Box It

Four same-size large boxes have different weights. Use the balance pan to compare their weights. What is the fewest number of weighings needed to be able to order them from heaviest to lightest?

Take the PRIME MATHgazine Challenge! Solve the problems and send in your solutions for a chance to become the GREAT STEMATICIAN OF 2014. Awards in July 2014. Submissions for this issue are due November 30, 2013.

3 ways to submit:
Email: lesley.le@asu.edu
Fax: 480-727-0910
Mail: Lesley Le, Editor at PRIME Center MATHgazine PO Box 875703 Tempe, AZ 85287-5703
Peculiar Patterns

Row 1 1 2 3 2 1
Row 2 1 2 3 4 3 2 1
Row 3 1 2 3 4 5 4 3 2 1
Row 4 1 2 3 4 5 6 5 4 3 2 1

This row pattern continues.

1. The middle number of Row 30 is: ___________.
2. The middle number of any Row (R) is: ___________.
3. The sum of the numbers in Row 30 is: ___________.
4. The sum of the numbers in any Row (R) is: ___________.

Mark Down

The original price of two sweaters differ in price by $1. The sweaters are marked down to the same sale price. The red sweater was reduced 25%. The blue sweater was reduced 20%. What was the sale price?
Related Rights

The lengths of two legs of Right Triangle A are 36 and 77 inches. Triangle B is similar to Triangle A. The hypotenuse of Triangle B is 190 inches.

What are the lengths of the legs of Right Triangle B?

Diagonal Diagnosis

What is the length of a side of a square whose diagonal is

1. \(4\sqrt{2}\) inches?
2. \(10\sqrt{2}\) inches?
3. \(7\sqrt{2}\) inches?
4. \(x\) inches?

Pouring Power

You have a:

- 20-cup jar filled with water
- 7-cup empty jar
- 4-cup empty jar

In 4 pours, can you be left with 12 cups of water in the 20-cup jar? Water can only be poured from one jar to another.
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 (the solution) of three or more shapes from clues that provide information about the shapes and their locations. The possible shapes are triangle, hexagon, circle and square. No shape is repeated.

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

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 shape that is in the Desired Arrangement and in the right place.

Correct Shape in the Wrong Place identifies the number of shapes in the Desired Arrangement that are the right shapes BUT in the wrong place. There are 2 of these in the second row.

Incorrect Color identifies the number of shapes that are NOT in the Desired Arrangement. There is 1 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>
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