Chapter 13 / **Example 5**

Binomial probabilities

a In a family of six children, find

i the probability that there are exactly three girls

ii the probability that exactly three consecutive girls are born.

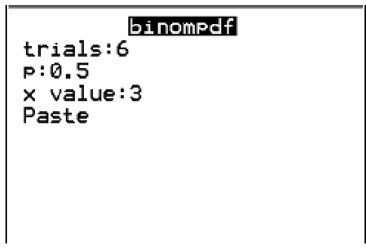
b A study shows that 0.9% of a population of over 4 000 000 carries a virus. Find the smallest size of sample from the population required in order that the probability of the sample having no carriers is less than 0.4.

$G \sim \mathrm{B}(6,\ 0.5)$. Find $\mathrm{P}(G = 3)$.

Press [2nd] [vars] ([distr]) A:binompdf(.

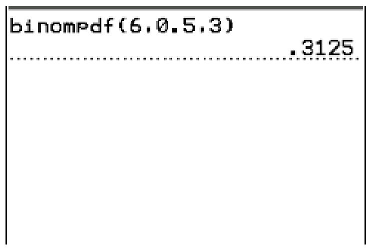
Enter 6 as the number of trials, 0.5 as the probability of success and 3 as the x value.

Navigate down to Paste and press [enter].



Press [enter].

The GDC displays the solution $\mathrm{P}(G = 3) = 0.3125$.



P(3 consecutive girls) = $4 \times \left(\frac{1}{2}\right)^6 = 0.0625$.

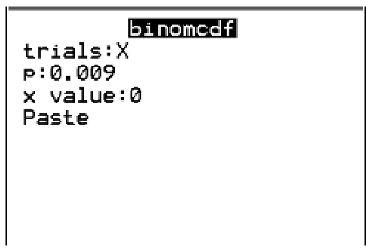
$C \sim \mathrm{B}(n,\ 0.009)$. Find $\mathrm{P}(C = 0) < 0.4$.

Press [f1] [y=] to display the equation entry screen.

Press [2nd] [vars] ([distr]) B:binomcdf(.

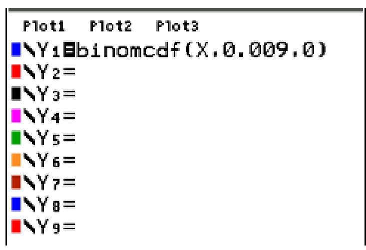
Enter x as the number of trials, 0.009 as the probability of success and 0 as the X value.

Navigate down to Paste and press [enter].



Press [enter].

Press [2nd] [graph] [table].



Chapter 13 / **Example 5**

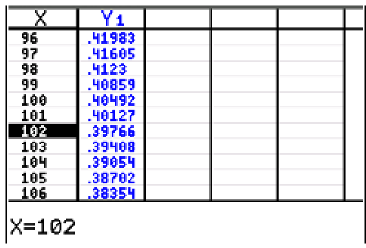
Binomial probabilities

A table of values is displayed.

Scroll down the table using ▼.

From the table, you can see that n = 102 is the first value for which $\text{P}(C = 0) < 0.4$.

Hence n = 102 is the minimum value required.



X	Y1
96	.41983
97	.41605
98	.4123
99	.40859
100	.40492
101	.40127
102	.39766
103	.39408
104	.39054
105	.38702
106	.38354

X=102