


Name: _____

Division E	Mathematical Olympiads FEBRUARY 5, 2008 <i>for Elementary and Middle Schools</i> 	Contest 4
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4A *Time: 3 minutes*

January 1, 1990 was a Monday. What day of the week was February 1, 1990?

4B *Time: 4 minutes*

In an election, Ethan got 5 fewer votes than Christopher, who got 3 votes more than Olivia, who got 4 fewer votes than Ava. How many more votes did Ava get than Ethan?

4C *Time: 6 minutes*

Mrs. Allen spends $\frac{3}{5}$ of her money at the grocery store. Next she spends $\frac{3}{5}$ of her remaining money at the gas station. She then has \$8.00 left. With what total number of dollars did Mrs. Allen start?

4D *Time: 7 minutes*

Jan and Nika ride their bikes. Jan rides at 5 miles per hour for 1 hour and then rides at 10 miles per hour for 30 minutes. Nika rides at a constant 8 miles per hour. The trips cover the same distance. For how many minutes does Nika ride?

4E *Time: 6 minutes*

In the multiplication shown, different letters represent different digits. What three-digit number does SAY represent?

$$\begin{array}{r} \text{SAY} \\ \times \quad 3 \\ \hline \text{BABY} \end{array}$$

**5A** *Time: 4 minutes*

A total of 20 marbles are placed into 5 cups. Each cup has a different number of marbles. No cup has exactly 4 marbles, and no cup is empty. What is the greatest number of marbles that any one cup can have?

5B *Time: 5 minutes*

Aidan writes the counting numbers in order. In Row 1, he writes the first number. In Row 2 he writes the next two numbers, and so on as shown. What is the thirteenth number in Row 16?

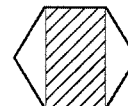
Row 1: 1
 Row 2: 2 3
 Row 3: 4 5 6
 ... and so on

5C *Time: 6 minutes*

Joshua has more than 250 toy soldiers. When he tries to arrange them in rows of 3, there are 2 left over. When he tries to arrange them in rows of 5, there are 2 left over. When he tries to arrange them in rows of 7, there are 2 left over. What is the least number of toy soldiers Joshua may have?

5D *Time: 7 minutes*

The figure shows a regular hexagon: all 6 sides are congruent to each other and all 6 angles are congruent to each other. The area of the shaded rectangular region is 60 sq cm. What is the area of the hexagon, in sq cm? (Hint: Draw the diagonals.)

**5E** *Time: 5 minutes*

In the sequence below, we add any two consecutive entries to get the very next entry. The last two entries are 37 and 60 in that order. The first entry is 4. How many entries are in this sequence in all?

4, ..., , 37, 60.



1A *Time: 3 minutes*

What is the value of the following?

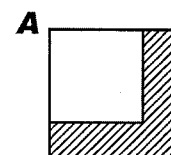
$$55 - 11 + 44 - 22 + 33 - 33 + 22 - 44 + 11 - 55$$

1B *Time: 5 minutes*

In all, how many two-digit prime numbers have 4 as one of their digits?

1C *Time: 5 minutes*

In the figure shown, two squares share corner A. The larger square has an area of 49 sq cm. The smaller square has an area of 25 sq cm. What is the perimeter of the shaded region, in cm?



1D *Time: 5 minutes*

Janine's number has three digits. One digit is a prime number. Another digit is a square number. The other digit is neither prime nor square. Her number is NOT divisible by 3. What is the greatest possible value of Janine's number?

1E *Time: 6 minutes*

In all, how many whole numbers between 400 and 600 are divisible by 9?