

One's Good but More's Better



NCTM Conference SF
April 15, 2016
with Michael Serra

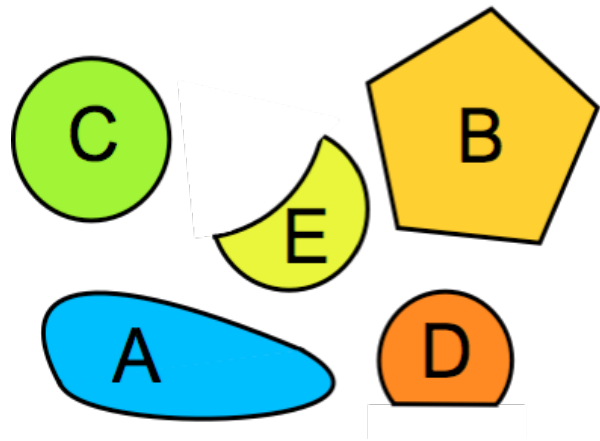
Finding the Oddball

Given the following set of numbers:

9 18 36 64 144

Which number does not belong with the others?

Of the five figures to the right, select the one that does not belong with the others?



Multiple Solutions

1. Sketch two different rectangles with a perimeter of 48.
2. Sketch two different right triangles with two sides of lengths 8 and 15.
3. Sketch two different quadrilaterals with angles measuring: 45° , 135° , 45° , 135° .
4. Find two linear equations passing through the point (2,3).
5. Find two different pairs of linear equations whose graphs are perpendicular.
6. Sketch two different squares with two of the vertices (0, 0) and (4, 2).

Mental Jogging

Each group member is to make a list of possible answers. Then group members share answers. Finally the group reaches consensus on the best two or three answers.

Sample Mental Jogging: List people you'd like to be stranded with on a desert island.

Mental Jogging task #1: List ways to tell if someone is a vampire.

Rearrangement Puzzles

$$62 - 63 = 1$$

- Add one segment to make a true statement.
- Do the same in a different way.
- Add one segment to make a true equation.
- Move one segment to make a true equation.
- Move one numeral to make a true equation.

Dice Puzzle

What is the sum of all the dots not visible as you walk around and observe the tower of dice (no touching/ no peeking)?

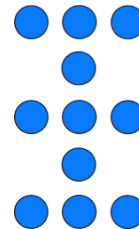
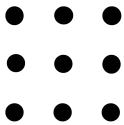
Four Four's Puzzles

Using exactly four 4's with the four basic operations, square root, and placing numbers next to each other (44), how many of the whole numbers can you create?

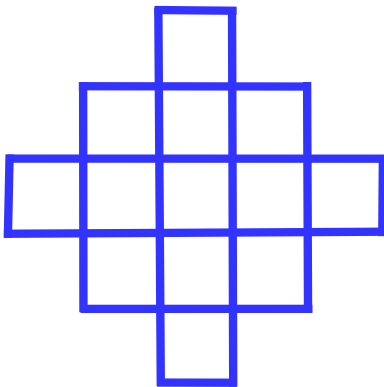
One Hundred Puzzles

Use the nine digits $\{1, 2, \dots, 9\}$ *in order*, along with the four basic operations $\{+, -, \times, \div\}$ to create an answer of 100. You may use parentheses, decimal points, placing numbers next to each other (such as 23 or 789), exponents, factorials, and the use of the square root symbol ($\sqrt{\quad}$).

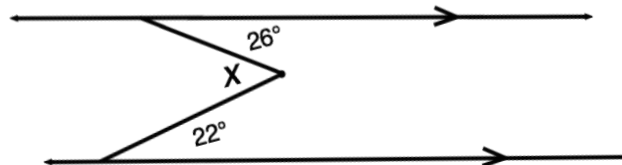
9-Dot Puzzle & How Many Dots?



How Many Segments



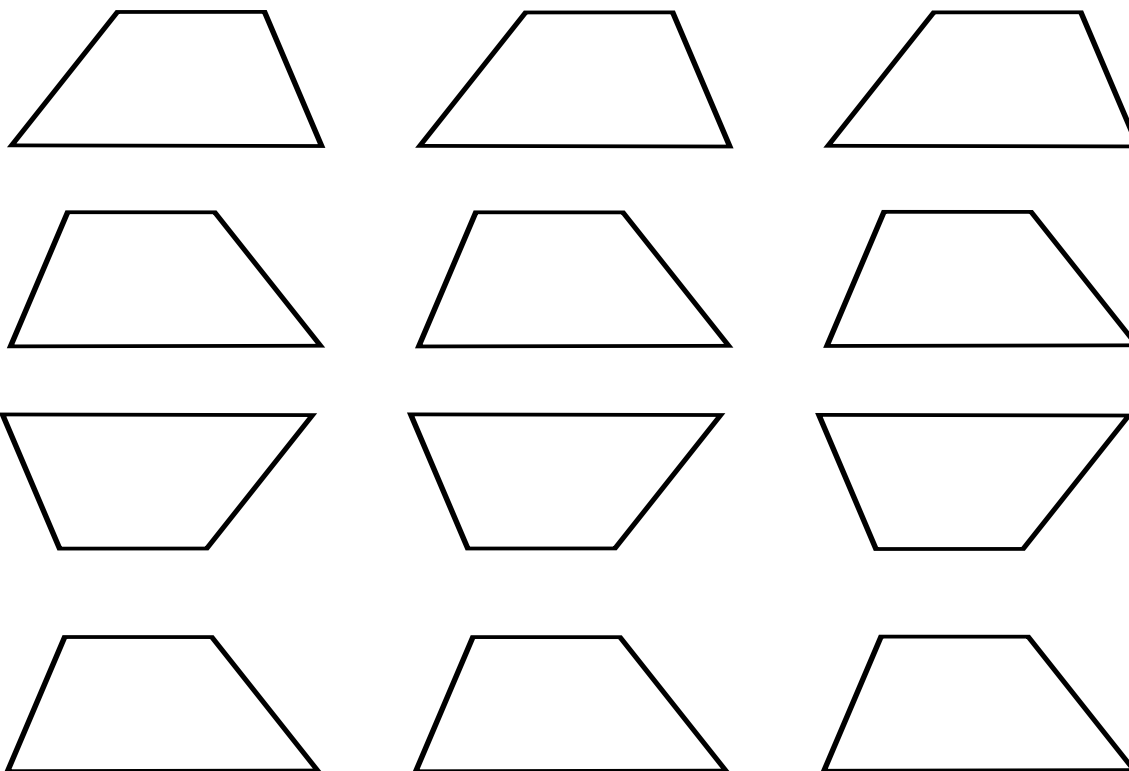
Find x



The Handshake Problem

How many handshakes at a party of n people if everyone shakes hands exactly once with everyone else there?

Area of a Trapezoid



Careful of Your Assumptions

The Reverend Terry Fallhard announced that Sunday he would perform a great miracle. He said that he would walk on the surface of the Hudson River without sinking into the water. A large crowd gathered to witness the event. The Reverend did exactly as he said he would. How did he manage it?

“Real-World” Problem Solving

Did you hear the one about the absent-minded commuter? It seems she always prepared her next day’s lunch the night before and placed it in the refrigerator for the next day. However half the time she would drive off to work and forget her lunch. After years of this forgetfulness, she finally developed a foolproof way to remember her lunch. How?

Resources

- *Discovering Geometry* 4th edition, Serra, Kendall Hunt Publishing
- *Patty Paper Geometry*, Serra, Playing It Smart 1994
- *Smart Moves*, Serra, Playing It Smart 2011
- *Pirate Math*, Serra, Playing It Smart 2014
- www.michaelserra.net