Activity Sheet for the February, 2012, MATHCOUNTS Mini

Warm-Up!

Try these problems before watching the lesson.

1. A fair coin is flipped 37 times. What is the probability that the total number of heads is greater than the total number of tails? Express your answer as a common fraction.

2. Abby counts from 1 to 100 out loud. If the number Abby says is a multiple of 2, then Bob says, "Hi!" If the number Abby says is a multiple of 3, then Carol says, "Hi!" If the number Abby says is a multiple of 4, then Dave says, "Hi!" So, when Abby says 1, no one says, "Hi!" When Abby says 2, Bob says, "Hi!" When she says 3, Carol says "Hi!" When Abby says 4, Bob and Dave both say, "Hi!" How many times does "Hi!" get spoken in total as Abby counts from 1 to 100?

3. A number is a palindrome if it is the same written both forwards and backwards. For example, 282 is a palindrome, but 291 is not. What is the sum of all two-digit palindromes?

The Problem

First Problem: Two of the vertices of a regular octahedron are to be chosen at random. What is the probability that they will be the endpoints of an edge of the octahedron?
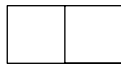
Second Problem: The L-shaped piece shown will be placed on the grid so that it covers exactly three unit squares of the grid. The sum of the numbers in the grid's covered three unit squares will be S. If rotating the L-shaped piece is permitted, what is the sum of all the values of S for all possible placements on this grid of the L-shaped piece?
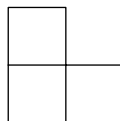
| 1	2	3
4	5	6
7	8	9

Follow-up Problems

4. There are 11 students in Ms. McGinn's Chemistry class, including the Baker triplets: Annika, Billy, and Catherine. The teacher calls all 11 students in random order one at a time to her desk to tell each student his or her final grade. What is the probability that Billy is the first of the triplets that she calls to her desk? Express your answer as a common fraction.

5. The numbers 1 through 8 are arranged to form an eight-digit number which is a multiple of 5. What is the probability that the number is greater than sixty million? Express your answer as a common fraction.

6. The domino shown will be placed on the grid so that it covers exactly two unit squares of the grid. The sum of the numbers in the grid's covered two unit squares will be S. If rotating the domino is permitted, what is the sum of all the values of S for all possible placements on this grid of the domino?

1	2	3
4	5	6
7	8	9
10	11	12

7. The tetromino shown below on the left will be placed on the grid so that it covers exactly four unit squares of the grid. The sum of the numbers in the grid's covered four unit squares will be S. If rotating the tetromino is permitted, what is the sum of all the values of S for all possible placements on this grid of the tetromino?

1	2	3
4	5	6
7	8	9
10	11	12
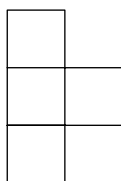
8. What is the sum of all three-digit numbers that are palindromes?

Wow! Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community (www.artofproblemsolving.com).