Pi Math Contest Euler Division

Final Round - 2026

INSTRUCTIONS

1. DO NOT OPEN THIS BOOKLET UNTIL YOUR PROCTOR TELLS YOU!
2. This is a 25 question test. Each question has a *single-digit* answer: 0, 1, 2, 3, 4, 5, 6, 7, 8, or 9.
3. Before the test begins, complete all information fields on the Answer Form. Write **EULER** in the division field.
4. Write your answers to problems 1-25 clearly in the designated boxes on the Answer Form. Write numbers only (digits 0-9) and do not include units, words, or symbols.
5. Do not write outside the answer boxes, as marks outside the boxes may interfere with grading. Only answers written in the designated boxes on the Answer Form will be graded.
6. SCORING: You will receive 10 points for each correct answer, 1 point for each problem left unanswered, and 0 points for each incorrect answer.
7. Only pencils, pencil sharpeners, and erasers are allowed. Calculators are not allowed.
8. Figures are not necessarily drawn to scale.
9. When your proctor gives the signal, begin working on the problems. You will have **40 minutes** to complete the test.
10. After the exam, return your **Answer Form** to your proctor. You may keep the Test Booklet, and your scratch papers.
11. Problems and solutions to the test will be posted on the contest website after June 6th.

1. In a line of 80 people, the first 35 are dressed as superheroes and the last 36 are dressed for a vintage film night. How many people are in neither group?

2. A farmer plants a row of 7 apple trees, spaced equally apart. The distance from the first tree to the last tree in the row is 42 feet. How many feet apart are two neighboring trees?

3. Evaluate $4 \times (\frac{2}{3} + \frac{1}{4} - \frac{1}{6})$.

4. Elizabeth reads 75% of a 16-page magazine. Tom reads all but 40% of a comic book with 15 pages. How many more pages does Elizabeth read than Tom?

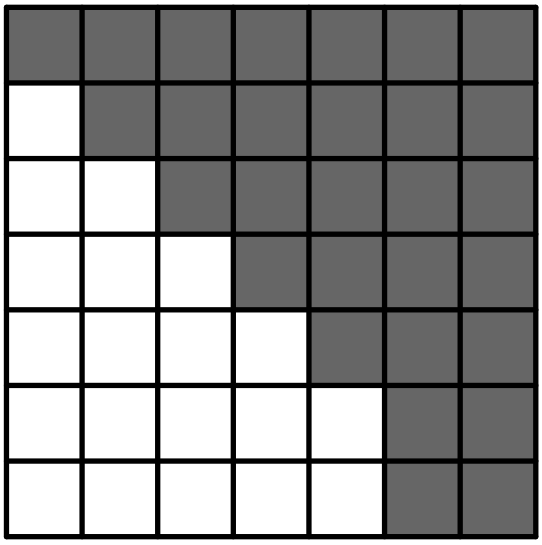
5. In the year 2026, Alex is 12 years old, his sister is 10, and his older brother is 17. After how many years will the sum of their ages be greater than 50 for the first time?

6. Walter cuts a square into three congruent rectangular pieces and rearranges them to form a wider rectangle. The perimeter of the new, wider rectangle is 40 units. What is the side length of the original square?

7. The average of four numbers is 6. Three of the numbers are 4, 5, and 6. What is the fourth number?

8. The product of a number and 4 is the same as the sum of the number and 12. What is the number?

9. In a 7×7 square grid, each unit square is either black or white. How many white squares must be changed to black so that the ratio of white squares to black squares becomes $2 : 5$?



10. Find the digit A such that the four-digit number $\overline{532A}$ leaves a remainder of 7 when divided by 9.

11. A gardener waters their plants using a sequence of sprinklers. A new sprinkler activates every 10 minutes and runs for exactly 25 minutes before shutting off. If the first sprinkler turns on at $t = 0$ minutes, how many sprinklers are actively running at exactly $t = 67$ minutes?

12. In the 3×3 magic square shown below, the numbers in every row, column, and diagonal sum to exactly 12.

?		5
8		
		7

Determine the value of the missing number, denoted by ?, in the upper-left corner.

13. A cookie recipe needs $\frac{3}{4}$ cup of flour, $\frac{1}{2}$ cup of sugar, and $\frac{1}{3}$ cup of butter per batch. A baker has 6 cups of flour, 5 cups of sugar, and 3 cups of butter. At most how many full batches can the baker make?

14. Consider the following infinite sequence, formed by repeating the pattern:

01234EULER56789

That is, the sequence looks like:

01234EULER5678901234EULER5678901234EULER56789 . . .

If this pattern continues indefinitely, what is the 2026th individual character (counting both numbers and letters) in the sequence?

15. In the figure below, five equilateral triangles are drawn inside a square such that their bases completely cover the top and bottom edges. This divides the square into white and black regions. If the total perimeter of the black region is 48, what is the side length of the square?

16. In the grid below, the numbers in every row, column, and diagonal form an arithmetic progression. Determine the value of the missing number, denoted by ?, in the upper-right corner.

10			**?**
	11		
		12	
22			13

17. A palindromic number reads the same forwards and backwards (for example, 121 or 343). How many three-digit palindromic numbers have a digit sum of exactly 15?

18. Steven and Todd are playing a game called *Evens and Odds*. In each round, both players simultaneously hold out either **1** or **2** fingers.

    - If the sum of their fingers is odd, Todd wins the round.
    - If the sum is even, Steven wins the round.

    The table below shows the outcomes of 25 rounds. The rows represent Todd's choices, and the columns represent Steven's choices. Each cell indicates how many times that specific combination occurred.

Todd \Steven	**1**	**2**
1	7	6
2	4	8

    What is the positive difference between Steven's total wins and Todd's total wins?

19. Hannah receives a weekly allowance of \$10. This year, the prices of goods increased by 25%, and her parents increased her allowance by 20%. By what percentage did the total amount of goods she can buy (her purchasing power) decrease?

20. On a circular space station walkway, there are 60 evenly spaced cleaning spots. Hank the robot needs to clean every spot, but he can only move clockwise in equal steps. He must choose a step size from 2 to 9 (inclusive). Starting at a random spot, he advances by his chosen step size and cleans the spot he lands on, continuing this pattern indefinitely. Which step size should Hank choose so that he eventually lands on and cleans all 60 spots?

21. Determine the pattern in the first three figures to find the missing top number in Figure 4.

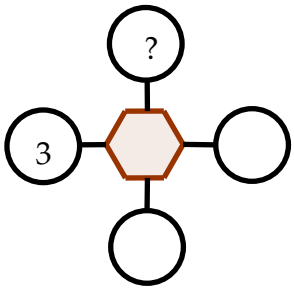


Figure 4

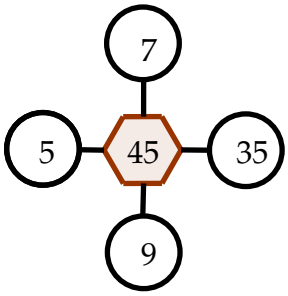


Figure 1

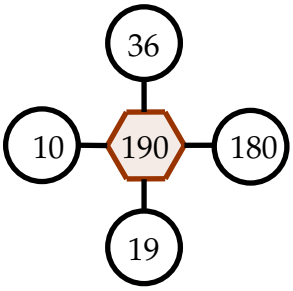


Figure 2

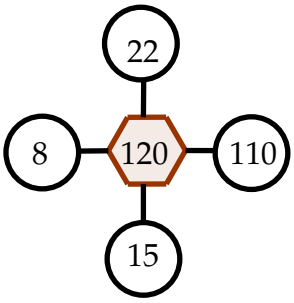


Figure 3

22. Akilan and Alex are playing a game with marbles. They each start with the same number of marbles. First, Akilan gives half of his marbles to Alex. Then, Alex gives half of his marbles to Akilan. Finally, Akilan gives 2 marbles back to Alex. If they both end up with the exact same number of marbles they started with, how many marbles did Akilan have at the beginning?

23. The product of three distinct positive integers a, b, and c is 60. Given that $a < b < c$, in how many different ways can the numbers a, b, and c be chosen?

24. Omer and Vera are playing a game of *Mastermind*. Vera has secretly chosen a 4-digit number with no repeated digits. Omer is trying to guess the number. After each guess, Vera tells Omer how many of the guessed digits are correct, and whether they are in the correct positions.
Below are Omer's first four guesses and Vera's responses:

Guess 1: Omer guesses `1234`.
Vera says: *"Exactly two digits are correct, but both are in the wrong positions."*

Guess 2: Omer guesses `5678`.
Vera says: *"Exactly one digit is correct, but it is in the wrong position."*

Guess 3: Omer guesses `6789`.
Vera says: *"None of these digits are in the secret number."*

Guess 4: Omer guesses `2450`.
Vera says: *"Exactly two digits are correct, and both are in the correct positions."*

Based on the information above, what is the first (leftmost) digit of Vera's secret number?

25. An alchemist needs to measure exactly 103 grams of a rare powder. He has an unlimited supply of 4-gram, 5-gram, and 6-gram weights. What is the difference between the largest number of weights and the smallest number of weights he can use to balance exactly 103 grams?