probabilities of x or fewer successes.) The screen displays list binomial probabilities for $n = 5$ and $p = 0.85$, as in Example 2. Notice that in each display, the probability distribution is given as a table. The Excel and TI-83/84 Plus display the first probability in scientific notation. (The Excel probability of 7.594E-05 is another way of expressing 7.594×10^{-5}, which can be expressed in a standard format as 0.00007594.)

Example 3 XSORT Method of Gender Selection

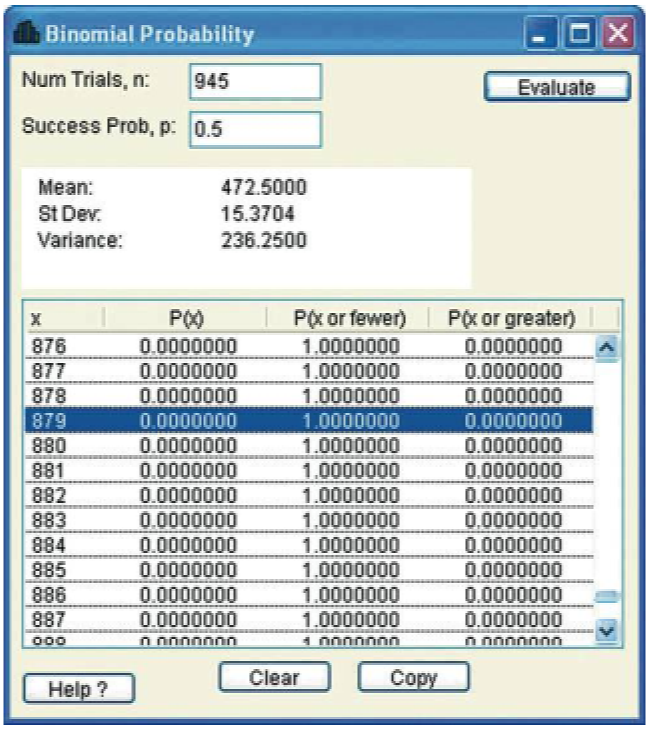
In the Chapter Problem, we noted that each of 945 couples gave birth to a child, and 879 of those children were girls. In order to determine whether such results can be explained by chance, we need to find the probability of getting 879 girls or a result at least as extreme as that. Find the probability of at least 879 girls in 945 births, assuming that boys and girls are equally likely.

Solution

Using the notation for binomial probabilities, we have $n = 945$, $p = 0.5$, $q = 0.5$, and we want to find the sum of all probabilities for each value of x from 879 through 945. The formula is not practical here, because we would need to apply it 67 times—that's not the way to go. Table A-1 (Binomial Probabilities) doesn't apply because $n = 945$, which is way beyond the scope of that table. Instead, we wisely choose to use technology.

The accompanying STATDISK display shows that the probability of 879 or more girls in 945 births is 0.0000000 when rounded to seven decimal places. This shows that it is *very* unlikely that we would get 879 girls in 945 births by chance. If we effectively rule out chance, we are left with the more reasonable explanation that the XSORT method appears to be effective in increasing the likelihood that a baby will be born a girl.

STATDISK



x	P(x)	P(x or fewer)	P(x or greater)
876	0.0000000	1.0000000	0.0000000
877	0.0000000	1.0000000	0.0000000
878	0.0000000	1.0000000	0.0000000
879	0.0000000	1.0000000	0.0000000
880	0.0000000	1.0000000	0.0000000
881	0.0000000	1.0000000	0.0000000
882	0.0000000	1.0000000	0.0000000
883	0.0000000	1.0000000	0.0000000
884	0.0000000	1.0000000	0.0000000
885	0.0000000	1.0000000	0.0000000
886	0.0000000	1.0000000	0.0000000
887	0.0000000	1.0000000	0.0000000