Registered School: Sycamore Ridge (SAN DIEGO CA)

Division **E** — Mathematical Olympiads for Elementary & Middle Schools — **November 14, 2022** — Contest **1**

Directions to Students: After all questions have been read by your PICO, you will have 30 minutes to complete this contest. You may not have a pen or pencil in your hand while the PICO reads the set of questions to the class. Calculators are not permitted. All work is to be done on the pages provided. No additional scrap paper is to be used. Answers must be placed in the corresponding boxes in the answer column.

Name: _____

1A What whole number is equal to 222 + 2022 + 2202 + 2220?

1B At Todd Morton's donut shop, mini-donuts are sold in boxes of 5, 10, and 20. What is the least number of boxes that must be bought to acquire exactly 95 mini-donuts?

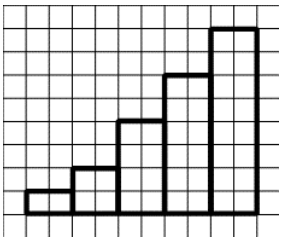
1C What is the greatest counting number that is a factor of both 96 and 120 but has no common factor with 105 other than 1?

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Name: _____

Answer Column
1A
1B
1C
1D
1E
Do Not Write in this Space. *For PICO's Use Only.* *SCORE:*

1D The figure shown was created when five rectangles were placed side by side. Each rectangle has a base of 2 cm. The heights of the five rectangles are 1 cm, 2 cm, 4 cm, 6 cm, and 8 cm. Compute the perimeter of the figure, in cm.



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1E The digits *a*, *b*, *c*, and *d* are used to form the 4-digit number *abcd*. How many 4-digit numbers have the following three properties?

(1) The digits *a* and *d* are the same.

(2) The digit *b* is less than any of the other digits

(3) The digit *c* has a value that is halfway between the digits *b* and *d*.

For example: 7357 is such a number.

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Registered School: Sycamore Ridge (SAN DIEGO CA)

Division **E** | Mathematical Olympiads for Elementary & Middle Schools | **December 5, 2022** | Contest **2**

Directions to Students: After all questions have been read by your PICO, you will have 30 minutes to complete this contest. You may not have a pen or pencil in your hand while the PICO reads the set of questions to the class. Calculators are not permitted. All work is to be done on the pages provided. No additional scrap paper is to be used. Answers must be placed in the corresponding boxes in the answer column.

Name: _____

2A Evaluate: 6789 – 678 + 5678 – 567 + 4567 – 456.

2B Maria is placing stakes in her garden in a straight line. The 10 stakes are equally spaced. The first and fourth stakes are 10 feet apart. How far apart, in feet, are the first and tenth stakes? [Ignore the width of the stakes.]

2C Ellie's favorite number is the least 3-digit number greater than 200 that satisfies the following conditions:

(1) it is a multiple of 6

(2) the sum of the digits is 9

What is Ellie's favorite number?

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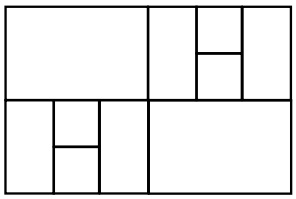
Name: _____

Answer Column
2A
2B
2C
2D
2E
Do Not Write in this Space. *For PICO's Use Only.* *SCORE:*

2D At the Orb Theater, there are 30 rows of seats. The first row has 20 seats, and each row behind the first has 2 seats more than the row in front of it. The last row has 78 seats. What is the total number of seats in the Orb Theater?

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2E How many rectangles (including squares) are in this diagram?



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Division **E** | *Mathematical Olympiads* **January 9, 2023** *for Elementary & Middle Schools* | Contest **3**

Directions to Students: After all questions have been read by your PICO, you will have 30 minutes to complete this contest. You may not have a pen or pencil in your hand while the PICO reads the set of questions to the class. Calculators are not permitted. All work is to be done on the pages provided. No additional scrap paper is to be used. Answers must be placed in the corresponding boxes in the answer column.

Name: _____

3A Ann and Andy are asked to evaluate 9 – (5 – 2). Ann evaluates the expression correctly. Andy evaluates incorrectly by ignoring the parentheses. Ann's answer is greater than Andy's answer by the number N. What is the value of N?

3B The number 2022 is a multiple of 6. Including 2022, how many 4-digit counting numbers of the form B0BB, where B is a digit and the second digit is zero, are divisible by 6?

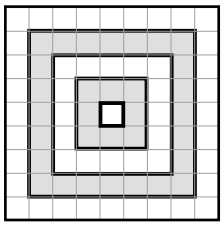
3C Lenny sold lemonade at a lemonade stand for $1.25 per cup. He had some change in the drawer at the beginning of the day, and that change was less than the price of one lemonade. At the end of the day, Lenny had $29.22 in the drawer. How many lemonades did Lenny sell that day?

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Name: _____

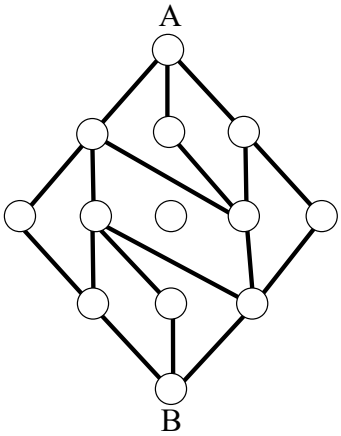
Answer Column
3A
3B
3C
3D
3E
Do Not Write in this Space. *For PICO's Use Only.* *SCORE:*

3D What fraction of the figure shown is shaded?
[Note: The figure is composed entirely of 1 × 1 squares.]



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3E Given the following diagram, how many different paths are there starting at A and ending at B while traveling along the given lines? Each step must move to the next lower row.



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Division **E** — *Mathematical Olympiads* **February 6, 2023** *for Elementary & Middle Schools* — Contest **4**

Directions to Students: After all questions have been read by your PICO, you will have 30 minutes to complete this contest. You may not have a pen or pencil in your hand while the PICO reads the set of questions to the class. Calculators are not permitted. All work is to be done on the pages provided. No additional scrap paper is to be used. Answers must be placed in the corresponding boxes in the answer column.

Name: _____

4A Find the following sum:

$$\begin{array}{r} 4\,3\,2\,1 \\ 5\,4\,3\,2 \\ 6\,5\,4\,3 \\ 7\,6\,5\,4 \\ 8\,7\,6\,5 \\ +\,9\,8\,7\,6 \\ \hline \end{array}$$

4B Jimmy, Kimmy, and Timmy are each thinking of a prime number. The product of Jimmy's and Kimmy's primes is 34. Kimmy's and Timmy's primes multiply to 85. What is the sum of their three prime numbers?

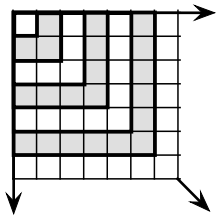
4C What is 1/2 of 2/3 of 3/4 of 2400?

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Name: _____

Answer Column
4A
4B
4C
4D
4E
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4D Part of a 10 × 10 grid is shown in the following diagram. If the pattern shown is continued for the remaining grid, N percent of the entire figure will be shaded. Find the value of the whole number N. [Do not include the percent sign.]



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4E Use the following 3 equations to determine the value of the last expression.

□ + Δ + ● + ● = 15

□ + Δ + Δ + ● = 19

□ + □ + Δ + ● = 14

What is the value of: Δ + Δ + Δ + □ + □?

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