<div align="center">

G4G's Celebration of Mind presents:

Top Ten Martin Gardner Brainteasers
www.martin-gardner.org

</div>

Here are ten great brainsteasers popularized by prolific and influential writer Martin Gardner (1914-2020), which can be found in books of his ranging from *The Arrow Book of Brain Teasers* (Scholastic Book Services, 1959) to *My Best Mathematical and Logic Puzzles* (Dover, 1994). Some also appeared in his famous *Scientific American* columns.

A basic knowledge of mathematics, logic and physics—not to mention a little common sense and some fearless experimentation—will enable you to solve them all correctly.

But be careful: each comes with its own "Aha!" moment, that wonderful realization one has when making a breakthrough on a problem that seemed challenging just a bit earlier. Several of these brainsteasters naturally lead to further exploration for those who are curious.

The names assigned are new. Several of the images are courtesy of ThinkFun/Puzzles.com.

1. **The hole truth:** Imagine heating a metal ring enough so it expands. What happens to the hole, does it get bigger, smaller or stay the same size?


2. **Either/Or:** A logician visits a distant planet inhabited by two groups of aliens, compulsive liars and faithful truth-tellers. She comes to a fork in a road—one road goes to the left, the other to the right. She meets two aliens there, one a liar, the other a truth-teller... but she doesn't know which is which. The logician must ask just one Yes/No question to discover which road she should take to reach their leader. She thinks for a moment and then successfully asks her question. What question might she have asked?

3. **Triangles:** What angle is made by the two red lines drawn on the two sides of this cube?
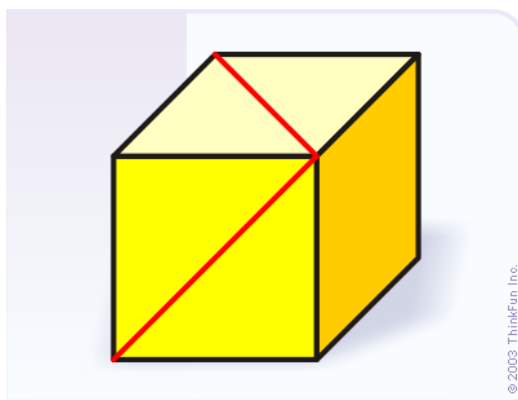
4. **Escalating simplicity:** Two identical bolts are placed together so that their helical grooves intermesh as shown.
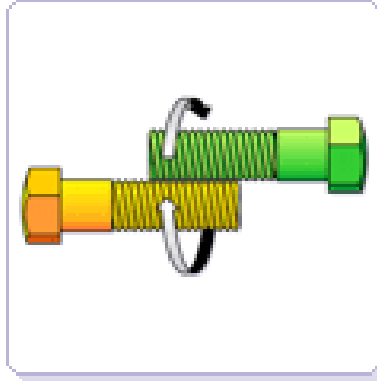
Now move the bolts around each other as you would twiddle your thumbs, holding each bolt firmly by the head so that it does not rotate and twiddling them in the direction shown. Will the heads move inward, move outward, or remain the same distance from each other?

5. **Five easy pieces:** Cut up a 7 by 7 square as shown on the left, to get five pieces.
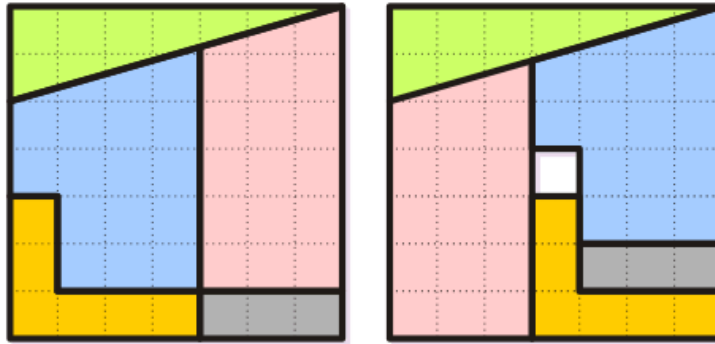
Rearrange these five pieces in the manner shown on the right. It seems that a hole appears in the center of the square! The square on the left is made up of 49 smaller squares, and the square on the right has only 48 small squares. Which small square has vanished and where did it go?
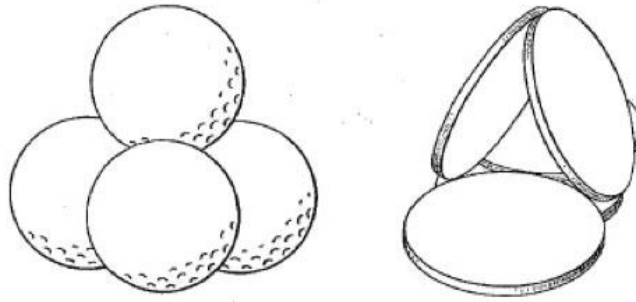
6. **Funny fold:** A large capital letter has been cut from a sheet of paper and given a single fold.
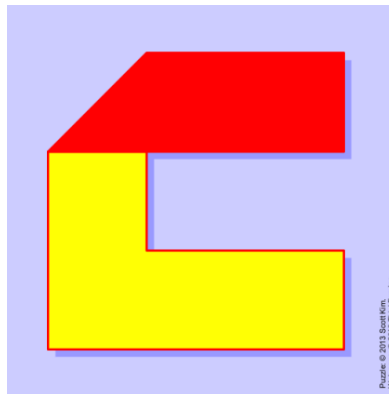
Of course, the letter could have been an L, but that is *not* what was cut out. What letter is it?

7. **Sixes and sevens**: Four golf balls can be placed so that each ball touches the other three, whereas five half-dollars can be arranged so that each coin touches the other four.

Arrange six cylinders, e.g., pencils, so that they all touch each other. Now repeat for seven pencils! Bonus: Can seven infinite pencils—ones that stretch forever in both directions—be arranged so that each touches all the others? (Very hard, this was only solved in 2013.)

8. **Domino theory:** Imagine a standard 8 by 8 chessboard and a set of 31 dominoes, where each domino covers exactly two squares on the board.
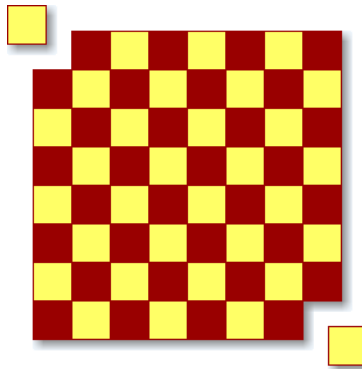
Suppose we cut off two squares at diagonally opposite corners of the board, as shown. Can the dominoes be arranged to exactly cover the 62 remaining squares? [Bonus: now suppose two squares of different colors are removed from an 8 by 8 board, for instance the top two corner squares. Show that the remaining 62 squares definitely can be covered with the 31. Can you construct a valid argument that works no matter which two squares of different colors are removed?]

9. **Don't sweat it:** Imagine that you are wearing a standard long-sleeved sweater. Your wrists are then tied together with a piece of rope.
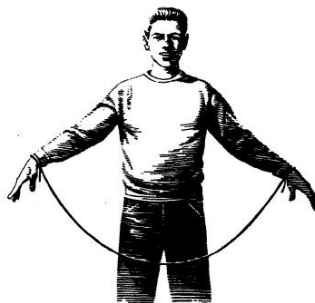

Figure out how to take off your sweater, turn it inside-out, and put it back on again! You can't untie or cut the rope, of course.

10. **Sock it to me:** Ten red sock and ten green socks are all mixed up in a drawer. They are exactly alike except for color. If you close your eyes, then open the drawer and take out socks without looking at them, what is the smallest number you can take out and still be absolutely sure that you have a pair of socks that match in color?