous answer using the binomial probability formula: 0.01563.