

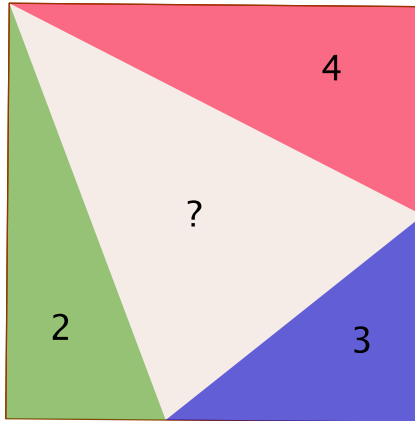
U.C. MATH BOWL 2020

LEVEL III — Session 1

Instructions: Write your answers in the blue book provided. Remember that even correct answers without explanation may not receive much credit and that partially correct answers that show careful thinking and are well explained may receive many points.

Have Fun!

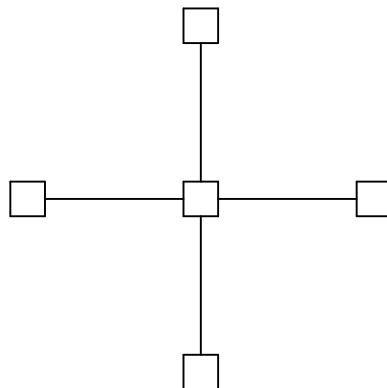
1. The big shape is a square. Can you replace the ? with a number so that the picture makes sense? Explain! Can you say how long some of the sides of the triangles are?



2. You go to a shop and buy three bags of candy. One has chocolates in it, one has licorice in it and the third has some of each. In an effort to be helpful the shopkeeper labels the bags as C, L, and CL but then admits that each bag is mislabeled. Explain how you can examine just one candy from one bag and correctly determine the contents of each of the three bags.
3. Suppose a and b are positive numbers with $a < b$. Arrange the following in increasing order:

$$\frac{b+1}{a}, \frac{b}{a}, \frac{b}{a+2}, \frac{b}{a+1}$$

4. For a set of 5 positive integers the mode is 1, the mean is 4, and the median is 5. What are these 5 numbers?
5. Using the numbers 2, 3, 4, 5, 6, 7 each at most once can you fill in the boxes so the sum of all the numbers in boxes in each line is the same? How many ways can you do it?



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LEVEL III — Session 2

Instructions: Write your answers in the blue book provided. Remember that even correct answers without explanation may not receive much credit and that partially correct answers that show careful thinking and are well explained may receive many points.

Have Fun!

1. How many integers from 1 to 100 have the property that the sum of their digits is divisible by 2?
2. Suppose that in the square shown below each box is filled with a positive number in such a way that the product of the numbers in each row, each column, and on each long diagonal are the same. A few numbers are shown. What number is in the lower-right corner?

	15	3
	9	
		?

3. The Titanic struck an iceberg at 11:40 PM on April 14, 1912 causing it to sink at 2:20 AM on April 15th. There 5280 feet in a mile.
 - (a) How many seconds elapsed between hitting the berg and sinking?
 - (b) The Titanic was 882.75 feet long. How many inches is that?
 - (c) The Titanic had a top speed of 28 miles per hour. At that speed approximately how long would it take the Titanic to pass by?
4. Out of 500 students at Diamond Middle School 200 are in the drama club 225 are in the physics club and 200 are in neither club. How many students are in both the physics and drama club?
5. Find positive integers A, B, C so that

$$A + \frac{1}{B + \frac{1}{C}} = 7.4$$