

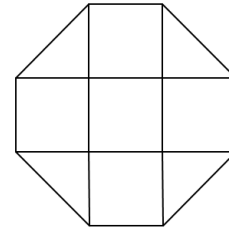
July, 2016 - Grades 6 & 7

### Individual Questions

Each question is worth 10 points. Calculators are PROHIBITED.

#1. (Time Limit: 7 minutes) If each of 2016 integers has an absolute value of 1, how many different sums of all of these 2016 integers are possible?

#2. (Time Limit: 7 minutes) The octagon shown consists of 5 congruent squares and 4 congruent triangles. If the length of the longest side of one of these triangles is 4, what is the area of the octagon?



of 1,

#3. (Time Limit: 7 minutes) Of the 5-digit positive integers whose digits all come from {1, 2, 3}, how many are divisible by 8?

#4. (Time Limit: 7 minutes) The coordinates of two consecutive vertices of a square are (8,0) and (0,6). If all of the coordinates of the vertices of this square are non-negative, what are the coordinates of the other two vertices of this square?

#5. (Time Limit: 7 minutes) Write, in simplest reduced form, the value of

$$\frac{(33\ 333\ 333)^2 - (33\ 333\ 333)(16\ 666\ 667) + (16\ 666\ 667)^2}{(33\ 333\ 333)^2 - (33\ 333\ 333)(16\ 666\ 666) + (16\ 666\ 666)^2}$$

#6. (Time Limit: 7 minutes) What is the least positive integer  $n$  for which  $200 + n$  and  $292 + n$  are squares of different integers?

#7. (Time Limit: 7 minutes) Al, Barb, Cal, Di, Ed, Fred, and Greg participated in a chess tournament. Each player must play each of his six opponents exactly once. So far, Al has played 1 match. Barb has played 2 matches. Cal has played 3 matches. Di has played 4 matches. Ed has played 5 matches, and Fred has played 6 matches. How many matches has Greg played at this point?

#8. (Time Limit: 7 minutes) What is the greatest number of different integers I can choose from the first 100 positive integers so that no three of these integers could be the lengths of the sides of the same triangle?

#9. (Time Limit: 7 minutes) The line  $y = mx + b$  passes through the point (1,2). If the sum of its  $x$ - and  $y$ -intercepts is  $-m$ , what is the value of  $m$ ?

#10. (Time Limit: 7 minutes) For how many integers  $k$  is  $\frac{k+2016}{k+3}$  an integer?