



# KMMC 2

Karate Masters Mathematics Competitions 2

3rd Annual

# KMMC 2 B

Saturday, May 18, 2024



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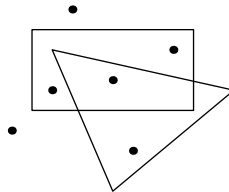
If we find out you cheated, we will remove your score.

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

1. How many of the six numbers below are greater than 12?



- (A) 2    (B) 3    (C) 4    (D) 5    (E) 6
2. How many numbers from 11 to 51 have a last digit of 3?
- (A) 2    (B) 3    (C) 4    (D) 5    (E) 6
3. Which of the following groups of numbers has a sum of 14?
- (A) 1, 12    (B) 2, 9    (C) 2, 3, 4    (D) 3, 4, 7    (E) 2, 3, 3, 4
4. Matsuri is thinking of a number. It has two digits, is even, and does not start with 4. Which of the following numbers could Matsuri be thinking of?
- (A) 5    (B) 13    (C) 42    (D) 68    (E) 124
5. How many dots are inside the rectangle?



- (A) 1    (B) 2    (C) 3    (D) 4    (E) 5
6. Sasazuka has to write a sentence for Japanese class. He has written 26 characters so far and needs to write 18 more before finishing. How many characters long will Sasazuka's sentence be?
- (A) 8    (B) 18    (C) 26    (D) 44    (E) 52
7. Nijika is riding her bicycle from home to school. On her way to school, she went to the cafe to eat for 16 minutes. If Nijika left home at 8:00 AM and arrived at school at 8:43 AM, how many minutes did Nijika ride her bicycle?
- (A) 27    (B) 37    (C) 43    (D) 47    (E) 59

8. Miu is 12 years old, and Nobue is 20 years old. When Miu is Nobue's age right now, how old will Nobue be?
- (A) 27    (B) 28    (C) 29    (D) 30    (E) 31
9. Ana has the number 89523. Which of the following numbers can be created by switching exactly two of the digits?
- (A) 23598    (B) 25389    (C) 38592    (D) 59823    (E) 82395
10. The word below has 11 Us, and the word UU does not appear in it.
- UGGUGGUGUGGGUGGGGUGUGUGUGGGUGGU
- How many times does the word GU appear?
- (A) 8    (B) 9    (C) 10    (D) 11    (E) 12
11. Ana and Matsuri are taking turns skip-counting by 7, starting with Ana saying the number 12, then Matsuri saying the number 19, and so on. What is the first number above 50 that Matsuri says?
- (A) 54    (B) 57    (C) 61    (D) 65    (E) 68
12. Every day, Satake eats at least 2 bowls and at most 4 bowls of food. Over five days, Satake ate 15 bowls of food. On at most how many of those days could Satake have eaten 4 bowls of food?
- (A) 1    (B) 2    (C) 3    (D) 4    (E) 5
13. Konata and Kagami are racing. Kagami starts 5 meters ahead of Konata. After one hour, Konata was 3 meters ahead of Konata. How many more meters did Konata run than Kagami?
- (A) 2    (B) 4    (C) 6    (D) 8    (E) 10
14. On her way to school, Ana saw five birds. On her way back home, Ana saw eight birds. If Ana saw exactly three birds twice, how many birds did Ana see only once?
- (A) 1    (B) 4    (C) 7    (D) 10    (E) 13
15. In a month with 30 days, how many days of the week appear 5 times?
- (A) 0    (B) 1    (C) 2    (D) 3    (E) 4

16. How many ways are there to order the numbers 1, 2, 3, 4 so that 2 is not next to 1 or 3?  
 (A) 2      (B) 4      (C) 6      (D) 12      (E) 18
17. Judo, Haruka, Ayaka, and Karate are standing in a square. In how many ways could they stand so that Judo is closer to Karate than to Ayaka?  
 (A) 4      (B) 8      (C) 12      (D) 16      (E) 24
18. Miu, Chika, Matsuri, Ana, and Nobue each have a different number from the list 3, 12, 17, 23, and 34.
- Miu does not have the largest number.
  - Matsuri's and Ana's numbers are the closest to each other.
  - Nobue's number is odd.

Which number does Chika have?

- (A) 3      (B) 12      (C) 17      (D) 23      (E) 34
19. The largest number Karate can think of has 8 digits. Each digit is bigger than the previous digit, and the sum of all of the digits in the number is 38. Which of the following digits is not in Karate's number?  
 (A) 3      (B) 4      (C) 5      (D) 6      (E) 7
20. Ryan's food stand serves cookies and soda. The table below shows the amount of sugar and price of one cookie and one soda.

Item	Sugar	Price
Cookie	5g	\$4
Soda	7g	\$5

- Taiki wants to spend at most \$16 with at least 14 grams of sugar. Which of the following options will Taiki like?
- (A) 3 cookies, 1 soda      (B) 5 cookies      (C) 1 cookie, 2 sodas  
 (D) 2 cookies      (E) 9 sodas
21. Ryan is forming two rectangles with blocks. First, he creates a red rectangle with  $\Delta + 1$  rows of  $\star$  blocks. Then, he creates a blue rectangle with  $\Delta$  rows of  $\star + 1$  blocks. If  $\Delta$  is larger than  $\star$ , how many blocks more does the blue rectangle have than the red rectangle?  
 (A)  $\Delta - \star - 1$       (B)  $\Delta - \star$       (C)  $\Delta - \star + 1$       (D)  $\Delta$       (E)  $\Delta + \star$

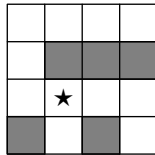
22. Miu has four numbers, of which two are equal to  $\square$  and the other two are equal to  $\triangle$ . When she adds three of the numbers, she gets 26, and when she adds all four of the numbers, she gets 38. What is the distance between  $\square$  and  $\triangle$  on the number line?

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

23. Four marbles weigh 1, 3, 4, and 6 pounds. Gorou puts two of the marbles in a red box and the other two marbles in a blue box so that both boxes weigh the same. If Gorou switches two of the marbles, the red box will weigh 4 pounds more than the blue box. Which of the following could be the number of pounds of the two marbles that Gorou switched?

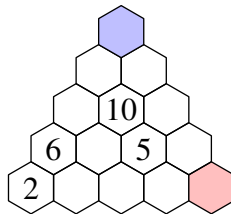
- (A) 1 and 3    (B) 1 and 4    (C) 1 and 6    (D) 3 and 4    (E) 3 and 6

24. Yui is walking in the grid below. Every move, she walks to one of the **white** squares that share a side with the square she is currently on. If Yui is currently on the square marked with  $\star$ , on how many different squares could Yui be standing after three moves?



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

25. In the diagram below, the number in each hexagon is equal to the sum of the numbers in the two hexagons below it. How much larger is the number in the blue hexagon than the number in the red hexagon?



- (A) 39    (B) 40    (C) 41    (D) 42    (E) 43



# KMMC 2 B

DO NOT OPEN UNTIL SATURDAY, May 18, 2024

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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, MAY 18, 2024.
- 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 <https://pogyou.github.io>.

Questions and comments about this competition should be sent to:

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

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

DeToasty3, pandabearcat, PandaMC, & pog