

# Mission Math Utah Winter Competition (2-5)

You will have 50 minutes to complete as much of this non-calculator 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. All free response answers are whole number answers unless otherwise stated. Write answers on the given line below each question. Please do not begin the test until told to do so.

Full Name: \_\_\_\_\_

Grade: \_\_\_\_\_

Age: \_\_\_\_\_

1. Natashá had 10 oranges. Then, she bought 6 more from the supermarket. How many oranges does she have now?

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2. What is the least number that when multiplied by itself yields 1?

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3. What is  $6 \times 3 \times 4 \times 3294 \times 0$ ?

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4. Marla is thinking of a number that when added to 13 becomes 26. What is Marla's number?

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5. Julien has 3 pairs of socks. Each pair has 2 individual socks. How many socks does Julien have?

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6. What is the probability that a fair coin will flip heads? You can answer as a fraction or as a percentage.

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7. James, John, and Jim play a game. James says any number he wants, then the three take turns saying the number one less than the previous one. The order is James, John, then Jim. For example, James would say “seven” followed by John saying “six” followed by Jim saying “five” and James saying “four”. The person who says “zero” wins. James picks a number from 21 to 23 inclusive. What number must James pick to win?

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8. Ronak is skip counting by 4's. He begins at 0, then says 4, then 8, and so on. What is the third number that ends in a 2 that he says?

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9. Alicia wants to buy 3 slices of apple pie and 2 bottles of whipped cream. If each slice of apple pie costs \$5 and each bottle of whipped cream costs \$6, how much will Alicia have to pay?

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10. What is  $\frac{1}{6} + \frac{3}{5} + \frac{1}{2}$ ? Express your answer as a common fraction.

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11. Mala does 3 more chores per day than Chinmay. How many more chores has she done after 1 week?

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12. A 10 foot by 10 foot wall is being painted. There is a 2 by 3 foot window in the middle. One bucket of paint can cover 12 square feet. You do not paint the window. How many buckets will be needed to paint the wall? Round up to the nearest whole number.

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13. How many distinct ways can the letters ABA be arranged?

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14. The tip of a marker begins at 5 cm and goes down .1 cm per use. How many times will the marker need to be used in order for the tip to be 3.5 cm?

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15. 8 workers paint 1 mural in 6 days. At the same rate, how many days would it take for 24 workers to paint 6 murals?

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16. To order a boba drink, you must choose one type for each of the following categories: ice level (no ice, less ice, and regular), flavor (traditional, thai, and oolong), and toppings (no topping, pudding, boba, and lychee jelly). How many different drinks can be made?

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17. Amrita has five beads, two are green and three are blue. She wants to put them on a string and make a perfectly circular bracelet. How many unique ways can she arrange her beads?

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18. A magic square is a 3 by 3 square in which all of the diagonals, rows, and columns sum to the same number. Find the value of the square marked with an X below.

|   |   |   |
|---|---|---|
| 4 | ? | ? |
| 3 | 5 | ? |
| ? | X | 6 |

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19. Two mangoes and one bunch of grapes cost \$7. Three mangoes and two bunches of grapes cost \$11. How much does a single mango cost?

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20. Kiran is deciding to build a right triangle shaped fence around his barn. The sum of the angles of every triangle is  $180^\circ$ . If one of the three angles is  $30^\circ$ , what is the absolute difference between the other two angles?

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21. Micah has four Harry Potter lego sets with an average of eighty pieces in each set. If the first set has 81 legos, the second has 64, and the third has 92, how many legos does the fourth set have?

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22. Meah bought 2022 pencils from her local manufacturer. She decides to sell them in packs. Meah sells all the packs she can. She puts a prime number of pencils in each pack. What is the largest prime number of pencils per pack she can sell so none are left?

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23. Anika is making a batch of chocolate chip, red velvet, sugar, and oatmeal cookies. She makes 2 dozen cookies total, where a dozen is 12.  $\frac{7}{3}$  of them are sugar,  $\frac{1}{3}$  of them are chocolate chip, and 25% of them are red velvet cookies. How many oatmeal cookies are there?

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24. 9 friends share a meal and each pay the same integer amount. Their total is the three digit number  $92\underline{A}$ . What is the value of A?

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25. Derek has a bag of marbles filled with 97 big marbles and 43 small ones.  $\frac{5}{7}$  of these marbles are yellow, and the rest are red. How many red marbles are there?

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26. Brendon puts candy into a jar for MMU summer campers to try to guess how many candies are in it. There are 60 summer campers total and 90% of them guess a number between 100 and 200, inclusive. 44 guess a number between 100 and 150, inclusive, and 15 guess a number between 150 and 200, inclusive. How many summer campers guess that there are 150 candies in Brendon's jar?

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27. Find the units digit of  $3^{1986} - 2^{1986}$ .

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28. For how many positive integers  $n$  is  $8000 * (\frac{3}{5})^n$  an integer?

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29. Every time Jerry goes to the gym, he pays \$5.10. However, there is a new membership that if he pays \$70 every year, every time he goes to the gym, he only pays a 10 cent fee. What is the minimum amount of times Jerry needs to go to the gym in a year for the membership to start saving him money?

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30. When Callie dumped the coins out of her piggy bank, she noticed that there were only nickels, dimes and quarters. The number of dimes was one more than twice the number of quarters, and there were half as many quarters as nickels. The coins dumped out of Callie's piggy bank had a total value equal to \$10.00. What was the total value in dollars of the nickels and dimes dumped out of Callie's piggy bank? Express your answer as a decimal to the nearest hundredth.

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