Number Please?

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Use the clues.

Figure out the phone number including the area code.

- All digits are different
- \( j = e^3 \)
- \( h \div g - c = e \)
- \( a + b = a \)
- \( h - i = a \)
- \( d, e, g, \) and \( i \) are prime numbers

Win the 2013 STEMATICIAN Award
Every time you send in solutions we keep track of your score.
Solutions due **January 10, 2013**.

**3 ways to submit:**

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Rectangle Ruckus

Dimension: 5-by-5

1. How many rectangles are hidden in the square? Remember all squares are rectangles.
   1 x 1?  2 x 2?  3 x 3?  4 x 4?  5 x 5?
   1 x 2?  2 x 3?  3 x 4?  4 x 5?
   1 x 3?  2 x 4?  3 x 5?
   1 x 4?  2 x 5?
   1 x 5?

2. Complete the table for number of rectangles in any n-by-n square.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Number of Rectangles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-by-1</td>
<td></td>
</tr>
<tr>
<td>2-by-2</td>
<td></td>
</tr>
<tr>
<td>3-by-3</td>
<td></td>
</tr>
<tr>
<td>4-by-4</td>
<td></td>
</tr>
<tr>
<td>5-by-5</td>
<td></td>
</tr>
<tr>
<td>6-by-6</td>
<td></td>
</tr>
<tr>
<td>n-by-n</td>
<td></td>
</tr>
</tbody>
</table>

Stack It!

How many different block towers can be made with:

• 5 blue blocks and 1 red block?
• 4 blue blocks and 2 red blocks?
• 3 blue blocks and 3 red blocks?
• 2 red, 2 blue and 2 green blocks?

Show the towers for each and label the colors B, G, or R.
Square Sums

All of these numbers can be expressed as a sum of two, three or four square numbers. What are those square numbers?

12 = ______________________________

15 = ______________________________

17 = ______________________________

24 = ______________________________

63 = ______________________________

86 = ______________________________

103 = ______________________________

10 = $1^2 + 3^2$

10 = $1 + 9$
Balzano is a puzzle that will tap into your logical reasoning abilities. Read the directions carefully, then try your hand at Balzano Shapes.

**Directions:**

Your job is to figure out the Desired Arrangement of three or more shapes from clues that provide information about the shapes and their locations. Same shapes may be used more than once in an arrangement. Each clue consists of two parts. The possible shapes are circle, square, triangle and hexagon.

The Arrangement Column shows sets of shapes in rows. In the Balzano below, the second row is arranged in order from left to right, square, triangle, triangle.

**Correct Shape in the Correct Place** identifies the number of shapes that are in the Desired Arrangement AND in the right place. The second row has no shapes that are in the Desired Arrangement and in the right position.

**Correct Shape in the Wrong Place** identifies the number of shapes in the Desired Arrangement that are the right shapes BUT not in the right places. There are two of these in the second row.

**Incorrect Shape** identifies the number of shapes that are not in the Desired Arrangement. There is one of these in the second row.

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Correct shape in correct place</th>
<th>Correct shape in wrong place</th>
<th>Incorrect shape</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ ■ ○</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>■ △ △</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>○ ○ ○</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>○ ○ ○</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>