Gauss School and Gauss Math Circle
2018 Gauss Math Tournament
Grade 3-4 (Sprint Round 50 minutes, 40 Questions)

1. How many feet are in 5 yards?

2. Compute $(9 + 10)^{(2+1-1)}$

3. How many vowels are there in this sentence (y is not as a vowel)?

4. A triangle has an area of 24. It has side lengths of 6 and 8. What is the side length of the third side?

5. Simon studies math for 10 hours a day, where he studies Geometry, Probability, and Algebra. If he studies Algebra half as much as he studies Geometry but 3 times as much as he studies Probability, how many hours a day does Simon spend studying Algebra?

6. Ivy is taking a math contest. The contest has 25 questions. Each correct answer is worth 6 points, each unanswered question is worth 1.5 points, and each incorrect answer is worth no points. Ivy answers 22 questions and leaves 3 blank; if she gets 19 right and 3 wrong, what is her score?

7. Andrew is a Boy Scout who saves birds. If he saves birds at a rate of 4 birds every 7 days, how many birds does he save in February of 2018?

8. How many ways can one rearrange the letters in the word "Gauss"?

9. Sam's age is twice what it was 6 years ago. How old is he?

10. If there are 12 pips in a pop, 7 paps in a pop, how many pips are in 21 paps?

11. Compute the number of divisors of 13464.

12. What is the 10th positive integer that has an odd number of positive divisors?

13. At a local fast food chain, 5 burgers and 3 sodas costs $41. If the cost of the burgers is doubled and the cost of the sodas is halved, a burger and soda can be bought for $15. How many dollars did one burger originally cost?

14. Bob flips a fair two sided coin three times. What is the probability of obtaining exactly two heads?

15. What is the first integer that is greater than twice the number of letters it has?

16. What is the maximum number of points at which 4 circles can intersect?

17. Albert wants to paint a rectangular wall that is 3 feet by 10 feet. If a gallon of paint costs 7 dollars and covers 6 square feet, how money must Albert spend?

18. If the sum of two numbers is 7 and their product is 10, what is the sum of their squares?

19. Sebastian, Sameer, and Sunay see each other at the grocery store on Monday. If Sebastian visits the grocery store every 2 days, Sameer visits the grocery store every 3 days, and Sunay visits the grocery store every 5 days, what day of the week will they all see each other at the store again?

20. Nathan and Marvin are 10 miles apart. If Nathan runs at 3 miles per hour and Marvin runs at 2 miles per hour, what is the minimum time it takes for them to meet each other?

21. Simon and Daniel are running around a circular track of length 100 m. Simon runs at 40 m/m, and Daniel runs at 60 m/m. They both start running at the same time, from the same place, in the same direction. After how many minutes will Daniel meet Simon again?

22. A rabbit is hopping in a straight line. It first hops 1 meter. Every hop after that is ⅓ the length of the previous hop. How far does the rabbit travel in total?

23. John solves one problem on the first day. Everyday after the first, he solves two times as many problems as he did the day before. How many problem will John have solved at the end of the 10th day.

24. What is the gcd(24,45) times lcm(24,45)? (gcd stands for greatest common divisor and lcm stands for least common multiple)

25. What radius should a circle have if its area and circumference are the same?

26. What is the area of a equilateral triangle that has the side length $2\sqrt{3}$?

27. Sameer and Simon have taken the Junior Math Olympiad. The sum of Sameer's score and Simon's score is 28. Sameer's score minus Simon's score is 14. What is the value of the higher score?

28. Angelisa likes pie. She has 5 choices of crust, 3 choices of filling, and 2 choices of topping. How many different pies can Angelisa make?

29. Eric is a snake on a 2x2 board. He starts at the bottom left corner, and wants to get to the top right corner. How many ways can he walk there, if he can only 1 step walk up or 1 step to the right on each turn?

30. This week Greg plans to buy 100 ice cream cones. There are two deals for ice cream cones.

○ 15 cones for 12 dollars

○ 5 cones for 5 dollars

What is the least amount of money Greg can spend on the 100 ice cream cones?

31. John can split his pencils equally into groups of 10, groups of 12, and groups of 15. What is the least amount of pencils he can have?

32. Given that $1763 = 42^2 - 1$, what is the greatest prime factor of 1763?

33. How many seconds are in a day?

34. Charles, Eric and Simon are conversing. Two are telling the truth and one is lying.

○ Charles: Eric is taller than me.

○ Eric: Charles is taller than me.

○ Simon: Eric is tallest.

Who is lying?

35. What is the smallest number with 8 factors?

36. What is the area of a rectangle with diagonal of length 25 and one of the sides length 7.

37. How many triangles are in this figure?
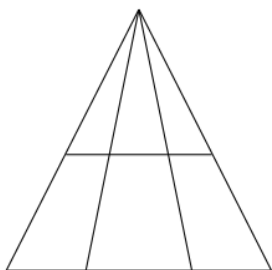
38. Simon has 32 dollars. Everyday he loses half of his money. How many cents will he have after 6 days.

39. Mrs. Yang has some students. She tries to divide her students into groups of 5 but there is one person left over. She tries to divide her students into groups of 6 but there is one person left over. What is the least amount of students Mrs. Yang has?

40. Evaluate $1 + \cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\dots}}}}}$

End of Sprint Round

1. Alice, Bob, and Carly are running around a track. They can run a lap in 40, 42, and 49 seconds, respectively. They all start at the same starting line. After how many seconds will be the first time that two of them meet at the starting line at the same time?

2. Lexi drops a bouncy ball from a height of 90 meters. Each time the ball bounces it rises to ⅓ of its height before the bounce. How high, in meters, will the ball rise immediately after the 6th bounce? Express your answer as a fraction.

3. What is the degree measure of the smaller angle between the hour and minute hands on a clock when the clock reads 4:10?

4. A cubical container measuring 10 inches on each side is filled ⅕ full with water. The container is then tilted 45 degrees with one of its edges resting on a table. In inches, what is the depth of the water in this position?

5. Fred is blowing up some balloons. He wants each of the balloons to have a radius of 9cm. At what rate, in cm^3/second, must he blow air into the balloons so that he can have 10 completed balloons in exactly 2 minutes?

6. The month of January has 5 Mondays in a certain year. How many possible days of the week can January 1st be?

7. A rhombus has side length 12. Its angles are 60º, 120º, 60º, 120º in that order. What is the area of the largest circle that can completely fit inside this rhombus?

8. Michael flips a coin 6 times. What is the probability he gets more heads than tails?

End of Target Round

Sprint Round Answers

1. 15
2. 361
3. 13
4. 10
5. 3
6. 118.5
7. 16
8. 60
9. 12
10. 36
11. 48
12. 100
13. 7
14. 3/8
15. 9
16. 12
17. 35
18. 29
19. Wednesday
20. 2
21. 5 minutes
22. 1.5 meters
23. 1023 problems
24. 1080
25. 2
26. $3\sqrt{3}$
27. 21
28. 30
29. 6
30. 82 dollars
31. 60
32. 43
33. 86400
34. Eric
35. 24
36. 168
37. 12
38. 50
39. 31
40. $\frac{1+\sqrt{5}}{2}$

Target Round Answers

1. 294 seconds
2. 10/81 meters
3. 65°
4. $2\sqrt{5}$ inches
5. 81π cm^3/second
6. 3
7. 27π
8. 11/32