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10 PRINT "SIMULATION--BREAKING STICKS TO MAKE TRIANGLES"
20 PRINT
30 PRINT "HOW MANY STICKS DO YOU WANT TO BREAK";
40 INPUT D
50 \text{ LET N} = 0
60 FOR I = 1 TO D
70 LET X = RND(1)
80 LET Y = RND(1)
90 IF X > = Y THEN 70
100 \text{ LET R} = X
110 LET S = Y - R
120 LET T = 1 - R - S
130 IF R + S < = T THEN 170
140 IF S + T < = R THEN 170
150 IF R + T < = S THEN 170
160 LET N = N + 1
170 NEXT I
180 LET P = N/D
190 PRINT
200 PRINT "THE EXPERIMENTAL PROBABILITY THAT"
210 PRINT "A BROKEN STICK CAN FORM A TRIANGLE IS ": P
220 END
```

Line Number	Explanation
60–120	These lines simulate the breaking of each stick. When I = 10, for example, the computer is "breaking" the tenth stick.
130–150	Here the computer uses the Triangle Inequality to check whether the pieces of the broken stick can form a triangle. If not, the computer goes on to the next stick (line 170) and the value of N is not affected.
160	If the broken stick has survived the tests of steps 130-150, then the pieces can form a triangle and the value of N is increased by 1.
170	Lines $60-170$ form a loop that is repeated D times. After I = D, the probability P is calculated and printed (lines $180-210$).

Exercises

- 1. Pick any two numbers x and y between 0 and 1 with x < y. With paper and pencil, carry out the instructions in lines 100 through 150 of the program to see how the computer finds r, s, and t and tests to see whether the values can be the lengths of the sides of a triangle.
- 2. If you use a language other than BASIC, write a similar program for your computer.
- 3. Run the program several times for large values of D, say 100, 400, 800, and compare your results with those of some classmates. Does the probability that the pieces of a broken stick form a triangle appear to be less than or greater than $\frac{1}{2}$?