DTP-Math-Circle: Session 1—Counting

Sept 02 2022

6 Moving stacks

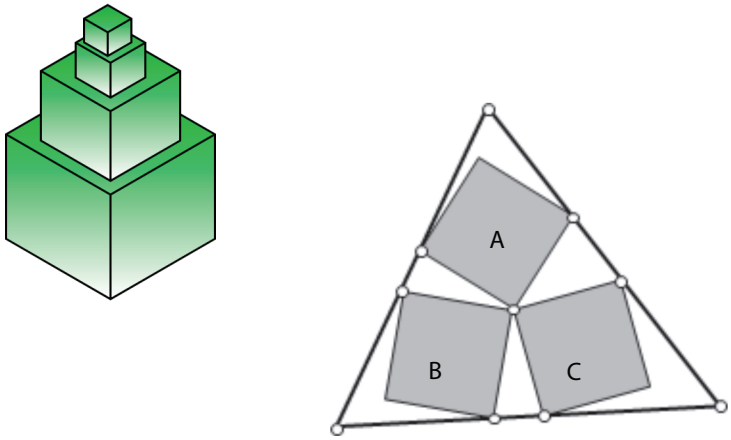

Figure 2: Moving a stack of boxes from A to C.

This requires a prop: Students should bring four stackable coins or disks of different sizes that can be stacked to form a tapering tower.

Moving a stack of boxes: I have one stack of 3 boxes in a tight space, (See Fig. 2) where I can accommodate three such stacks near each other. Call these spaces A, B and C. Suppose the stack is originally in the space A, and I want to move it to space C using B as a temporary space, making sure that a smaller box never appears under a larger box. Someone claims this can be done 7 steps. Is this possible? Is six possible?

What if the number of boxes is 4? What do you think is the smallest number of steps?

If I now have a stack of N boxes, can you estimate the minimum number of moves needed to shift the stack from A to C?