



Problem of the Week

Problem B and Solution

I Say My Name



Problem

An onomatopoeic chickadee flies from one of three different trees to one of two feeders, and then flies back to one of the trees.

- Make a 'tree' diagram to show all possible routes the chickadee might take. How many routes are there in total?
- Look at the number of possible choices of trees the chickadee might leave, the number of possible choices of feeders on which it could land, and then the number of possible choices of trees to which it could return. With what arithmetic operation (e.g., addition, multiplication, etc.) could you combine these three numbers in order to obtain the total number of routes found in part a)?
- After dining at one of the feeders, the chickadee decides to stop at either a birdbath, or on your hand for some seeds before returning to the trees. Use your result from b) to determine the new number of total possible routes.

Solution

- In the tree diagram at the right, the feeders are labelled 1, 2, and the trees are labelled 1, 2, 3. The tree diagram reveals that there are 18 different routes the chickadee could take.
- For each of the three trees the chickadee could leave there are two possible feeders on which it could land. So there are $3 \times 2 = 6$ ways it could do this part of its journey. Then for each of these, there are 3 different trees to which it could fly back. So in total there are $3 \times 2 \times 3 = 18$ different routes it could take, obtained by multiplying the number of possibilities at each stage.
- If it could also stop at a bird bath or to eat some seeds from your hand, then two further possibilities would be inserted after the feeders but before the return to the trees. Thus there would now be a total of $3 \times 2 \times 2 \times 3 = 36$ routes.

