

# RAMC 2021

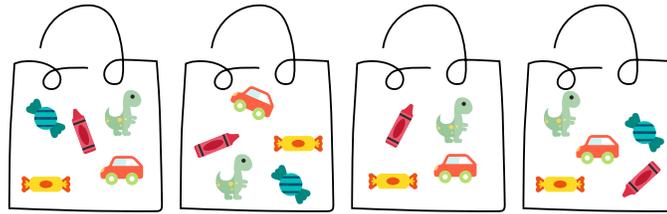
## Elementary I Individual Round

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- **SCORING:** The first 10 questions are worth 1 point each, and the last 5 questions are worth 2 points each.
- This round contains 15 questions to be solved in 45 minutes. Problems towards the end tend to be more difficult than problems toward the beginning.
- No computational aids are permitted other than scratch paper, graph paper, and a pen/pencil. No calculators of any kind are allowed.
- All answers are integers. When submitting answers, do not add additional characters (such as spaces or units) beyond pure numerical digits, with the exception of a minus (-) symbol when needed.
- If you believe there is an error on the test, submit a challenge to [rochestermathclub@gmail.com](mailto:rochestermathclub@gmail.com). Please include your name, level (Elem I/II, MS, HS), and explanation of the problem and your solution.

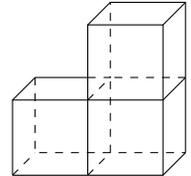
Take a moment to check that your information is entered correctly!

1. Lucy is filling gift bags with the same items in each bag. Which item is missing in one of the gift bags?



1. 2. 3. 4. 5.

2. Yelena is building a small staircase with blocks. It takes three blocks to build two steps. How many blocks will it take her to build five steps?

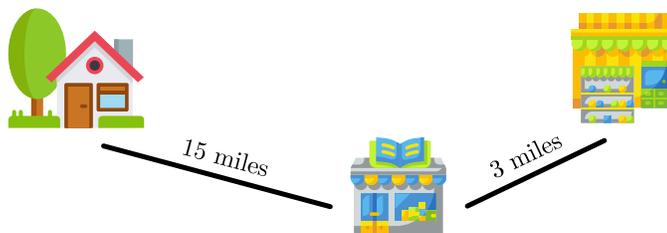


3. Toby placed stickers over some of the numbers in two problems of his math book, with the same stickers over the same numbers.

$$\begin{aligned} \text{snowflake} &= 3 \times 4 - 2 \\ 23 - 6 &= \text{magnifying glass} - \text{snowflake} + 7 \end{aligned}$$

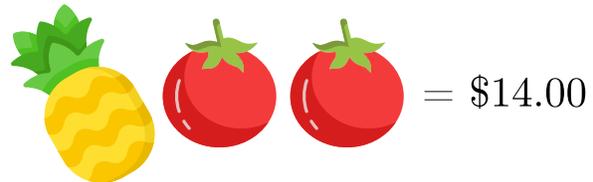
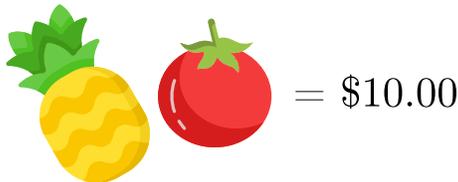
What number can be found under the sticker?

4. Three identical full jugs of juice weigh 5 pounds in total. Three empty jugs weigh only 2 pounds in total. Richard has a full jug of juice, one half-full jug of juice, and an empty jug. If the weight of all three bottles can be expressed as a mixed number in simplest form,  $a \frac{b}{c}$ , find  $a + b + c$ .
5. Sally lives on the same street as the local bookstore and the local grocery store. The map below shows the distances between (from left to right) Sally’s house, the book store, and the grocery store. Sally’s day consists of going from her house to the book store, then returning from the bookstore, then going to the grocery store, and finally going back home. What total distance does Sally travel on this day, in miles?



6. Maggie has 13 toys. Albert has 27 toys. How many toys does Albert have to give to Maggie in order for them to have an equal amount of toys?

7. The Rochester Forest Management (RFM) is planting trees in a recently developed area. They want to plant 150 trees in total. On the first day, they planted 80 trees. Each day after that, they planted half the amount of trees as the day before. How many days did it take for the RFM to finish planting all trees?
8. How much does a pineapple cost in the figure below?



9. Bob, Sally, Jason, Peggy, and April each choose a different number from the figure below. Jason's number is divisible by 3 and is larger than Sally's number. Bob's number is divisible by both 6 and 8. April's number is the closest to the the average of the 5 numbers (which is calculated by the sum of the five numbers, divided by 5). What number did Peggy choose?



10. Arden has some coconuts. He divides his coconuts equally into 3 medium piles. He then divides each medium pile equally into 4 small piles. He then removes 1 coconut from each of the small piles. Each of the small piles now has 3 coconuts. How many coconuts did Arden have to start with?
11. Sophie used letter blocks to spell out **MATH**. Some of the blocks were turned over. By rotating the "M" block two times clockwise, she can correct the letter M. If blocks have to be turned individually, how many times does Sophie need to rotate the blocks in this fashion for all the letters to be correct?



12. The numbers 5000, 2201, and 1031 have digits that add up to 5. How many 4 digit numbers have digits that add up to 3? *Digits are allowed to repeat.*

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13. Jack has a chocolate bar. He takes  $\frac{1}{2}$  of the whole bar and gives it to Jill who takes  $\frac{1}{2}$  of the remaining bar. Their friend Julian then takes  $\frac{1}{4}$  of the remaining bar. The amount of the original chocolate bar that remains after Julian takes his piece can be expressed by the simplest fraction  $\frac{p}{q}$ . Find the sum  $p + q$ .
14. Alfredo the bird was out catching worms. On every 13<sup>th</sup> attempt, he successfully catches a worm. In addition, on every 15<sup>th</sup> attempt, his friend Benito gives him 3 more worms for free. How many worms will Alfredo have after exactly 600 attempts?
15. Felix has 7 coins, 3 of which are currently heads up and 4 are tails up. In one move, Felix can use three fingers to flip any 3 coins to the other side at the same time. What is the least number of moves it takes for him to get all of the coins heads up?