5th Grade Team Test Instructions
2025 James Clemens Math Tournament

1. Your team has 60 minutes to complete this exam. Four students from each grade level will participate in this round.

2. This exam consists of 15 free-response questions, each worth 10 points if answered correctly and 0 points if answered incorrectly or left unanswered.

3. Calculators, books, and other aides are prohibited during this examination. Scratch paper will be provided for calculations. Diagrams are not necessarily drawn to scale.

4. Mark your answers to the questions in the provided team answer sheet. You may use the test booklets for scratch work, but only answers marked in the team answer sheet will be counted. If you require additional scratch paper, simply raise your hand and a volunteer will assist you.

5. All answers for the team test will be an positive integer from 1 to 999.

6. A team's final score will be calculated by adding each school's top 4 written test scores per grade (excluding tie breaking questions) as well as the team round score, for a maximum of 550 points.

7. In the event of a tie, the team with the highest team round score will be favored. If team round scores result in another tie, answers will be evaluated starting backwards from question 15 to 1 to determine a winner.

8. Although this math tournament is intended to demonstrate your knowledge and skills in math, it is also a great opportunity for you to interact with your fellow peers, so be sure to enjoy yourself and have fun!

9. This test will be taken in teams of 4, with unofficial teams being able to compete (i.e., groups can take it for fun).

1. Jeffrey and Eddie are both painters. Jeffrey can paint a wall in 3 hours. Eddie can paint this same wall in 5 hours. If the time (in hours) it takes them to paint this same wall while working together may be expressed as $\frac{a}{b}$ (a and b are relatively prime), find $a + b$.

2. Let $A =$ the least common multiple of 25 and 40. Let $B =$ the number of times the digit 6 is written while writing all the numbers from 1 to 100. Let $C =$ the number of positive integral factors of 512. Find $\frac{A}{B \cdot C}$

3. Find the sum of the digits in the value of the expression $12345678 \cdot 99999999$.

4. Let $A =$ the length of the hypotenuse of a right triangle with legs of length 24 and 10 units. Let $B =$ the value of the expression $\sqrt[3]{1331}$. Let $C =$ the greatest common factor of 91 and 156. Let D $=$ the greatest common factor of 1331 and 132. What is the value of $\frac{A \cdot B}{C \cdot D}$.

5. Angela, Joshua, Caleb, Hubert, and Andrew randomly choose where they sit from a row of 5 seats. If the probability that Andrew and Hubert sit next together may be expressed as $\frac{a}{b}$ (a and b are relatively prime integers), what is the value of a^b.

6. If the area of the shaded area of the following figure may be expressed as $a - b\pi$. Find the sum of the least common multiple and greatest common factor of a and b.

4

4
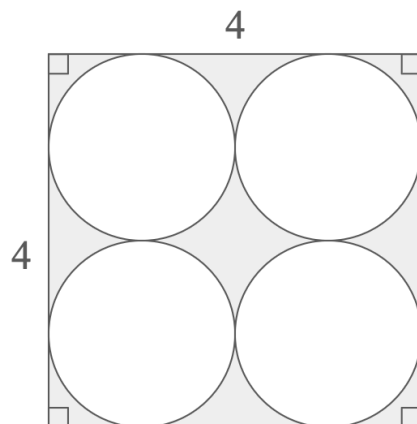
7. A palindrome is a number that has the same value even when the digits are reversed (i.e., 0, 11 and 121 are palindromes, but 21 is not). How many numbers from 1 to 1000 inclusive are palindromes?

8. If $\sqrt{2 + \sqrt{0 + \sqrt{2 + \sqrt{x}}}} = 2$, what is the value of x?

9. Vineet's instrument store has two types of instruments: clarinets and bassoons. A clarinet has a price of 3 dollars and a bassoon has a price of 5 dollars. Erik has some amount of money such that no matter how many clarinets or bassoons he buys, he will always have some left over money. What is the greatest amount of money Erik could have?

10. If $ab = 6, bc = 16, ac = 24$, what is the value of abc?

11. A 3-digit number n has a remainder of 3 when divided by 7, a remainder of 3 when divided by 9, and a remainder of 3 when divided by 11. What is the greatest possible value of n?

12. Let

$$A = \frac{2^{2024} \cdot 5^{2024}}{10^{1025}}.$$

What is the positive difference between the number of digits of A and the sum of the digits of A?

13. How many 3-digit numbers are divisible by 5 or 3 but not 15?

14. A magic square is a square grid of numbers such that the sum of the numbers in each row, column, and main (longest) diagonal are all the same. What is the sum of the numbers of each row in a 5 x 5 magic square?
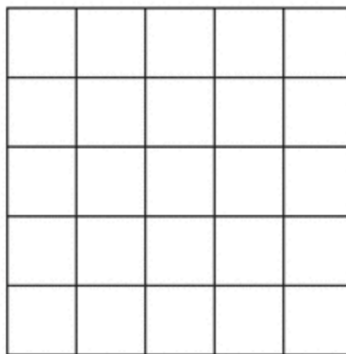
15. The time is between 3:00 PM and 4:00 PM, and Joshua notices that the smaller angle formed by the hour and the minute hand has a measure of 75 degrees. If the current time is $A : BC$, find $A + B + C$.