

Puzzle

- *Mini-golf* -



Materials:

- Video of the puzzle
- Pen and paper

The Puzzle

In golf, *par* is the number of strokes a good player normally requires to get the ball inside a particular hole.

For example, a par-two hole would typically require 2 strokes to get the ball inside the hole. However, the number of strokes can be greater or fewer than the indicated par. For example, for a par-three hole, it should take 3 strokes to get the ball in the hole, and that is what a good player would play. But, it can be done in 2 or 4 strokes.

The mini-golf of Mathville is an 18-hole mini-golf course.

Nine of the 18 holes are par-two holes and the other nine are par-three holes.

Michael has just completed the mini-golf course. Even though he **never equaled the par assigned to each hole**, he played as well as a good player would, and overall hit **a total of 45 strokes**. He also got **one hole-in-one**.



What is the minimum number of holes Michael played in 3 strokes?

Puzzle Solution (continued)



To have a total of 45 strokes, we must add a total of 2 more strokes to one or more holes. Here are the different possibilities:

- If we add 2 strokes to a hole that was played in 2 strokes, we get a hole played in 4 strokes. We would then have 8 holes played in 2 strokes, 8 holes played in 3 strokes, 1 hole played in 4 strokes, and 1 hole played in 1 stroke, for a total of 18 holes played in 45 strokes.

Par 2 1	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3
Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2

- If we add the 2 missing strokes to a hole played in 3 strokes, we would then get 1 hole played in 1 stroke, 1 hole played in 5 strokes, 7 holes played in 3 strokes, and 9 holes played in 2 strokes, for a total of 18 holes played in 45 strokes.

Par 2 1	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3
Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2

- If we add the 2 missing strokes to 2 different holes played in 3 strokes, we would get 1 hole played in 1 stroke, 2 holes played in 4 strokes, 6 holes played in 3 strokes, and 9 holes played in 2 strokes, for a total of 18 holes played in 45 strokes.

Par 2 1	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3	Par 2 3
Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2	Par 3 2

Now, we cannot take off one stroke from the holes that were played in 3 strokes, because they are par-two holes and Michael **did not play any of the pars assigned**. We also cannot take off 2 strokes from a hole that was played in 3 strokes, because that would mean that Michael would have done more than one hole-in-one.

Thus, we can conclude that the minimum number of holes played in 3 strokes is 6.