

Even and Odd Numbers : Solutions

puzzle #1

If you play the stars-and-squares game starting with 5 stars and 1000 squares, are stars still sure to win?

If you play the game starting with 201 stars and 201 squares, who will win?

if you play the game with 10 stars and 10 squares, will the same person win over and over again?

ANSWER TO PUZZLE 1:

a) We have an odd number of stars, which means we'll never be able to eliminate them. So, when there is one shape left, it must be a star!

b) Again, we are starting with an odd number of stars. Stars must win!

c) As you play the game the count of stars has to be even: 10 or 8 or 6 or 4 or 2 or 0. When we're at the point of the game where there is just one shape left, it must be that we have 0 stars. Squares win!

ANSWER TO PUZZLE 2:

Each turn changes the count of each shape by 1. Consequently, each turn changes an odd count of a shape to an even count, and each even count of a shape to an odd count.

We started with an even number of squares and odd counts of the other shapes. The even/oddness of count of the squares is always opposite that of other shapes. So, if you have counts of 0, 0, and 1 for the shapes, the 1 shape must be a square.

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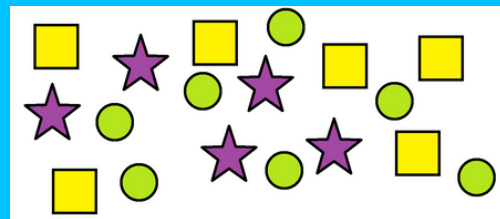
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puzzle #2

Here's another game. Start with 5 stars, 6 squares, and 7 circles on a page.



Each turn consists of erasing two different shapes and drawing in their place the third shape. (So, for example, if you erase a square and a star, you must draw a circle.) Your goal is to get down to a single shape. Can you? (And how do I know that if you do succeed you'll be left with a square?)