
Nuts!

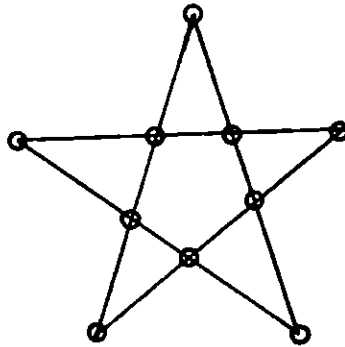
or

How Children Solve Problems

by
John Firkins
Gonzaga University

Attending NCTM meetings is always stimulating and the Grand Forks, North Dakota meeting was a special treat. As I boarded the plane to return to Spokane I ran across an ad for F. M. C. Corporation in the March issue of Republic Airline's magazine with the heading, "Drive Yourself Nuts." Under this was THE PROBLEM: Place 10 nuts in five rows of four nuts each. The problem is not new. What is new is that a corporation used it in its advertising.

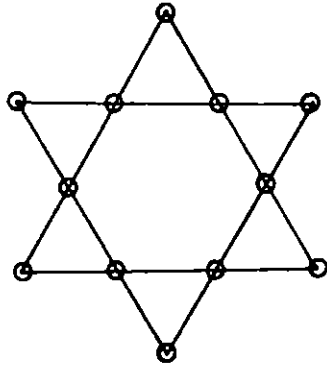
I took the ad with me and showed it to my daughters when I arrived home. Deborah, 15, scribbled on a paper for awhile and then announced that the problem was easy. Her solution looked like this:



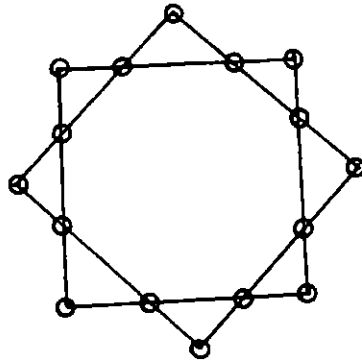
Meanwhile, Jessica, 12, had selected 10 nuts from a bowl on the kitchen counter and dashed to the basement to solve the problem. She was afraid Deborah would solve the problem and tell the answer before she had a chance to solve it.

The problem was out of a magazine not a textbook; neither was it the clever utterance of a teacher trying to stimulate a class! The effect was amazing.

Within minutes Deborah declared she could place 12 nuts in six rows of four nuts each! Her solution was to make a six pointed star and place the nuts as illustrated:



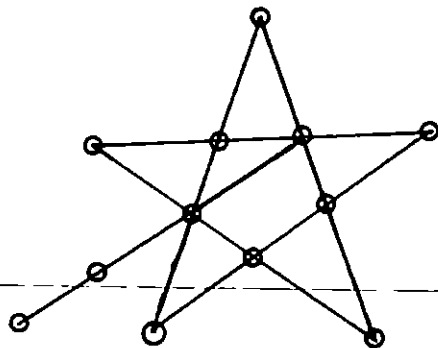
Shortly after making this discovery she declared that she could place 16 nuts in 8 rows of four nuts each! Her solution:



She was excited and rushed downstairs to tell Jessica.

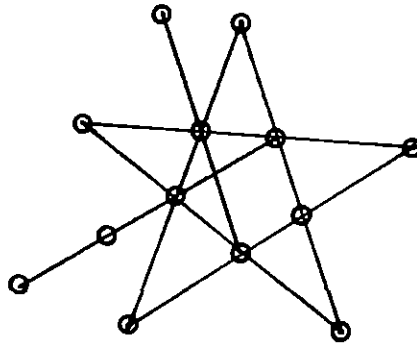
By this time Jessica had solved the original problem by placing the nuts on a table in approximately the shape of a five pointed star. Deborah didn't like Jessica's solution since some of the rows were not straight. She drew a picture of her solution for Jessica and challenged her to place 12 nuts in six rows of four nuts each.

Jessica's solution:



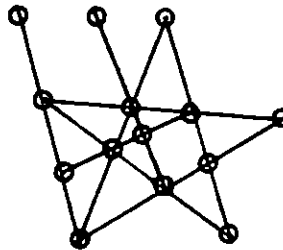
Jessica then had some surprises of her own for her older sister. "Place 14 nuts in seven rows of four nuts each."

Solution:



"Place 15 nuts in eight rows of four nuts each!"

Solution:



In this world the ability to solve problems is of paramount importance. The level at which children approach problems, the investigations they carry out and the solutions they devise depend on many variables. Fortunately, once a problem has been solved it can be explained to others who will then know as much as the original problem solver. The insight achieved can then be used by those who did not solve the original problem, or who did it a different way, to solve new similar problems. In any case, not everyone gains insight into a problem in the same way or at the same stage.

Each of the girls solved the problem. Each produced generalizations to intrigue the other.

What did Deborah learn from Jessica? Lines need not be straight. What was her last challenge?

"Place 10 nuts in 45 rows of two nuts each!"

She drew a circle, placed points on it, drew all possible chords and counted them.

It is exciting to be at the beginning!