

**Gauss School and Gauss Math Circle**  
**2015 Gauss Math Tournament**  
**Grade 3-4 (Sprint Round 50 minutes)**

1. Amy spent 2 hours 40 minutes doing her math homework. If she finished at 6:10 PM, at what time did she start?
2.  $\frac{5}{12}$  of the students in a class are boys. The rest are girls. If there are 21 girls in the class, how many boys are there in the class?
3. Aley, Betty, Caroline, Dina, and Eleni entered a room together. If all the girls shake hands with each other exactly once, how many handshakes took place?
4. Jiyun has three times as many shells as Abigale. If they have 92 shells altogether, how many shells does Jiyun have?
5. A square region with side length 1 foot is covered completely with 2-inch by 2-inch square stickers. How many of the stickers are needed to cover the region exactly without overlap?
6. Roberto has four pairs of trousers, seven shirts and three jackets. How many different outfits can he put together if an outfit consists of a pair of trousers, a shirt and a jacket?
7. Jackie bought 90 marbles. She gave  $\frac{2}{5}$  of them to her friend and lost  $\frac{1}{6}$  of the remaining. How many marbles does she have left?
8. If  $3x=8y$  and  $5y=15z$ , what is the value of  $x/z$ ? Express in simplest form.
9. The Quotient of two positive integers is  $\frac{5}{2}$  and their product is 160. What is the value of the larger of the two integers?
10. Margaret started a stamp collection. She collected 8 stamps the first day. Each subsequent day she collected 8 more stamps than she had collected the previous day. If she collected stamps for 5 consecutive days, what was the average number of stamps collected per day?
11. In the land of Ink, the money system is unique. One Trinket is equal to 4 Blinkets, and 3 Blinkets are equal to 7 Drinkets. In Trinkets, what is the value of 56 Drinkets?
12. A 2-cup mixture is  $\frac{1}{3}$  flour and  $\frac{2}{3}$  cornmeal. If 1 cup of flour is added to the 2-cup mixture, what fraction of the new 3-cup mixture is flour?

13. Ivory successfully shot 7 free throws in 15 free-throw attempts. How many additional successful free throws, without a miss, must she make in order to attain a success rate of 75%?
14. Five workers paint four houses in six days. Working at the same rate as these workers, how many workers are needed to paint 12 houses in three days?
15. When writing the integers from 1 through 97, how many times is the digit 3 written?
16. How many positive factors of 72 are perfect cubes?
17. The mean of one set of five numbers is 13, and the mean of a separate set of six numbers is 24. What is the mean of the set of all eleven numbers?
18. In a certain dormitory, there are 72 rooms for 131 students. If each room is occupied by either one or two students, how many rooms are occupied by just one student?
19. The sum of the digits of a two-digit positive integer is seven. Subtracting 45 from this integer yields another two-digit integer with the same digits, but in reversed order. What is the original integer?
20. Jordan ran 2 miles in half the time it took Steve to run 3 miles. If it took Steve 24 minutes to run 3 miles, using the same rates, how many minutes would it take Jordan to run 5 miles?
21. The sum of the numerator and the denominator of a fraction is 216. The fraction is equivalent to  $\frac{2}{7}$ . What is the value of the denominator?
22. Zachery paid for a \$1 burger with 32 coins and received no change. Each coin was either a penny or a nickel. What was the number of nickels Zachery used?
23. Kyle has five tires but only uses four at a time on his car. He has rotated the five tires on his car so that each tire has been on the car for the same number of miles. If the car has been driven 90,000 miles, for how many miles was each of the five tires on the car?
24. In a spelling bee 50% of the students were eliminated after the first round. Only  $\frac{1}{3}$  of the remaining students were still in the contest after the second round. If 24 students were still in the contest after the second round, how many students began the contest?

25. Isaac wrote the integers from 1 through 104, inclusive. How many digits did he write?
26. How many different positive, four-digit integers can be formed using the digits 2,2,9,9?
27. Cindy joined New Star so that she could download songs from the internet. Her cost per song is \$1.50. She paid \$32.50 for the first month for 20 songs and the annual membership fee. What was the price of the annual membership fee?
28. A ball is dropped from 10 feet high and always bounces back up half the distance it just fell. After how many bounces will the ball first reach a maximum height less than 1 foot?
29. How many positive integers less than 200 are divisible by 2, 3 and 5?
30. What is the total surface area, in square inches, of a closed rectangular box 4 inches wide, 6 inches long and 3 inches tall?
31. Grandma gave Bryce and Carter some raisins. Bryce received 6 more raisins than Carter, and Carter received half the number of raisins Bryce received. How many raisins did Bryce receive?
32. When a positive number is multiplied by the sum of twice the number and half the number, the result is the original number. What is the number?
33. Chandler has \$95. Payton has \$33 less than Chandler but \$14 more than Morgan. How much money does Morgan have?
34. A rectangular piece of paper is 32 cm long and has a perimeter of 98 cm. A square with a perimeter of 36 cm is cut away from it. What is the area of the paper is left?
35. John is twice as old as his son. In 42 years, the ratio of their ages will be 4:3. What is the son's current age?
36. On a particular cube, one face is white, two faces are green, and the rest of the faces are red. If the total area of the red faces is 21 square inches, what is the area of the white face?
37. What is the smallest positive integer that is a perfect square and is divisible by 3 and 5?

38. Jake, Max, and two of their friends are seated in a row at a restaurant. If Jake can only sit next to Max, how many seating arrangements of the 4 friends are there?
39. A triangle with side lengths 6 units, 8 units, and 10 units is inscribed in a circle. In square units, what is the area of the circle? Express your answer in terms of  $\pi$ .
40. What year in this century, when its digits are written in reverse order, is a year in the next century?

**Sprint Round Ends**

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**Grade 3-4 (Target Round 20 minutes)**

1. Judy ate 100 cookies in five days. On each day, he ate 6 more than one the previous day. How many cookies did he eat on the fifth day?
2. A square of side length 4 inches has four equilateral triangles attached on each side. What is the total area of this figure?
3. The average of  $a$ ,  $b$  and  $c$  is 15. The average of  $a$  and  $b$  is 18. What is the value of  $c$ ?
4. Arthur invests \$5000 in a mutual fund that gains 20% of its value in the first month, and then loses 20% of its value the following month. How much is Arthur's investment worth at the end of the second month?
5. A drawer contains five brown socks, five black socks and five gray socks. Randomly selecting socks from this drawer, what is the minimum number of socks that must be selected to guarantee at least two matching pairs of socks?
6. A side of the larger square is a diagonal of the smaller square. If the area of the smaller square is 1 square unit, what is the area of the larger square?
7. What is the percent of increase in the volume of a cube when its edge length is increased by 50%? Express your answer to the nearest tenth.
8. A triangle has a base of 3 feet and a height of 6 feet. If its area is increased to  $35 \text{ ft}^2$  by increasing the base and height by the same number of feet, what is the sum of the new base and height?

**Target Round Ends**

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

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

Sprint Round Answers:

1		21	
2		22	
3		23	
4		24	
5		25	
6		26	
7		27	
8		28	
9		29	
10		30	
11		31	
12		32	
13		33	
14		34	
15		35	
16		36	
17		37	
18		38	
19		39	
20		40	

Target Round Answers:

1		5	
2		6	
3		7	
4		8	

