



RAMC 2024

Elementary II Individual Round

- **SCORING:** The first 10 questions are worth 1 point each, and the last 5 questions are worth 2 points each, for a total of 20 possible points.
- This round contains 15 questions to be solved in 45 minutes. All answers are integers.
- No computational aids are permitted other than scratch paper, graph paper, and a pen/pencil. No calculators of any kind are allowed.
- Fill out your information, and sign/initial the honor code on the answer sheet provided.
- If you believe there is an error on the test, submit a challenge to the proctors. Please include your name, level (E1/E2/MS/HS), and your solution to the problem with explanation.

Do not flip the page until the proctor begins the round!

1. Evaluate $2024 \div ((7 + 6 - 2) \times 8)$.
2. A factory produces 240 bicycles in 8 days. If the factory continues to operate at this rate, how many bicycles will it produce in 15 days?
3. A movie theater sells two types of tickets: adult and kid. Adult tickets cost \$12 each, and kid tickets cost \$8 each. On a particular day, the theater sold 50 tickets and earned \$440. How many kid tickets were sold?
4. Ana gives a test to her ten students. The first nine students score an average of 64 points. The tenth student scores 84 points. What is the average score of the entire class?
5. Yuchen, who is 7 feet tall, casts a 6-foot long shadow. At the same time, a tree directly next to him casts a shadow of 14 feet. How tall is the tree, in inches?
6. Exene is hiding 40 Zorgons in her basement. Zorgons have either triangular or square eyes, and either star-shaped or square feet. Of the Zorgons in Exene's basement, 25% have triangular eyes, and 50% have star-shaped feet. If 30% of the Zorgons have both square eyes and square feet, how many have both triangular eyes and star-shaped feet?
7. The third term of an arithmetic sequence is 63 and the fifth term is 111. What is the sum of its first 6 terms?
8. For a homework question, Golden has to multiply a two digit number by 6, then subtract 52, then divide by 2, and then finally add 3. He accidentally switches around the digits for the original two digit number, and he ends up with an answer of 160. If Golden had used the correct number, what would his answer be?
9. Zoe has 10 red socks, 11 blue socks, and 30 green socks in her drawer. She then grabs them out of her drawer one at a time without looking. What is the least number of socks that Zoe must grab to guarantee that she has grabbed a green sock?
10. Jackson has a 250 mL beverage bottle that is 15% orange juice and a 150 mL beverage bottle that is 55% orange juice. If Jackson mixes the contents of both bottles together, what percentage of the new mixture will be orange juice?

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11. Ben is sending the recipe to his “special sandwich” to the RMC Cafe. He sends the following message:
- “My special sandwich is exactly $\frac{1}{4}$ bread, $\frac{3}{9}$ turkey meat, and $\frac{1}{12}$ lettuce, by weight. It contains two grams of cheese for every gram of lettuce, and the last ingredient is special sauce from the Zumbro River.”*
- If the cafe wants to make a 24-ounce “special sandwich”, how many ounces of special sauce is required?
12. Matt writes out the numbers 2024, 2025, 2026, \dots , 2098, 2099. How many times does he use the digit 2?
13. There are x students at Mandy Elementary School. If the students are arranged in rows of 3 students each, there is one left over. If the students are arranged in rows of 5, there are no students left over. Finally, if the students are arranged in rows of 11, there are no students left over. If $150 \leq x \leq 300$, what is x ?
14. Felix and Jerry are painting a fence. Felix can paint the whole fence by himself in 6 hours, while Jerry can do it in 4 hours. How long will it take them to finish the fence if they work together, in minutes?
15. Kevin and Michael are playing a game with quarters on a table. They take turns removing either one or two quarters (but not zero) from the table. The winner is the person who removes the final quarter from the table. There is at least \$3 on the table to start the game, and both players play optimally with Kevin going first. What is the minimum number of quarters that must be on the table so that Kevin has a strategy to force a win?