## PROBLEMS AS SPRINGBOARDS, NOT HURDLES
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Problems for you to solve: choose any one! (Of course, take the next one if you have time; repeat 😊)

Problem 1 There are two concrete staircases, both one meter high and two meters long. The first staircase has seven steps and the second has nine, as shown in the diagram. Will the runner that completely covers the first staircase also completely cover the second one? (A runner is a long strip of carpet for covering the stairs.)
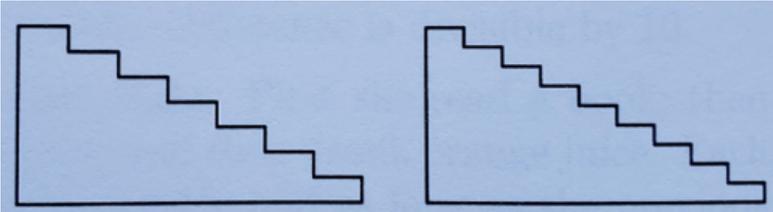
Problem 2 Is it possible to place dots into cells of an 8-by-8 square (no more than one dot per cell) so that the number of dots in every column is the same, while no two rows have the same number of dots?
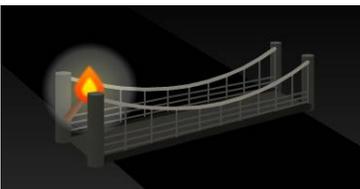
Problem 3 What fraction of the area of this **regular pentagram** is painted green?

Problem 4 Prove that

$$1^3 + 2^3 + 3^3 + \ldots + n^3 = (1 + 2 + 3 + \ldots + n)^2$$

A starter problem for your problem-posing and modeling

Person A takes 1 minute to cross a bridge, Person B takes 2 min, Person C takes 5 min, and Person D takes 8 min. It is dark, and they must carry a torch to cross. Two people can walk close together if one carries the torch, but the bridge will break if more than two people step on it. All four people must cross with just one torch, and take no more than 15 minutes to cross. Can they cross, or will they fail?

Image credits: DavisOLizabam, r27.jp, and Sergei Dorichenko

For hints and solutions see: **https://aimathcircles.org/minibluebird/**

Write us if you want to share your thoughts or have any questions! Use the contact form at the same page:
https://aimathcircles.org/minibluebird/