



RAMC 2023

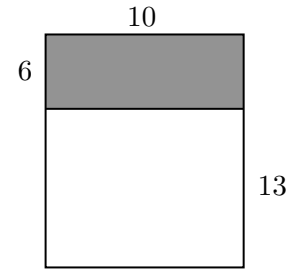
Elementary II Individual Round

- **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 (Elem I/II, MS, HS), and explanation of the problem and your solution.

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

1. Shannon is cutting shapes out of paper. She cuts a square with a side length of 12 inches. She wants to double the area of the square for the next one she cuts out. What is the area, in square inches, of her next square?
2. Evaluate $2023 \cdot (8 \cdot (31 + 5 - 3))$.
3. Billy is creating a seasoning blend, where the ratio of salt to pepper is 1 : 3. If Billy needs 164 grams of this seasoning to top his pizza with, how much pepper does he need?
4. Gerry the giraffe has 5 different shirts, 2 of which are black. He also owns 4 different pants, and 3 different hats. How many different outfits can Gerry create, if he must wear one of his 2 black shirts?
5. If $6x + 5 = 193$, what is the closest integer to x ?
6. A stop sign is a regular octagon and a speed limit sign is a rectangle. Rochester's speed limit signs have an area of 32 square inches, and one side of length 4 inches. Rochester's stop signs have the same perimeter as their speed limit signs. How many inches long are the sides of the stop signs?
7. There are 3 children, Aiden, Bethany, and Carl. When Aiden turned 14 years old, Bethany was 8 years old and Carl was 5 years old. What was the average of the ages of the children when Aiden turned 30?
8. Evaluate the product: $\frac{3}{2} \times \frac{4}{3} \times \frac{5}{4} \times \cdots \times \frac{2024}{2023}$.
9. Red bags contain 15 red balls, blue bags contain 12 blue balls, and yellow bag contain 9 yellow balls. Andrew has 1 red bag, 2 blue bags, and 3 yellow bags. He then pours out all his balls into a big box. If Andrew randomly pulls out a ball from the box, the probability that the ball is blue can be written as a fraction in simplest form, $\frac{a}{b}$. Find $a + b$.
10. There are 100 candies in a bag, that are either yellow or blue in color and round or square in shape. 45 of them are yellow, and 80 of them are round. If 30 of the candies are round and yellow, how many square blue candies are there?
11. On his test, Eric answered 80% of 40 English questions correctly, 75% of 60 Math questions correctly, and 98% of 50 Science questions correctly. If Eric answered $X\%$ of all the questions correctly, what is X ?

12. The board shown to the right has width 10, the shaded region has height 6, and the unshaded region has height 13. A dart is thrown randomly and lands on the board. The probability that the dart lands in the shaded region can be expressed as a fraction in simplest form, $\frac{a}{b}$. Find $a + b$.



13. Norah is running 3 kilometers (3000 meters). She runs the first 300 meters in 2 minutes. For every additional 300 meters she runs, her pace slows, and it takes 5 more seconds than the previous 300. Along the way, Norah takes a 15 second break to take a sip of water. How many seconds does it take Norah to finish?
14. There are 80 animals on a farm. If each cow gets to eat 24 pounds of hay, and each horse gets to eat 20 pounds of hay, how many cows are there if a total of 1744 pounds of hay are eaten?
15. A triangle has sides with lengths 20, 23, and x , where x is a square number. How many possible values of x exist?