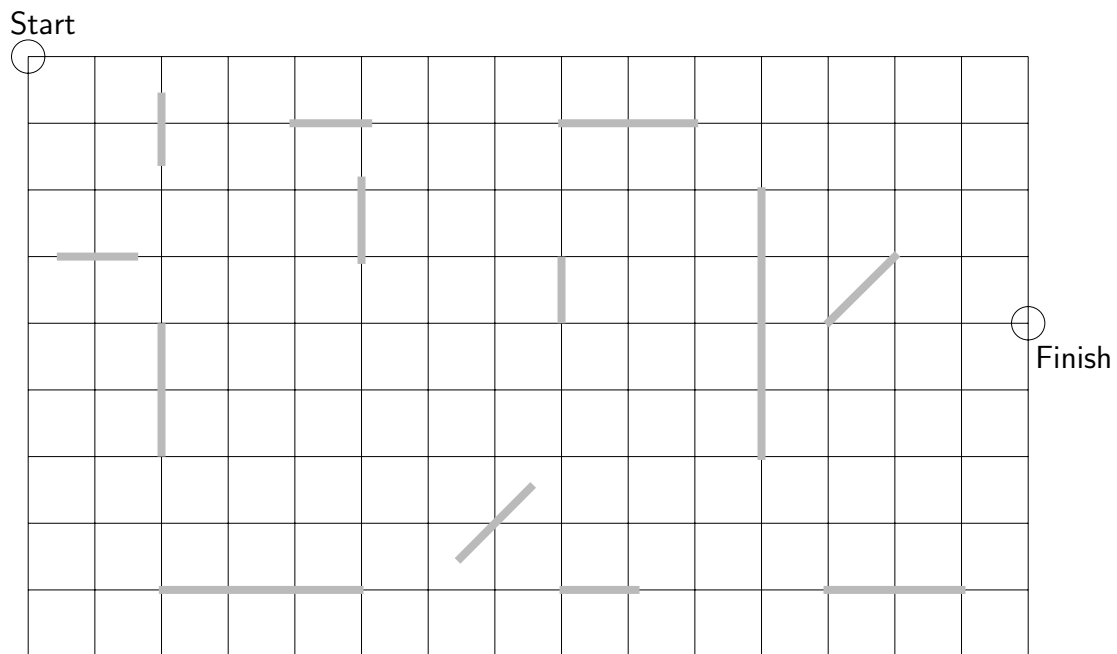


## Lucky 13 Path Puzzle Problem

Robert J. Reed, Brown Middle School, Newton, MA

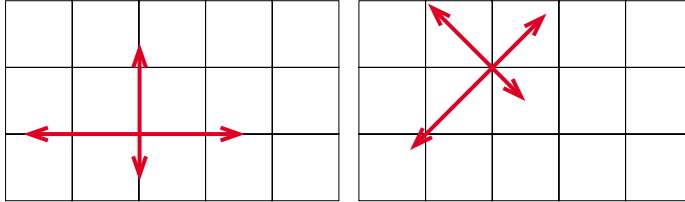
Draw a 13-segment path from “Start” to “Finish,” using segments of the lengths given in the list below, *in order*. The path must avoid all barriers, and stay within the  $9 \times 15$  rectangle.

$\sqrt{2}$ , 1, 2,  $\sqrt{8}$ ,  $2\sqrt{2}$ , 3, 4, 5,  $\sqrt{17}$ ,  $\sqrt{5}$ ,  $\sqrt{10}$ ,  $\sqrt{50}$ ,  $\sqrt{50}$



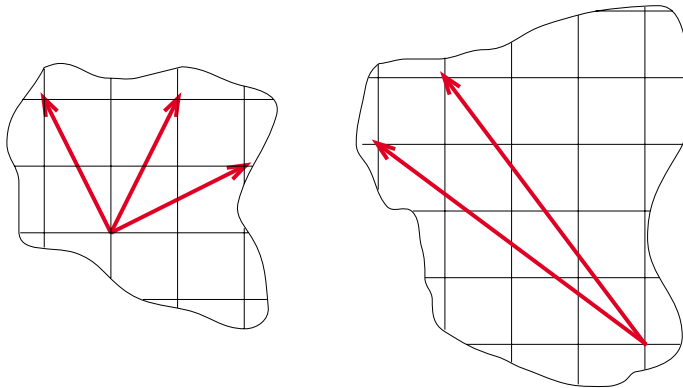
## Hints

**Hint 1:** If barriers and walls don't get in the way, segments of *any* length can be drawn in at least four different directions.



**Hint 2:** *Some* lengths can be drawn in *more* than four directions. What are the lengths of these segments? In how many other directions can segments of this length be drawn from the common starting point?

These are worthy problems on their own! Given a particular length, like  $\sqrt{7}$ , or  $\sqrt{2}$ , or 5, how can you tell whether segments of that length can be made from corner to corner on the grid *at all* and, if so, in how many directions they can be made?



**Hint 3:** You may find it helpful to work from both ends toward the middle.

## Answers

See solution.

## Solutions

There is only one path that meets all the criteria. Notice that  $\sqrt{50}$  is represented once as  $\sqrt{1^2 + 7^2}$ , and once as  $\sqrt{5^2 + 5^2}$ .

Start

