

Gauss School and Gauss Math Circle
2020 Gauss Math Tournament
Division II (Target Round 20 minutes, 8 Questions)

1. What is the angle between the hour and minute hands of a clock at 2:40?
2. Douglas and John are mowing a lawn. If John mows alone, it takes him 6 hours. If Douglas and John mow together it takes them 4 hours. How long does it take Douglas to mow by himself?
3. Mr. Teacher has 7 identical homework passes and 4 distinct students. How many ways can he distribute the passes among the students such that students each must have at least one pass?
4. How many ways can you rearrange the letters of BANANA so that no two adjacent letters are the same? (BANANA is one such permutation)
5. An equilateral triangle is inscribed in a circle. Another circle is inscribed on the equilateral triangle. What is the ratio of the area of the larger circle to the smaller circle?
6. $\frac{4}{7}$ of the people in a room are wearing tuxedos. $\frac{3}{5}$ of the people in the room are wearing sunglasses. What is the smallest amount of people in the room that are wearing both?
7. How many integers between 1 and 100 have 2 as a digit, but not 5 as a digit, and are not prime?
8. Let x and y be complex numbers that satisfy the equation $x^3 - y^3 = 98$ and $x - y = 2$. Compute the value of $x^2 + 2xy + y^2$.