Take the PRIME MATHgazine Junior Challenge! Solve the problems and send them in for a chance to become the GREATSTEMATICIAN OF 2012. Awards in July 2012.

Each answer is worth 5 points. Points are awarded for both creative ways to solve the problems and for correct answers. Solutions due **March 1, 2012**.

**3 ways to submit:**
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- **Fax:** 480-727-0910
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**What’s the Difference?**

Shapes can be:
- Large or Small
- Red, Blue or Green
- Triangle, Hexagon or Circle

The number of arrows tells how many ways each figure is different from the ones next to it.

Which figure belongs in the  ?  ?

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I. Blue  
   ![Blue Shape]  
   ![Blue Shape]  
   Red  
   ![Green Shape]  

II. Green  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  
   ![Green Shape]  

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Carole Greenes, Associate Vice Provost for STEM Education
Give Me a Line! Use all of the numbers in the rectangle. Fill in the blanks so that the story makes sense.

1. The Goldsmith family went on a fishing trip to Crystal Lake. They drove an average of ________ miles per hour for ________ hours. They drove a total of ________ miles to get to the lake. The Goldsmiths’ car gets an average of ________ miles to the gallon of gasoline. The one-way trip to the lake used about 4.5 gallons of gasoline.

2. When they reached the lake, they stopped at the Bait and tackle Shop. The shop sells ________ worms for $2.5 and 1 pint of bait for $________. The Goldsmiths bought ________ dozen worms for $________ and ________ pints of bait for $2.50. They spent $________ in all.

3. The shop rents boats for $________ for the first half-hour and $________ for each additional half-hour. The Goldsmiths rented a boat from ________ o’clock in the morning to ________ o’clock in the afternoon for a total of 8 hours. The boat rental cost $________ in all.

4. The Goldsmiths caught a total of ________ fish. The largest bass they caught weighed ________ pounds ________ ounces, or a total of ________ ounces. Their bass weighed 9 pounds 14 ounces less than the heaviest bass ever caught. The heaviest bass ever caught weighed ________ pounds and ________ ounces.
Toss It!

You have two number cubes numbered 2-7.

I. What is the probability that when you roll the cubes, the sum of the numbers on the top faces will be
   1. greater than 9?
   2. less than 7?
   3. equal to 12?

II. What is the probability that the product of the two numbers will be a
    1. square number?
    2. cubic number?
    3. triangular number?

Puzzling Paper

You open a section of the Sunday paper and pull out a page from the paper. The numbers 8 and 21 are on the same sheet of paper.

How many pages are in that section of the newspaper?
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. 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, hexagon, circle, triangle.

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

**Correct Shape in the Wrong Position** identifies the number of shapes in the Desired Arrangement that are the right shapes BUT not in the right positions. There are 2 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>
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<td>△ ⬟️ ⬜️</td>
<td>2</td>
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<td>1</td>
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<tr>
<td>△ □ ⬜️</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>3</td>
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<td>0</td>
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