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 $\mathrm{P}(G = 3)$.

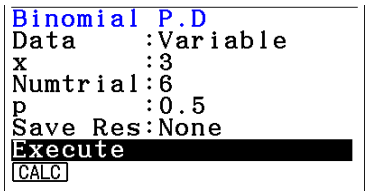
Press MENU 2 to display the List Editor screen.

Press F5 DIST F5 BINOMIAL F1 Bpd.

Choose F2 Var.

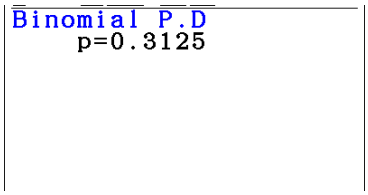
Enter 3 as the value of x, 6 as Numtrial and 0.5 as p.

Choose F1 None for Save Res.



Navigate down to Execute and press EXE.

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

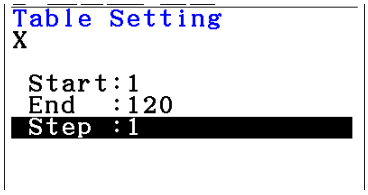


P(3 consecutive girls) = $4 \times \left(\frac{1}{2}\right)^6 = 0.0625$.

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

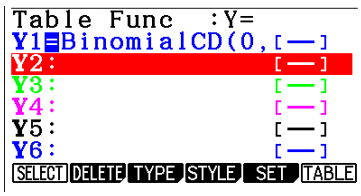
Press MENU 7 . Press F5 SET and change the settings so that the table starts from 1 and ends at 120.

Press EXIT.



Press OPTN F6 ▷ F5 STAT F1 DIST F5 BINOMIAL F2 Bcd.

Type 0, 0, x, 0.009. Close the parentheses and press EXE to enter the equation as Y1.



Chapter 13 / **Example 5**

Binomial probabilities

Press F6 TABLE.

A table of values is displayed.

Scroll down with ▼.

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

Hence $n = 102$ is the minimum value required.