2023 Mission Math Utah Spring Competition (3-5)

You will have 40 minutes to complete as much of this test as you can. There are 30 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. If Tony has 25 pomegranates, and Sophie has 32 pomegranates, how many pomegranates do they have together?

   _____

2. Carter randomly picks a number between 1 and 10. The number he picks can be added to itself three times to get 24. What is Carter's number?

   _____

3. Jenny has 6 Pennies, 2 dimes, and 3 quarters. How much money does she have in cents?

   _____

4. Alex, Ben, and Charlie run in a race. Someone will win, someone else will get second, and the last one will get third. How many different ways can the race end?

   _____

5. Napoleon splits his 15 countries evenly between his 4 friends and himself. How many countries does each person get?

   _____

6. Jake makes 60 dollars a month. How many dollars does he make in 3.5 months?

   _____

7. Mary and Bob have 4 children, each of their children marries 1 person and has 3 kids. How many grandchildren to Mary and Bob have?

_____

8. Compute $-3 \times (4 + 5) \times (6 - 8) + 12$.

_____

9. Mason threw a party in his garage, and the party goers have damaged a light bulb so that it flickers once every 15 seconds. How many times do the light bulbs flicker over a 1-hour period?

_____

10. Every car has 4 wheels, and every motorcycle has 2 wheels. How many total wheels are there in a parking lot with 43 cars and 7 motorcycles?

_____

11. Lebron James takes exactly 5 shots every 3 minutes. Given that he played for the entire game, and one game is 48 minutes long, how many shots did Lebron take?

_____

12. 15 gallons of water leak out of a full fish tank at the aquarium, and now the tank is $\frac{3}{4}$ full. How much water is left in the tank?

_____

13. A and B are two digits between 0 and 9. If $A + B + 1 = \underline{1A}$ and B - A = 7, what is B? (Here, $\underline{XY} = 10X + Y$.)

_____

14. Isaac goes to the gym for the entirety of one week. Each day, he lifts 10 more pounds than the previous day. If he lifts 30 pounds on the first day, how many pounds will he lift in total over the entire week?

_____

15. At a summer camp, there are 200 people attending. Each student has a favorite sport, and it is either soccer, basketball, or tennis. If there are three times as many people who chose soccer than tennis, and there are ten more people who chose soccer than basketball, how many people chose basketball as their favorite sport?

_____

16. Hagrid draws 7 straight lines on a piece of paper. What is the maximum number of intersection points between the lines that he can create?

_____

17. How many integers strictly greater than -5 have the property that their square is greater or equal to their cube?

_____

18. Jeff is six feet tall. If he stands at the base of a flagpole, he casts a shadow that is 12 feet long. Given that the pole is 20 feet tall, how long in feet is the shadow of the pole.

_____

19. I have a ratio of 7 black socks for every 3 brown socks in my drawer. What is the minimum number of socks I need to take from my drawer in order to guarentee a pair of the same color?

_____

20. Jade drives down to St. George at 60 miles per hour and drives back at 84 miles per hour. Given that the distance to St. George is 840 miles, what is Jade's average speed, in miles per hour?

_____

21. Find the number of 4 digit numbers that satisfy the following properties:

   - The second digit is even,
   - The first digit is odd,
   - the fourth digit is at least twice the second digit.

_____

22. What is the maximum number of equilateral triangles with side length 1 that can be placed in a regular hexagon with side length 3 so that no 2 equilateral triangles overlap?

_____

23. Simplify the product $\frac{17}{10} \times \frac{24}{17} \times \frac{31}{24} \times ... \times \frac{7n+10}{7n+3} \times ... \times \frac{20230}{20223}$.

_____

24. Ben starts with 3 and continuously adds 9 to create the sequence 3,12,21... What is the smallest integer larger than 1000 that Ben will have in his sequence?

_____

25. A cherry tree increases its height by 20% at the end of every year. What is the largest possible size (in feet) that a cherry tree could be at the beginning of the year, so that it is no taller than 60 feet by the end of the year?

_____

26. Joseph wants to draw an equilateral triangle, a square, a regular hexagon, and a regular octagon. What is the minimum number of distinct vertices that Joseph will need to draw?

_____

27. Let x and y be integer solutions to the equation $x + xy + y = 71$. What is the maximum possible value of x+y?

_____

28. Right triangle ABC with right angle at B is inscribed in a circle of radius 13. If side AB is 10, what is side BC?

_____

29. How many positive integers less than 100 have the property that they are a perfect 4th power, when raised to the 6th power?

_____

30. The area of a square is 2, and the area of a rectangle is 4. What is the smallest possible positive difference of their perimeters? Express your answer in simplest radical form.

_____