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13. Binomial Probability on 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 $P(X \leq k)$

BINOMIAL_CDF(n, p, k, k2) computes $P(k \leq X \leq k2)$

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.

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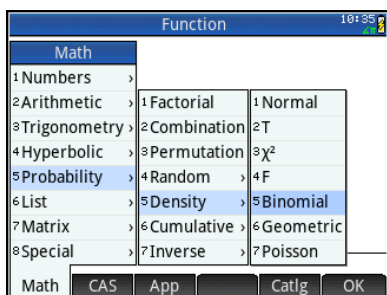

- Complete the command BINOMIAL(5, 0.25,3) and press Enter.
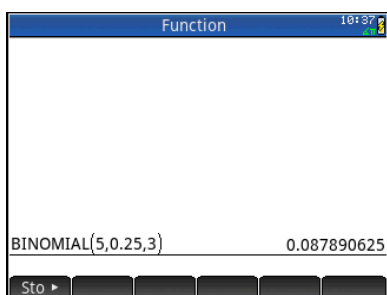
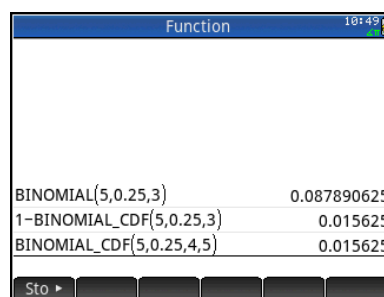These results agree with our previous answer using the binomial probability formula: 0.08789

2. 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 - $ BINOMIAL_CDF(5, 3, 0.25)

- Enter 1 −
- Press 🔲 and tap Math to open the Math menu.
- Tap *Probability*, then *Cumulative*, and select *Binomial*.
- Complete the command   1 − BINOMIAL_CDF(5,3,.25) and press Enter.
- Note: the same results are found using the BINOMIAL_CDF command with 4 and 5 and the bounds

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