



# RAMC 2021

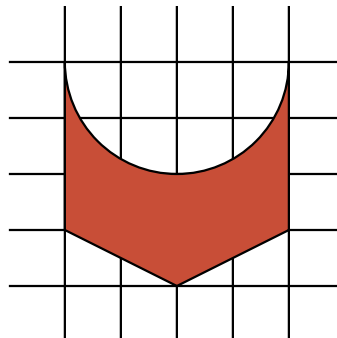
## Elementary II Team Round

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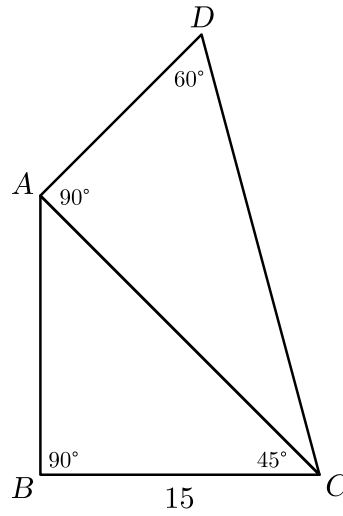
- **SCORING:** The first 5 questions are worth 2 points each, and last 5 questions are worth 3 points each.
- This round contains 10 questions to be solved in 25 minutes. Problems towards the end tend to be more difficult than problems toward the beginning.
- No computational aids are permitted other 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!

- Which of the shapes below has the largest interior angle?  
1. Regular Pentagon    2. Regular Hexagon    3. Square    4. Regular Octagon    5. Rectangle
- Tracy needs to buy some merchandise to sell at her store. She buys two carts that are \$50 each, three suitcases that are \$30 each, and a lamp that is \$10. The store Tracy is shopping at currently has a 25% discount on all items. Tracy also was the 100<sup>th</sup> customer that day, so she gets an additional 50% off her purchase. If Tracy plans to sell every piece of merchandise at \$30 each, what is her profit, in dollars, after she sells all 6 items?
- Harry is thinking of a number. Harry says that his number is a two-digit prime number, whose units digit is less than twice the tens digit. He also says that if you add 36 to his number, you would get his number, but digits reversed. What is the number that Harry is thinking about?
- The Rochester Clock Tower casts a 30-foot shadow. At the same time, a light post casts a 60-inch shadow. The height of the light post is 12 feet. Find the height of the clock tower, in feet.
- Sarah's salary in 1999 was \$200. In the beginning of 2000, her salary increased by 20% and in the beginning of 2001, her salary decreased by 20%. What is Sarah's salary, in dollars, at the end of 2001?
- Jason the race car driver is training for his next race. His training routine consists of driving on a straight 10 mile race track two times. The first time he goes on the track, he drives at a constant speed of 100 miles per hour. The second time, he gets an engine upgrade, and he is able to drive at a constant speed of 150 miles per hour. What is Jason's average speed, in miles per hour, for those two runs?
- When Natalie divides a number by 8, the remainder is 7. What is the remainder when Natalie divides three times the original number by 8?
- The grid below is composed of unit squares. If the area of the shaded region can be expressed as  $a - b\pi$ , find  $a + b$ .



9. If the length of side  $CD$  is  $a\sqrt{b}$  in simplest form, find  $a \times b$ .



10. How many ways can you move along the grid from point A to point B, if you can only move up and to the right, and you can not visit a point marked with a red dot?

