Spirit of Math®

Releasing the Genius®

GRADE 5

Spirit of Math International Contest 2024

INSTRUCTIONS

1. You have 60 minutes to write the contest.
2. The contest is multiple-choice with four choices for each question.
3. Write the CAPITAL letter of the answer you choose on the line to the right of each question.
4. Each question answered correctly is worth one mark, and the sum of the correct answers is the score.
5. Marks are not taken off for wrong answers.
6. No calculators or other counting tools are allowed.

Student Name: _____ **Score:** /40

1) $36 \div 6 - 8 + 10 = ?$

A) -4 B) 4 C) 8 D) 10 ____

2) Find the next number in the following sequence: 162, 54, 18, 6, ___ .

A) 0 B) 1 C) 2 D) 3 ____

3) There are 56 portions of food distributed to a local animal shelter. If each animal requires exactly four portions, how many animals can the shelter feed?

A) 12 B) 14 C) 16 D) 18 ____

4) A nine-sided dice is numbered consecutively starting with the number one. What is the probability of rolling an even number?

A) $\frac{4}{9}$ B) $\frac{1}{2}$ C) $\frac{5}{9}$ D) $\frac{2}{3}$ ____

5) On one snowy morning, the temperature was six degrees below zero. By noon, it had risen by 8°C. The temperature decreased 9°C by 6:00 p.m. and another 3°C by midnight. What was the temperature at midnight?

A) -10°C B) -8°C C) -1°C D) 14°C ____

6) How many different ways can you arrange the letters in the word "BUS", including the way that spells "BUS"?

A) 3 B) 5 C) 6 D) 7 ____

7) Elora is seven years younger than her sister Emira. In two years, Emira will be 13 years old. How old is Elora this year?

A) 2 B) 3 C) 4 D) 5 ____

8) How many whole numbers divisible by three are between $\sqrt{16}$ and $\sqrt{144}$?

A) 1 B) 2 C) 3 D) 4 ____

Space for rough work

9) A large square has been cut into nine smaller squares, as shown in the diagram. The area of the large square is 36 units^2. What is the area of the shaded part of the square?

A) 4 units^2 B) 5 units^2 C) 16 units^2 D) 20 units^2 ____

10) Your mom baked 18 raisin and 12 chocolate chip cookies. What is the ratio of chocolate chip to raisin cookies that your mom baked?

A) 2:9 B) 2:3 C) 3:4 D) 3:2 ____

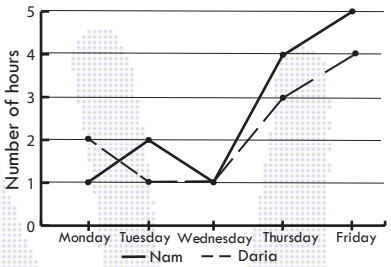
11) Which of these numbers is not a divisor of 3960?

A) 3 B) 8 C) 11 D) 13 ____

12) The distance between the towns of Lemziville and Old Rock is 600 km. The distance between Lemziville and New Mex is 15 times less than the distance between Lemziville and Old Rock. What is the distance between New Mex and Old Rock?

A) 500 km B) 530 km C) 540 km D) 560 km ____

13) Nam and Daria have been preparing for their school track and field competition. The graph shows the total number of hours each of them spent running throughout the week. How many more hours did Nam run than Daria from Monday to Friday?



A) 1 hour B) 2 hours C) 3 hours D) 4 hours ____

14) Consecutive numbers are numbers that follow each other in order, with a difference of one between any two adjacent numbers. For example, 3, 4, and 5 are consecutive numbers. Five consecutive numbers add up to 75. Which of the following is one of the consecutive numbers?

A) 10 B) 11 C) 12 D) 13 ____

Space for rough work

15) All 22 students in Mr. Lao's class went to a farm. Eleven students saw a horse and ten students saw a sheep. If five students saw neither a horse nor a sheep, how many students saw both a horse and a sheep?

A) 1 B) 4 C) 5 D) 6 ____

16) At a chocolate factory, a rice krispie is produced every 20 seconds and a truffle is produced every 24 seconds. If a rice krispie and a truffle are both produced at 9:15 a.m., at what time will they be produced together again?

A) 9:17 a.m. B) 9:18 a.m. C) 9:20 a.m. D) 9:23 a.m. ____

17) I am going fishing for one week. I need to buy enough fishing baits so that I can use five baits everyday for the entire fishing trip. If fishing baits are only sold in packages of 11, what is the fewest number of packages I need to buy?

A) 3 B) 4 C) 5 D) 7 ____

18) Daris added seven whole numbers together and noticed their sum was divisible by two. At most, how many of the numbers he added could have been odd?

A) 3 B) 4 C) 5 D) 6 ____

19) Fractions can always be written in decimal form. For example: $\frac{3}{11} = 0.\overline{27}$, where the bar above 27 indicates that 27 repeats indefinitely.

Find the 23rd digit of the decimal expansion of $\frac{3}{11}$.

A) 0 B) 2 C) 3 D) 7 ____

20) A class of 25 students took a history test. Ten students had an average of 85%. The other students had an average of 70%. What was the average score of the whole class?

A) 72% B) 75% C) 76% D) 80% ____

21) Calculate the sum of all different prime factors of 630.

A) 14 B) 16 C) 17 D) 20 ____

Space for rough work

22) Amina, Eric, and Peta are siblings. They are 10, 11, and 12 years old and they were born in January, April, and September, but not necessarily in this order. Peta's birthday is in April, Eric is 10 years old, and Amina's birthday is not in January. Furthermore, the person who does not celebrate a birthday in January or in September is not 12 years old. Based on the given facts, determine the age and the birth month of each of the siblings.

A) Amina is 10, born in September. Eric is 11, born in January. Peta is 12, born in April.

B) Amina is 11, born in September. Eric is 10, born in April. Peta is 12, born in January.

C) Amina is 12, born in September. Eric is 10, born in April. Peta is 11, born in January.

D) Amina is 12, born in September. Eric is 10, born in January. Peta is 11, born in April.

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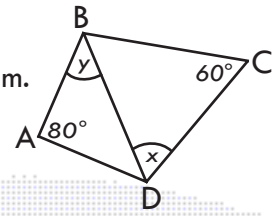
23) A kite is a quadrilateral with two pairs of equal sides. The measure of angles A and C in kite ABCD are 80° and 60° as indicated in the diagram. What is the difference between angles x and y?



A) 10° B) 15° C) 20° D) 30°

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24) Your math teacher Mr. Numeracy only knows how to communicate using numbers in place of letters of the English alphabet, such that the letter A is represented by 1, the letter B is represented by 2, the letter C is represented by 3, and so on. Yesterday, he had a message for your class: "20,8,5,18,5 23,9,12,12 2,5 1 20,5,19,20 20,15,13,15,18,18,15,23". What should you do when you get home?

A) Complete the assignment

B) Prepare for the school trip

C) Study for the Test

D) Work on the assigned project

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25) $(12 - 13)^2 - (-1 - 9)^2 \div (5 - -5) = ?$

A) –9 B) –1 C) 9 D) 10

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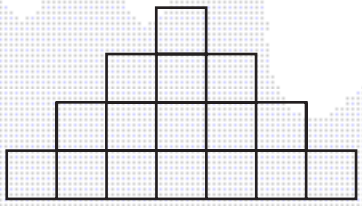
26) You want to build a monument in the shape of a square pyramid using identical cubes. If the diagram indicates both the front and the side view of the monument, how many cubes will you need to build it?



A) 16 B) 84 C) 86 D) 126

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Space for rough work

27) It takes Garima 45 seconds to fill a rectangular container with sugar. She has a second rectangular container that is two times larger in length and width than the first. How long will it take Garima to fill the second container with sugar?

A) 1.5 minutes B) 2.5 minutes C) 3 minutes D) 3.5 minutes ____

28) Ali gets his first part-time job at a supermarket. He works 24 hours per month and makes $15 per hour. At the end of month, Ali spends $90 on new headphones. What percent of his monthly salary does he spend?

A) 15% B) 20% C) 25% D) 30% ____

29) There are N number of people sitting equally spaced around a circle in order from 1 to N. The 10th person is directly across from the 58th person. How many people are sitting around the circle?

Hint: N can be any natural number!

A) 94 B) 95 C) 96 D) 100 ____

30) Lucy writes all the natural numbers less than 10 in her notebook. She then replaces two randomly chosen numbers with their product. She continues replacing two numbers with their product until there is only one number left in the notebook. What is the last digit of that number?

A) 0 B) 2 C) 4 D) 5 ____

31) Dana forgot the combination to her four-digit school locker. She knows the product of the digits is 1680. What is the sum of the digits of Dana's locker combination?

A) 26 B) 28 C) 31 D) 32 ____

Space for rough work

32) Beatrice has a unique counting machine that does the following: If the inserted number is a one-digit number, the machine doubles it. If a two-digit number is inserted, the machine finds the positive difference of its digits. Beatrice starts with the number 2 and she inserts the answer obtained back into the machine until the 100th number is inserted. What is the answer obtained by the machine after the 100th number is inserted? Which of the following would lead to finding the correct answer?

A) Keep doubling the number obtained by the machine two hundred times.

B) Keep adding two to each number obtained by the machine one hundred times.

C) Keep doubling the inserted numbers until a two-digit number is obtained. Then, keep subtracting the digits of the obtained numbers until the 100th number is entered.

D) Keep finding the machine outputs following the rules until the outputs start repeating.

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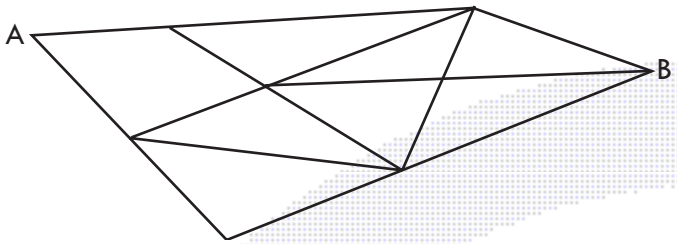
33) Always moving left to right, how many different pathways are there from A to B in the diagram below?



A) 11 B) 13 C) 15 D) 19 ____

34) A counting machine is printing the following sequence: 4^1, 4^2, 4^3, ..., 4^{155}. When each term is evaluated, how many terms in this sequence have 6 as their last digit?

A) 1 B) 77 C) 78 D) 154 ____

35) A dangerous comet is heading directly toward the Earth. To save the planet, scientists launched a rocket that should intercept the comet and destroy it. The comet travels at a constant speed of 3000 km/h and the rocket at a constant speed of 1200 km/h. Assuming that the rocket is heading directly toward the comet, how many kilometres apart are the comet and the rocket 30 seconds before impact?

A) 35 km B) 70 km C) 75 km D) 90 km ____

Space for rough work

36) A storage container in the shape of a rectangular prism can hold exactly two soccer balls where the balls are stacked on top of each other and are touching the sides of the container. If the height of the container is 60 cm, what is the surface area of one of the soccer balls stored in the container? (Hint: The surface area of a sphere is equal to four times the area of a circle with the same radius.)

A) 225π cm^2 B) 500π cm^2 C) 900π cm^2 D) 960π cm^2 ____

37) Two containers A and B with orange juice were placed beside each other. Some orange juice from container A was poured into container B, such that the amount of juice in container B doubled. Then, some orange juice from container B was poured into container A, such that the amount of juice in container A doubled. After this, both containers have 16 L of orange juice. How many litres of orange juice was originally in container A?

A) 12 L B) 16 L C) 20 L D) 22 L ____

38) A large rectangle is divided into four smaller rectangles. All rectangles have sides with integer lengths greater than one. The area of the large rectangle is 65 units^2. The perimeter of the top left rectangle is 14 units and the area of the bottom right rectangle is 24 units^2. What is the difference between the areas of rectangles P and Q?

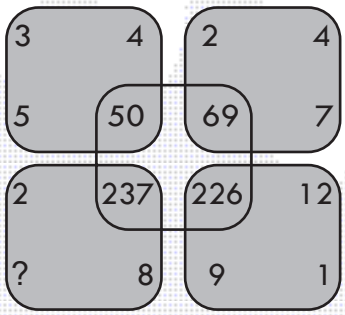
14 units	P
Q	24 units^2

A) 1 unit^2 B) 4 units^2 C) 5 units^2 D) 8 units^2 ____

39) How many more degrees does the minute hand of a clock travel than the hour hand in two hours and 25 minutes?

A) 790.5° B) 797.5° C) 815° D) 817.5° ____

40) The numbers in the squares follow a certain pattern. What is the missing number?



A) 11 B) 13 C) 15 D) 16 ____

Space for rough work