Division **E**

Mathematical Olympiads
November 15, 2021
For Elementary & Middle Schools

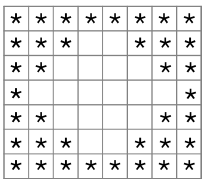
Contest **1**

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 Which whole number is equal to 1000 – 531 – 315 – 153?

1B How many stars '*' are there in the pattern shown?



1C The New York Nicks had a streaky season. They began by winning 4 games in a row, and then they lost 12 games in a row. After those 12 losses, they won every game, finishing with 3 wins for every 2 losses overall. How many games did they win after the first 16 games?

Copyright © 2020 by Mathematical Olympiads for Elementary and Middle Schools, Inc. All rights reserved.

Name: _____

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

–Page may be folded along dotted line.–

1D The least prime that is the sum of four different prime numbers is 17 because $17 = 2 + 3 + 5 + 7$. What is the least prime greater than 17 that is the sum of four different prime numbers?

–Page may be folded along dotted line–

1E In a video game, Brian collects ***unbreakable*** gems, each of which has its own value.
He earns 21 points when he collects 2 red gems and 3 yellow gems.
He earns 31 points when he collects 2 yellow gems and 3 blue gems.
He earns 23 points when he collects 2 blue gems and 3 red gems.
When Brian collects 2 red gems, 2 yellow gems, and 2 blue gems, how many points does he earn?

Registered School: MOEMS Test (BELLMORE NY)

Division **E**

Mathematical Olympiads
December 6, 2021
For Elementary & Middle Schools

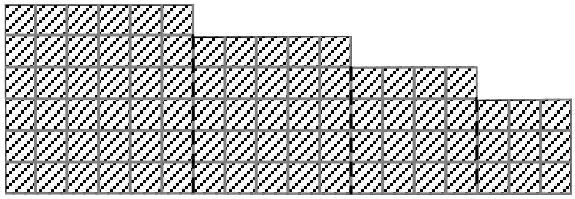
Contest **2**

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 1357 + 3571 + 5713 + 7135.

2B In the figure, four squares are placed on a grid whose small squares are each 1 × 1. What is the perimeter of the shaded figure?



2C On Main Street in Springfield, the first house is numbered 13, and each house number is 4 more than the house right before it. Jenny lives in the last house on the street. Her house number is 221. How many houses are on Main Street?

Copyright © 2020 by Mathematical Olympiads for Elementary and Middle Schools, Inc. All rights reserved.

Name: _____

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

–Page may be folded along dotted line.–

–Page may be folded along dotted line–

2D Exactly seven years ago, Sam was 5 times the age of Janet. Exactly two years ago, Sam was 3 times the age of Janet. What is the sum of their ages today?

2E The counting number *ABAB* is a multiple of 36. If different letters represent different digits, what is the greatest value *ABAB* can have?

Registered School: MOEMS Test (BELLMORE NY)

Division **E**

Mathematical Olympiads
January 10, 2022
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 What whole number is equal to $2 \times 3 \times 4 \times 5 \times 7 \times 25$?

3B Sarah wrote the whole numbers from 1 to 85 on a sheet of paper. How many times did Sarah write the digit 7?

3C Bert and Ernie are looking at their paper clip collections. Bert has 5 paper clips for every 3 paper clips that Ernie has. If Bert gives Ernie 12 paper clips, they will have the same number of paper clips. How many paper clips does Bert have?

Copyright © 2021 by Mathematical Olympiads for Elementary and Middle Schools, Inc. All rights reserved.

Name: _____

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

–Page may be folded along dotted line.–

3D A rectangle that measures 12 inches × 18 inches is cut into six identical squares by making three cuts. How many inches is the perimeter of one of those six squares?

3E Suppose that WARM – COLD = 6591 and each letter represents a different digit from 0 through 7. What is the greatest four-digit number WARM?

WARM – COLD 6591

–Page may be folded along dotted line–

Registered School: MOEMS Test (BELLMORE NY)

Division **E**

Mathematical Olympiads
February 7, 2022
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 Evaluate 987 – 876 + 765 – 654 + 543 – 432 + 321 – 210.

4B More than twenty people came to a sticker exchange. Every person brought the same number of stickers. Every person brought more than one sticker. In all, there were 141 stickers at the exchange. How many people came to the exchange?

4C The Fibonacci sequence 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, … is formed by summing two consecutive numbers to get the next number. The number after 55 is 34 + 55 = 89. A Fibonacci game cube has a different Fibonacci number on each face selected from the set {1, 2, 3, 5, 8, 13}. One red and one blue Fibonacci game cube are tossed together. How many of the 36 possible outcomes show a pair of numbers on the tops of the cubes whose sum is also a Fibonacci number?

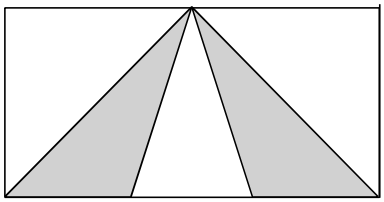
Copyright © 2021 by Mathematical Olympiads for Elementary and Middle Schools, Inc. All rights reserved.

Name: _____

Answer Column
4A
4B
4C
4D
4E
Do Not Write in this Space. *For PICO's Use Only.* *SCORE:*

–Page may be folded along dotted line.–

4D Jan is making a logo for her company. She begins with a 6-cm-by-12-cm rectangle. Two points along the bottom side divide that side into three equal pieces. A point on the top side divides that side into two equal pieces. The logo itself is the total shaded area, as shown. What is the area of the shaded logo, in square cm?



–Page may be folded along dotted line–

4E A palindromic number is a number that reads the same forwards as it does backwards (example: 282 or 51715). How many 5-digit palindromic numbers have digits that add up to 14?

Registered School: MOEMS Test (BELLMORE NY)

Division **E**

Mathematical Olympiads
March 7, 2022
For Elementary & Middle Schools

Contest **5**

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: _____

5A Evaluate 99 + 11 + 88 + 22 + 77 + 33 + 66 + 44 + 55.

5B How much greater than 21^2 is 22^2 ?

5C In a cryptarithm, each letter is assigned its own unique digit. In the cryptarithm shown (where MATH is 3 times FUN), FUN is a 3-digit number with its digits in consecutive and increasing order. What 3-digit number is FUN? [No leading digit can be 0.]

```
  F U N
  F U N
+ F U N
-------
M A T H
```

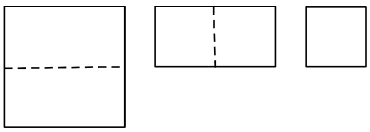
Copyright © 2021 by Mathematical Olympiads for Elementary and Middle Schools, Inc. All rights reserved.

Name: _____

Answer Column
5A
5B
5C
5D
5E
Do Not Write in this Space. For PICO's Use Only. *SCORE:*

–Page may be folded along dotted line.–

5D Start with a square as shown, whose perimeter is 800 inches. Penelope folds this in half along the horizontal dotted line. She then folds the result in half along the vertical dotted line shown, and so on, for some number of similar alternating folds (horizontal then vertical). How many folding-in-half steps does Penelope need to do in order to get the perimeter of the resulting quadrilateral to be 100 inches?



–Page may be folded along dotted line–

5E Express the given fraction below in simplest form.

$$\frac{3}{3+\frac{1}{3}}$$