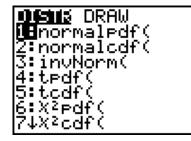# TI-83/84 Binomial Distribution
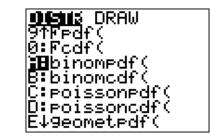
You can use the TI-83/84 calculator to find the probability of x (number of successful trials) for a discrete binomial distribution.

Press [2nd] and DISTR (above [VARS]). Cursor down and select A: binom**pdf**(which stands for binomial probability density function.

```
DISTR DRAW
1▮normalpdf(
2:normalcdf(
3:invNorm(
4:tpdf(
5:tcdf(
6:X²pdf(
7↓X²cdf(
```

```
DISTR DRAW
9↑Fpdf(
0:Fcdf(
A▮binompdf(
B:binomcdf(
C:poissonpdf(
D:poissoncdf(
E↓geometpdf(
```

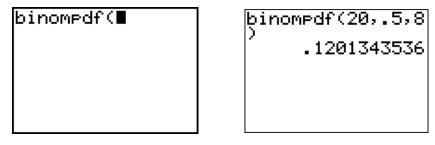This screen looks the same in the new operating system.

With the Stat Wizard off, or in the older models, enter n (number of trials), p (probability of success), and x (number

of successful trials) separated by commas and then press [ENTER] and the TI-83/84 will calculate the probability.

Example 1: $n = 20, p = 0.5$ find $P(x = 8)$:

```
binompdf(▮
```

```
binompdf(20,.5,8
)
        .1201343536
```
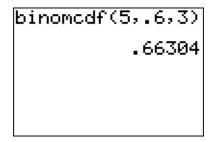
With Stat Wizard turned on in the new TI-84s, the screen displays what each of the values represents and does the syntax for you. Then select Paste at the bottom. The syntax shown above will appear on the screen, and then

press [ENTER] to execute and obtain the value.

```
    binompdf
trials:20
p:.5
x value:8
▮
```

TI-83/84 also has a cumulative density function for the binomial distribution. This function adds the probabilities for **0 up to and including** x. From the same DISTR menu, select B: binom**cdf**(and enter n, p, and x.
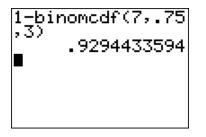
Example 2: $n = 5, p = 0.6$ find $P(x \leq 3)$ Using binom**cdf** with $x = 3$ will give us $P(x = 0, 1, 2, 3)$.

```
binomcdf(5,.6,3)
            .66304
```

With the Stat Wizard on, the screen will display the same thing as in the pdf above, but the screen will say cdf on screen. Follow the same steps to execute.

Example 3: Only three out of four patients who have an artery bypass heart operation are known to survive five years without needing another bypass operation. Of seven patients who had such an operation, what is the probability that at least four will survive five years without needing another operation?

For this problem $p = 0.75$ and $n = 7$ find $P(x \geq 4)$. Since binom**cdf** accumulates probabilities only from 0 up to and including x, then we'll rewrite this to match the TI-83/84 capabilities: $P(x \geq 4) = 1 - P(x \leq 3)$.

```
1-binomcdf(7,.75
,3)
    .9294433594
■
```

Example 4: Only three out of four patients who have an artery bypass heart operation are known to survive five years without needing another bypass operation. Of seven patients who had such an operation, what is the probability that at most four will survive five years without needing another operation?

For this problem $p = 0.75$ and $n = 7$ find $P(x \leq 4)$. Since binom**cdf** accumulates probabilities from 0 up to and including x, then there is no need to rewrite this probability.

```
binomcdf(7,.75,4
)
    .2435913086
```