GAUSS ACADEMY of Mathematical Education
MATH UNITES US

Gauss School and Gauss Math Circle

2018 Gauss Math Tournament

Grade 5-6 (Sprint Round 50 minutes, 40 Questions)

1. If $a\#b = ab - ba$, then what is $(2\#0)\#(1\#8)$?
2. What is the second smallest 2 digit number with 12 factors?
3. If 2017*2019=2018^2-x, what is x?
4. How many multiples of 3 are between 4^2 and 8^2?
5. Assuming x and y are positive integers where xy=7, what is 2x+2y?
6. If m has a remainder of 5 when divided by 7, what is the remainder when 6m is divided by 14?
7. Simplify $\frac{2018!}{2016! + 2017!}$.
8. How many factors does 1680 have?
9. If a pizza of diameter 8' can feed 4 people, how many people can a pizza of radius 12' feed?
10. If John has 8 different pieces of bread, and 4 different brands of pickle, how many sandwiches can he make with a piece of bread on top, a pickle in the middle, and a piece of bread on the bottom?
11. How many different three letter 'words' can be made from the letters in PRINT?
12. If a/b*πr^3 is the volume of a sphere with radius r, what is a^2+b?
13. A cylinder with radius r and height h has volume 50, what is the volume of a cylinder with radius 3r and height 4h?
14. Ashley can roll at 5 miles per hour, while Rick rolls at only 4 miles per hour. In a 80 mile race, what will the difference between their completion times be, in hours?
15. How many two digit numbers are divisible by 4?
16. Stanley can eat 12 cookies in half a minute, while Lucas can eat 144 cookies in one minute. How many seconds would it take Stanley and Lucas to eat 168 cookies?
17. Sonic is fast, unnaturally fast, but unfortunately, Eggman is three times as fast. If Sonic finishes a lap 2 minutes after Eggman, how many minutes does Eggman take to finish a lap?

18. How much wood would a woodchuck chuck in 2 minutes if a woodchuck could chuck 15 pieces of wood every 6 minutes?
19. 36 people failed the math test. If 55% of the class did not fail the math test, how many people are in the class?
20. If n+10 and n+25 are both perfect squares, what is the sum of all possible n?
21. If Mario has 6 power-ups to choose from, and he can have up to 2 powers at a time, how many ways can he have power-ups, assuming there is no regard to order.
22. In a group of people, half of them enjoy drinking water, and a third of them enjoy breathing. What is the probability that a randomly chosen individual enjoys drinking water but does not enjoy breathing?
23. A rectangular prism has sides with areas 15, 27, and 45. What is its volume?
24. Stanley decides that, for some wacky reason, he wants lemons for lunch. To be more precise, Stanley wants to eat exactly 4096 lemons. If Stanley eats lemons at a rate of 8 every 40 minutes, how long will it take Stanley to eat all 4096 lemons? Express your answer in minutes.
25. If Betty takes 8 hours to mow a lawn, and Jim takes 4 hours to mow a lawn, how long, in minutes, does it take them to mow a lawn while working together?
26. If it takes 3 minutes to make 5 sandwiches, and 2 minutes to make 1 sandwich, what is the minimum amount of minutes it can take to make 13 sandwiches?
27. If the area of a rectangle with integral side lengths is a perfect square less than 11, and one side has length 3, what is the other side?
28. If A/B=2, what is (A+B)/(A+2B)?
29. 15 gimps are equal to 9 jomps, and 8 jomps is equal to 4 jimps. How many jimps are equal to 10 gimps?
30. What is the probability that a positive number starting with the digit ‘1’ is a multiple of 5?
31. How many 4 digit numbers are divisible by both 7 and 11?
32. The circle with center O has radius 13. If a chord MN has length 24, what is the shortest distance from O to chord MN.
33. What is the smallest nonnegative integer divisible by 3, 7, 10, and 17?
34. What is the minimum number of cards Mantry, who is blind, needs to take from a deck of

52 cards to ensure that he has one of every single suit (aces, spades, diamonds, clubs)?

35. What is the probability that Jimothy wins four best-of-three rock-paper-scissors tournaments in a row?
36. Manthony does 14 push-ups everyday. In how many days will his total number of push-ups first be a four digit number?
37. How many numbers formed with all four digits in '7617' are prime?
38. If the units digit of 7^n is 3, what is the smallest possible n if n>117?
39. Right triangle ABC has area 210. If one leg has length 35, what is the length of the hypotenuse?
40. If x is the answer to question #4 and y is the answer to question #8, what is the fifth smallest prime number?

End of Sprint Round

GAUSS ACADEMY of Mathematical Education
MATH UNITES US

Gauss School and Gauss Math Circle

2018 Gauss Math Tournament

Grade 5-6 (Target Round 20 minutes)

1. Awful Waffles is holding a celebration of their 10-year anniversary and are having a 60% off sale. If large packages cost $30, and small packages cost $20, how much would it cost Chortling Choffle to buy 3 large packages and 2 small packages, in dollars?

2. How many different 'words' can be created by rearranging the letters in WAFFLE? For example, 'FALEWF' is a word that can be created.

3. Awful Waffles make their waffles in hexagons with a side length of 5 inches, while Lawful Waffles make their waffles in triangles with a side length of 10 inches. What the ratio of the areas of the waffles made by Awful Waffles to that of Lawful Waffles?

4. Unlawful Falafels used to make their special falafel meal cost $17.60, but after their competitor, The Fiery Falafel, went out of business, they raised the price of their special falafel meal by 25%. Two weeks later, after Spicy Rice goes out of business, they raise their new price by 30%. If the total increase in price is $ab.cd, what is 2a+3b+4c+5d?

5. Laughable Loffle is making her way to a waffle house to meet up with her friends. She leaves her house at 2:45, and she knows that, if she bikes the whole trip, she will get there at 2:55. Unfortunately, she gets a flat tire and is forced to walk the rest of the way. She doesn't have a way to tell time, and when she gets to the waffle house she sees that it is 3:05. If she bikes three times as fast as she walks, then at what time did she get a flat tire? Assume Loffle travels at a constant rate when either biking or walking.

6. A positive integer is considered 'wafflable' if it is divisible by both 2 and 3, but is not within 2 of a multiple of 7. For example, 24 is waffable, but 30 is not. What is the 6th smallest waffable number?

7. Huggable Hoffle is deciding what kind of waffle she wants to eat. There are three waffle types to choose from and five types of toppings. Hoffle wants two waffles to eat, and she doesn't want two of the same kind of waffle, but she's fine with eating the same kind of toppings. If, for each waffle, Hoffle chooses one waffle type and 3 distinct toppings, eating the first before making the second. In how many ways can this happen?

8. Choffle's waffles sells waffles in packs of size 5 and 11, what is the largest number of waffles that cannot be bought with just these sizes?

End of Target Round

GAUSS ACADEMY of Mathematical Education
MATH UNITES US

Sprint Round Answer Key:

0	72	1	16	16	2	2017	40
36	224	60	19	1800	4	22	60
1	5	80	30	22	1/3	135	20480
160	12	3	3/4	3	1/5	118	5
0	40	1/16	72	0	119	37	11

Target Round Answer Key:

52	360	3/2	5
2:50	108	600	39