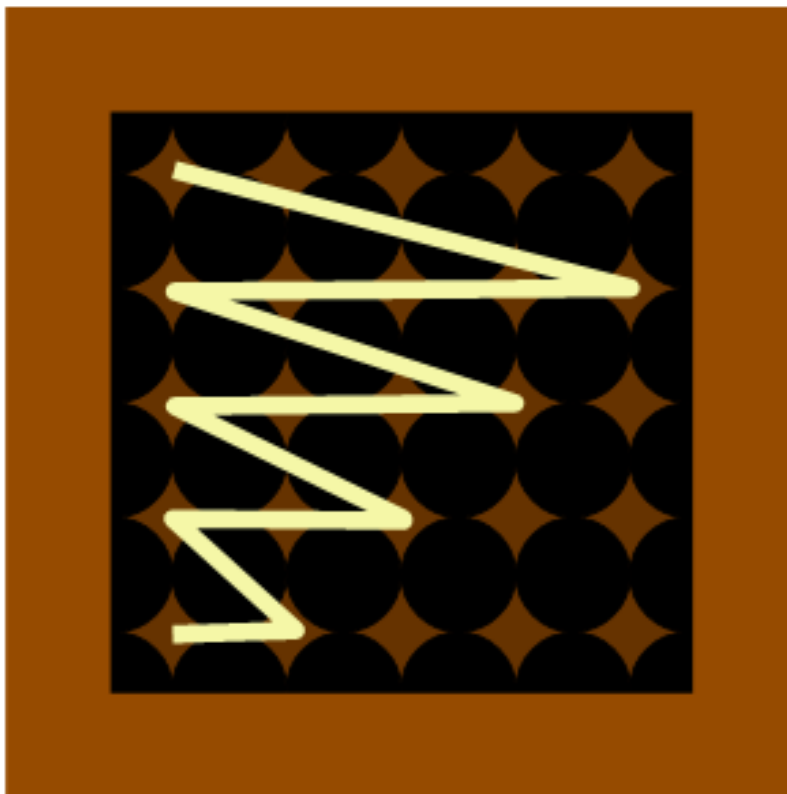


## Pointy Spaghetti

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Once upon a time there was a plain chef that lived on the prairie. People came from far away to eat his pointy spaghetti which he prepared in various ways always ensuring that there was no overlap... but by far his favourite dish was the **solitary spaghetti snack**, which he prepared by laying a pointy spaghetti on a 5x5 plate so that the distance between successive points increased:

One day, a wise old woman hobbled into the store, sat down on a stool, and ordered the **solitary spaghetti snack** with 10 points (including the two ends). The plain chef scratched his head. He had made dishes with 9 points, but never 10. Luckily for him, you were on a stool close-by and had overheard the conversation.



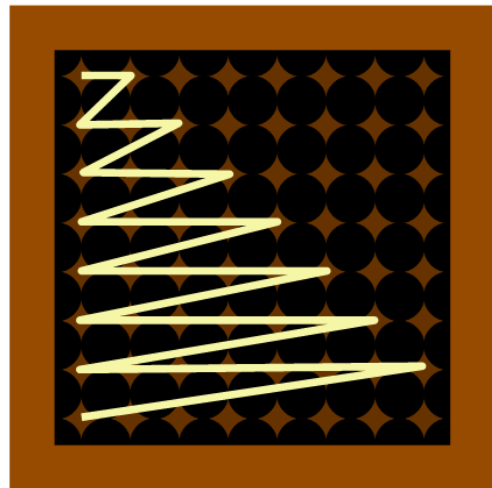
Each point must be in the centre of a diamond region formed by the circles.  
This spaghetti has 9 points. **Hint**

## Extensions:

- By the time the plain chef had figured out how to make a 10 point *solitary spaghetti snack*, the wise old woman was very hungry and after eating the 10 point spaghetti immediately ordered a 16 point *solitary spaghetti meal* on an 8x8 plate.



A spaghetti with 14 points.



A spaghetti with 15 points.

Click [here](#) for a 16 point spaghetti hint.

Prove that for a plate of side  $N$  there that there always exists a spaghetti of at least length  $2N-1$ . Is this number usually the maximum?

### The Math in This Problem:

This brainteaser involves the analysis of lines, dimensions, and shapes. Using the knowledge they have of these fundamental notions of mathematics, students are faced with a problem involving patterns and deriving formulas to representing such patterns.