



# KMMC 2

Karate Masters Mathematics Competitions 2

2nd Annual

# KMMC 2 A

Saturday, October 8, 2022



## INSTRUCTIONS

1. Please don't open this booklet until you start the test.
2. This is a twenty-five question multiple choice test. For each question, only one answer choice is correct.
3. Answer the problems by typing your answers on the KMMC 2 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 25 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.

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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. Karate has 4 pencils more than Judo. If Judo has 3 pencils, how many pencils does Karate have?

(A) 6      (B) 7      (C) 8      (D) 9      (E) 10

2. How many sides does the shape below have?



(A) 5      (B) 6      (C) 9      (D) 13      (E) 15

3. How many numbers between 5 and 15 are even?

(A) 2      (B) 3      (C) 4      (D) 5      (E) 6

4. When Yuzuko was exactly 2 years old, Yui was exactly 4 years old. If Yui is exactly 7 years old now, how many years old is Yuzuko now?

(A) 5      (B) 6      (C) 8      (D) 9      (E) 11

5. Aki and Fuyu each have 10 coins. After Aki gives Fuyu 3 of his coins, how many more coins will Fuyu have than Aki?

(A) 3      (B) 5      (C) 6      (D) 8      (E) 10

6. If the price of a shirt is between, but not exactly, 30 and 40 dollars, which of the following could be the price of 2 shirts, in dollars?

(A) 60      (B) 70      (C) 80      (D) 90      (E) 100

7. The number 7 is exactly between two numbers on the number line. If one of the two numbers is 1, what is the other number?



(A) 4      (B) 11      (C) 13      (D) 20      (E) 27

8. How many digits from 0 to 9 do **not** appear in the number 2023?

(A) 3      (B) 4      (C) 5      (D) 6      (E) 7

9. Karate is doing laundry. In his basket, he has 5 shirts, which each take 9 minutes to fold and 1 minute to put away. In how many minutes can Karate fold and put away all of the shirts?

(A) 20    (B) 30    (C) 40    (D) 50    (E) 60

10. Yuzuko writes each digit from 1 through 9 in the grid below. The sum of the numbers in each row is written. What is  $\Delta$ ?

		7	→ 14
9	2	$\Delta$	→ 17
	8		→ 14

(A) 1    (B) 3    (C) 4    (D) 5    (E) 6

11. Tomomi is counting stars. She counts 11 stars in the sky. Later in the night, she counts 8 stars in the sky. If she counted 4 stars twice, how many different stars did Tomomi count?

(A) 11    (B) 14    (C) 15    (D) 19    (E) 20

12. Yuri is counting sheep. She counts sheep in cycles of 7, and after counting 20 sheep, she will fall asleep immediately. On which cycle will she fall asleep?

(A) 1st    (B) 2nd    (C) 3rd    (D) 4th    (E) 5th

13. Yuzuko, Yui, Yukari, Aikawa, and Aisaka are counting in a circle in that order, starting from 1, until Yukari says 2023. Who said the number 2019?

(A) Yuzuko    (B) Yui    (C) Yukari    (D) Aikawa    (E) Aisaka

14. Ayaka has a bag of 37 marbles. If she adds 6 marbles to the bag every second, in how many seconds will the bag have 55 marbles in total?

(A) 1    (B) 2    (C) 3    (D) 4    (E) 5

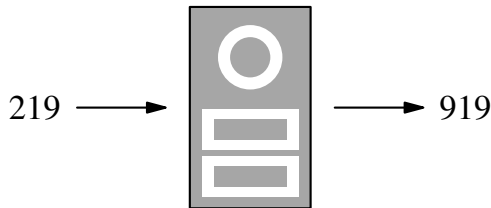
15. Which of these numbers will have a tens digit of 9 upon subtracting 12 from it?

(A) 122    (B) 231    (C) 1701    (D) 2011    (E) 2023

16. The calendar below has all the days of November. Karate wants to choose a day in November to hang out with his friend, Judo. He does not want to choose a day that is a Wednesday or a Friday, and he cannot choose a day when he already has an event, all of which are labeled in the calendar with a circle. How many possible days could Karate choose?

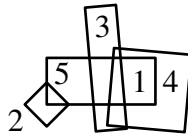
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

- (A) 16      (B) 18      (C) 19      (D) 21      (E) 25
17. A machine reads the digits of a number and replaces all occurrences of the digit 2 with the digit 9. (For example, putting the number 219 into the machine would output the number 919.) When put into the machine, how many different numbers would output the number 99?



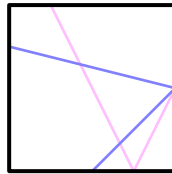
- (A) 1      (B) 2      (C) 3      (D) 4      (E) 5
18. Misa is coloring some pebbles during art class. After Misa colors 8 of the pebbles, Andrew throws away 5 of the pebbles, 2 of which are not colored. If Misa has an equal number of colored and not colored pebbles left, how many pebbles in total were there originally?
- (A) 8      (B) 10      (C) 11      (D) 13      (E) 15

19. What is the sum of the numbers **not** inside any square?



- (A) 2      (B) 6      (C) 8      (D) 10      (E) 15

20. A square is cut along the colored paths into seven pieces. How many of the resulting pieces are triangles?



- (A) 3      (B) 4      (C) 5      (D) 6      (E) 7

21. How many 3-digit numbers between 200 and 300 are there such that the sum of their digits is 11?

- (A) 8      (B) 9      (C) 10      (D) 11      (E) 12

22. Kenta has 1 walnut, 3 peanut, and 4 pineapple stickers. Ichiro has 2 grape, 1 melon, and some coconut stickers. Ichiro has fewer stickers than Kenta does, but if Kenta gave Ichiro his walnut sticker, then Ichiro would have more stickers than Kenta. How many coconut stickers does Ichiro have?

- (A) 2      (B) 3      (C) 4      (D) 5      (E) 6

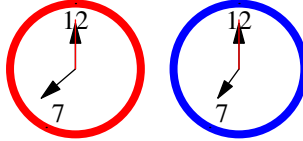
23. Karate, Judo, and Ayaka are in a line. Karate is in front of Judo, who is in front of Ayaka. If there are 7 people between Karate and Ayaka and 4 people between Judo and Ayaka, how many people are between Karate and Judo?

- (A) 1      (B) 2      (C) 3      (D) 4      (E) 5

24. There are 5 trains numbered 1 through 5 from front to back. Judo refuses to sit in a train with an even number, and Ayaka and Karate refuse to sit in a train with an odd number. Haruka wants to sit directly in front of Ayaka, and Karate wants to sit somewhere behind Saya. Who will sit in the back?

- (A) Karate      (B) Judo      (C) Haruka      (D) Ayaka      (E) Saya

25. Taiki has a red clock, which is accurate, and a blue clock, which gains 10 minutes more than the red clock each hour. In the morning, the red clock is set to 7:50, while the blue clock is set to 7:30. At which of the following times will the red clock and the blue clock show the same time?



- (A) 9:10      (B) 9:20      (C) 9:30      (D) 9:40      (E) 9:50



# KMMC 2 A

**DO NOT OPEN UNTIL SATURDAY, October 8, 2022**

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

- All the information is not contained in the non-existent KMMC 2 Teacher's Manual. PLEASE READ THE MANUAL BEFORE SATURDAY, OCTOBER 8, 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 five-minute challenge mode.
- To take the traditional, 25-minute test, start the Quilgo and open the test link. You can just close out the Quilgo afterwards without submitting it. Instead, you have 25 minutes to send a private message on AoPS to **DeToasty3**, **pandabearcat**, and **pog**.

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For more information about the KMMC 2 and our other competitions, please visit  
*Wait, we don't have a website!*

Questions and comments about this competition should be sent to:

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

The KMMC 2 contest was written by the KMMC 2 Committee:

DeToasty3, pandabearcat, & pog