



KMMC 2

Karate Masters Mathematics Competitions 2

1st Annual

KMJJIME

Saturday, January 22, 2022



INSTRUCTIONS

1. Please don't open this booklet until you start the test.
2. This is a 15-question competition. All answers are whole numbers from 00 to 99 (including 00 and 99). Please make sure to put a 0 as the first digit for all single-digit answers! (For example, if your answer is 1, please write 01.)
3. Answer the problems by typing your answers on the KMJJIME Answer Form with a keyboard. Check the keys for accuracy and erase errors and stray marks completely.
4. SCORING: You will receive 1 point for each correct answer, 0 points for each problem left unanswered, and 0 points for each incorrect answer.
5. You can only use blank scratch paper, rulers, and erasers. Don't use anything else! No problems on the competition will require the use of a calculator.
6. Figures are not necessarily drawn to scale.
7. Before beginning the competition, your competition manager will not ask you to record your name and other information on the answer sheet.
8. You will have 50 minutes to complete the competition once you start the test.
9. When you finish the competition, don't sign your name in the space provided on the answer sheet.

If we find out you cheated, we will remove your score.

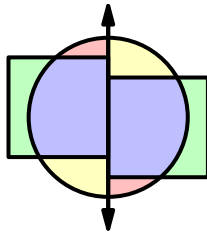
Please don't send the problems to someone else or talk about the problems before the contest is over, as it is cheating.

1. Ayaka has one-third the amount of money that Karate has, and Judo has one-fourth the amount of money that Ayaka has. If Karate has 72 dollars, find the sum of the amounts of money that Ayaka and Judo have, in dollars.
2. Seven years ago, Saya's age was half her brother's age. Saya is currently 15 years old. Find how many years old Saya's brother currently is.
3. For vacation, Karate wants to go to 20 total states in either the East or the West. He also wants to go to four more states in the East than in the West. Find the number of states in the West that Karate wants to go to.
4. Judo makes a 17-inch straw by gluing some 3-inch straws and 4-inch straws together. Find how many total straws (3-inch and 4-inch) Judo used.
5. Aki is hiking in a straight line. He passes the first trail marker after hiking for 3 total miles and passes the second trail marker after hiking for 11 total miles. If the spaces from one trail marker to the next are equal in length, find how many total miles Aki will have hiked once he passes the 11th trail marker.
6. Karate has four different whole numbers, where three of the numbers are 10, 7, and 12, and the other number is unknown. If Karate can split his four numbers into two pairs so that the sums of the two numbers in both pairs are equal, find the greatest possible value of the unknown number.
7. Karate glues together ten identical squares by their sides so that they line up exactly, and they form a rectangle with a perimeter of 132 inches, as shown in the picture. Find the area of one of the squares, in square inches.

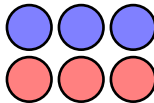


8. Karate currently has 84 pennies. Karate can trade five of his pennies for a nickel. After making some number of trades, Karate ends up with 64 coins (pennies and nickels). Find how many of these 64 coins are pennies.
9. Karate lies on his bed at 9:50 PM and falls asleep at 10:10 PM. He then sleeps for 25 minutes, and then he wakes up and reads a book for 15 minutes. Right after reading, Karate falls asleep again until he wakes up at 11:20 PM. Find how many minutes Karate was asleep from 9:50 PM to 11:20 PM.
10. Karate writes all of the whole numbers from 1 to 100 (including 1 and 100) on a sheet of paper. Then, Karate erases all numbers that are multiples of 3 from the paper. Then, Karate erases all numbers whose tens digit is equal to 2 from the paper. Find how many whole numbers are left on the paper.

11. Aki and Hanami each have a whole number from 1 to 20 (including 1 and 20). They only know that at least one of their numbers is odd. Aki says, "My number is less than 7, but it is greater than 4." Hanami says, "Then, I know that my number is at least three times as large as yours." Aki says, "Then, I know your number." Find the sum of Aki and Hanami's numbers.
12. Aki has two squares and a circle, where the area of the circle is twice the area of one square. He cuts the circle in half with a line and glues the squares on opposite sides of the line. In the picture, regions with the same color are identical. If the sum of the areas of 1 red, 1 yellow, 2 green, and 3 blue regions is $90\frac{3}{4}$ square inches, find the perimeter of one square, in inches.



13. Karate chooses two different whole numbers and writes their sum, their positive difference, and their product on a board. If there is exactly one even number on the board, and that number is equal to 72, find the sum of all possible values of the smaller of Karate's two numbers.
14. Karate, Judo, Naruto, Haruka, Ayaka, and Saya each stand on one of the six circles in the picture so that each circle has exactly one person standing on it. Find how many ways they can stand so that Karate and Judo both stand on blue circles, and Naruto and Saya stand on circles with different colors.



15. Karate has two whole numbers \square and \triangle such that

$$\square + \triangle = 2022 \quad \text{and} \quad 4 < \frac{\square}{\triangle} < 5.$$

Find the number of possible values of \triangle .



KMJJIME

DO NOT OPEN UNTIL SATURDAY, January 22, 2022

****Administration on an earlier date will disqualify your results.****

- All the information is not contained in the non-existent KMJJIME Teacher's Manual. PLEASE READ THE MANUAL BEFORE SATURDAY, JANUARY 22, 2022.
- Please don't send the problems to someone else or talk about the problems before the contest is over, as it is cheating.
- Please submit your answers to the Quilgo form if you are taking the 10-minute challenge mode.
- To take the traditional, 50-minute test, start the Quilgo and open the test link. You can just close out the Quilgo afterwards without submitting it. Instead, you have 50 minutes to send a private message on AoPS to **DeToasty3**, **pandabearcat**, and **pog**.

For more information about the KMJJIME and our other competitions, please visit
Wait, we don't have a website!

Questions and comments about this competition should be sent to:

DeToasty3, **HrishiP**, **pandabearcat**, and **pog**.

The KMJJIME contest was written by the KMMC 2 Committee:

DeToasty3, pandabearcat, & pog