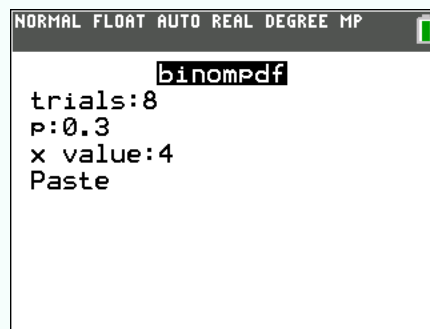


4.8 Binomial distribution

Consider $X \sim \mathcal{B}(8, 0.3)$.

4.8.1 Compute $P(X = a)$ with `binomPdf` function

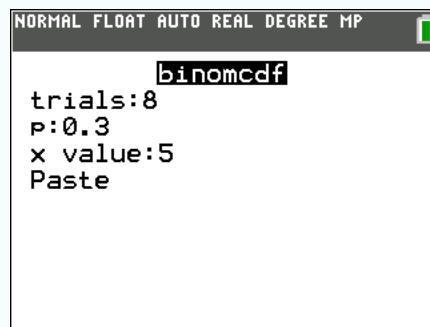
Consider $X \sim \mathcal{B}(8, 0.3)$. Suppose you want to compute $P(X = 4)$. To do this, press 2nd, distr, vars, `binomPdf()`. Choose **x value:4**:



Press **Paste**, entry solve, enter. The result should be 0.136 (rounded).

4.8.2 Compute $P(X \leq a)$ with `binomcdf` function

Consider $X \sim \mathcal{B}(8, 0.3)$. Say you want to compute $P(X \leq 5)$. To do this, press 2nd, distr, vars, `binomcdf()`. Choose **x value:5**:



Press **Paste**, entry solve, enter. The result should be 0.989 (rounded).

NB: If you wanted to compute $P(X < 5)$ instead, you would calculate $P(X \leq 4)$ (since the binomial distribution is discrete).

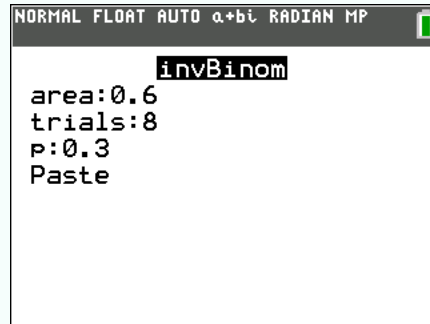
4.8.3 Find x when $P(X \leq x) = c$ with `invBinom` function



Some calculators may not have this functionality

Consider $X \sim \mathcal{B}(8, 0.3)$. Suppose you want to find **the smallest** x for which $P(X \leq x) \geq 0.6$.

Press **2nd**, **distr**, **vars**, **invBinom**(, and fill the parameters as follows:



Press **entry solve**, **enter**. The result should be 3.

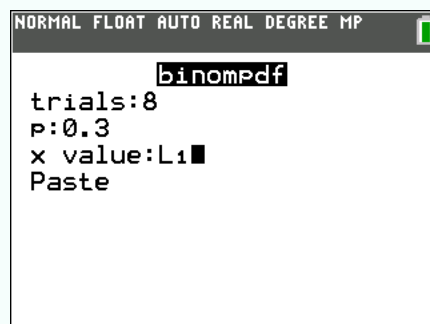


Note that $\text{binomcdf}(8, 0.3, 3) = 0.806$, which is **not** 0.6. But since $\text{binomcdf}(8, 0.3, 2) = 0.552$ is smaller than 0.6, **invBinom** gives us 3 (even though 2 gives an area closer to 0.6, the calculator gives the first integer that gives an area bigger or equal to 0.6)

4.8.4 Plot a binomial distribution



To plot a binomial distribution, we will create two lists, one being the possible amount of successful trials, and the other their probability, and then plot it.

- ① Create a list L_1 of integers from 0 to n (here: $n = 8$) (press **list**, **stat**, **Edit...** to enter the list). Place the cursor on L_2 and press **2nd**, **distr**, **vars**, **binompdf**. Choose L_1 (by pressing **2nd**, **1**) for **x value**:



Press **Paste** and . The following should be displayed:







NORMAL FLOAT AUTO REAL DEGREE MP					
L1	L2	L3	L4	L5	2
0	0.0576	-----	-----	-----	
1	0.1977				
2	0.2965				
3	0.2541				
4	0.1361				
5	0.0467				
6	0.01				
7	0.0012				
8	6.6E-5				
-----	-----				
L2(1)=0.057648010000006					

② Press ,  1: to be able to plot the binomial distribution. Choose the following as parameters:

NORMAL FLOAT AUTO REAL DEGREE MP
PRESS [◀] OR [▶] TO SELECT AN OPTION



Plot1 Plot2 Plot3

On Off


Type:      

Xlist:L1

Freq :L2

Color:  BLUE 

Color can be changed

Press  (see 2.3.2 on page 27 if it is not displayed correctly). The following should be displayed:

