2024 MMU Spring Competition (K-2)

You will have 30 minutes to complete as much of this test as you can. There are 20 free response questions total, and questions are arranged roughly from easiest to most difficult. Units are not needed. Write answers on the given line below each question. Calculators are not allowed. Do not begin the test until told to do so. Good Luck!

Full Name: _____

Grade: _____

Age: _____

1. _____ letters How many distinct letters are in the word "why"?

2. _____ If $2x + 4 = 8$, what is x?

3. _____ inches The range of an F-15 jet is 15 feet. What is the range of an F-15 jet in inches? (1 foot = 12 inches).

4. _____ What is the sum of the digits of x if $x = 2,000,000,583,272$?

5. _____ Alice, Bobby, and Charlie are racing each other. If there are no ties, how many possible outcomes are there? (For example, Alice as first, Charlie as second, and Bobby as third counts as one possible outcome).

6. _____ What is 10 - 9 + 8 - 7 + 6 - 5 + 4 - 3 + 2 - 1?

7. _____ units A square has a side length of 4 units. A rectangle has a height of 3 units and a width of 6 units. What is the positive difference between the perimeters of the two shapes?

8. _____ What is 98765 - 43210?

9. _____ flies In a pond, there lives a frog named Fred. Every day, Fred eats two flies, except on the weekends, when he eats three flies. Over the course of two full weeks, how many flies does Fred eat in total? Assume the week starts on a Monday.

10. _____ When five times the number x is added to 23, we get the same result as when nine times the number x is reduced by one. What is x?

11. _____ A number is called *unique* if the number has exactly two digits and the tens digit is greater than the units digit by exactly 1. For example, 21 is *unique*, but 35 and 67 are not *unique*. How many *unique* numbers are there?

12. _____ Suppose the integers 1, 2, 3, and 4 are written on a blackboard. Brabus then chooses two digits to form a two digit number. His friend Mansory takes the remaining two digits and forms a second two digit number. For example, if Brabus picked the numbers 1 and 2, he could form either 12 or 21 as his number. This leaves Mansory with two options, 34 or 43 for his number. If the difference between Brabus' number and Mansory's number is 11, and Brabus' number is larger than Mansory's number, what is the sum of the digits of Brabus' number?

13. _____ units An octagon and a pentagon have the same perimeter. All of the sides of the octagon are equal in length and all of the sides of the pentagon are equal but a different length than the octagon. If the side length of the octagon is 10, what is the side length of the pentagon?

14. _____ songs Three guitarists, Wolf, Ludy, and Franz have decided to write songs for the community. Wolf plans to write three songs per week, Ludy plans to write four songs per week, and Franz decides to write five songs per week. They have agreed to each write songs at this rate for six weeks. However, Franz got distracted by the fascinating prospect of the piano after three weeks, and left to pursue his interests instead. If Wolf and Ludy kept to their promise, how many songs did all three artists release in total (including the three weeks that Franz was still interested in guitar)?

15. _____ When 27 is divided by an integer x, the quotient is 3 with no remainder. When x is divided by an integer y, the quotient is also 3 with no remainder. What is $x \cdot y$?

16. _____ The number 174 can be written as the product of three primes. What is the sum of the three primes? A prime number is a number whose only divisors are 1 and itself.

17. _____ words How many words can you make by rearranging the letters in MISSION? For example, MISSION, SSIIONM, and MISISON are three different words that can be made.

18. _____ What is the largest number with at most one repeated digit whose digits add up to 14?

19. _____ If passing a test is defined by getting at least 3/5 of the questions correct, and David is equally likely to answer a question correctly or incorrectly, what is the probability that David got all 5 questions correct given that he passed the test? Express your answer as a common fraction.

20. _____ minutes There are twenty questions on this test. You have passed nineteen questions to reach this point. An interesting fact that we noticed while writing this test is that the *nth* question took n minutes to write. For example, it took us five minutes to write question five, and eleven minutes to write question eleven. Given this fact, how many minutes, in total, did it take us to write questions one through nineteen?