



Winter Math Competition 2019

Group Three Sample Problems (Grades 6 - 8)

1. Abby, Ben, Carla, and Daniel bake a cake. First, Abby eats one quarter of the cake. Then, Ben eats two quarters of what is left. Carla eats three quarters of the rest of the cake, and finally Daniel finishes the rest. Who ate the most cake?
2. An eight-sided die has its faces numbered from 1 to 8. What is the expected value of the roll of the die?
3. $x * y = x^2 + 3y$. What is $3 * 14$?
4. What is the units digit in 2019^{2019} ?
5. In the set $x, 8, 3, 1, 7$, the mean is 1 greater than the median. How many real values of x are there?
6. The angles of a right triangle are x , $2y$, and $x + y$ degrees. What is the value of x ?
7. How many ways can the letters in ALASKA be rearranged?
8. The tennis shop sells tennis balls in tubes of 7 and tubes of 8. If it is impossible to buy exactly n tennis balls at this shop, what is the greatest possible integer value of n ?
9. Circle O is inscribed in a square. What proportion of the area inside of the square is also outside of the circle? Express your answer as a common fraction in terms of π .
10. If $a + b = 4$ and $ab = 2$, what is the value of $a^3 + b^3$?

Group Three Sample Answers

1. Ben
2. 4.5
3. 51
4. 9
5. 3
6. 22.5
7. 120
8. 41
9. $\frac{4-\pi}{4}$
10. 40