

2024 Gauss Math Tournament Sprint Round (Div. 2)

June 8, 2024

1. Five students take a test and have an average of 91. Four of the scores are 98, 84, 92, and 87. What is the fifth student's score?
2. Two regular six-sided dice are thrown. What is the probability that the two numbers on the dice have a product greater than 10?
3. If x is a positive integer between 100,000 and 1,000,000, what is the greatest possible value of the sum of the digits of $5x$?
4. Let a_n be an arithmetic sequence of integers and b_n be a geometric sequence of integers. Given that $a_{b_1} = 7$, $a_{b_2} = 23$, $a_{b_3} = 71$, $a_{b_4} = 215$, determine a_{b_5} .
5. Abigail is buying flower bouquets at a store, where a rose bouquet costs \$10 and a lilac bouquet costs \$24. She wants to buy exactly 5 bouquets, and she has two coupons: one for 25% off a purchase of \$60 or more and one for 40% off a purchase of \$80 or more. What is the least amount of money Abigail must spend to purchase exactly 5 bouquets?
6. Out of all positive integer quadruples (a, b, c, d) that satisfy the equations $ab + cd = 185$ and $bc - ad = 1$, what is the minimum value of $a + b + c + d$?
7. In triangle ABC inscribed inside a circle ω , the A -angle bisector intersects ω at D . Given that $AB = 6$, $BD = 4$, and $AC = 9$, compute BC^2 .
8. First, we start with the number 62. Adding the digits 6 and 2 together, we get 8 and add that to the end of our number, giving us 628. Then we add the last two digits, 2 and 8, together to get 10, which we add to the end of our number, giving us 62810. If this process is repeated until there are 2006 digits, what is the sum of the digits?