AMTNJ Mathematics Contest of New Jersey - 2022
Middle School Students
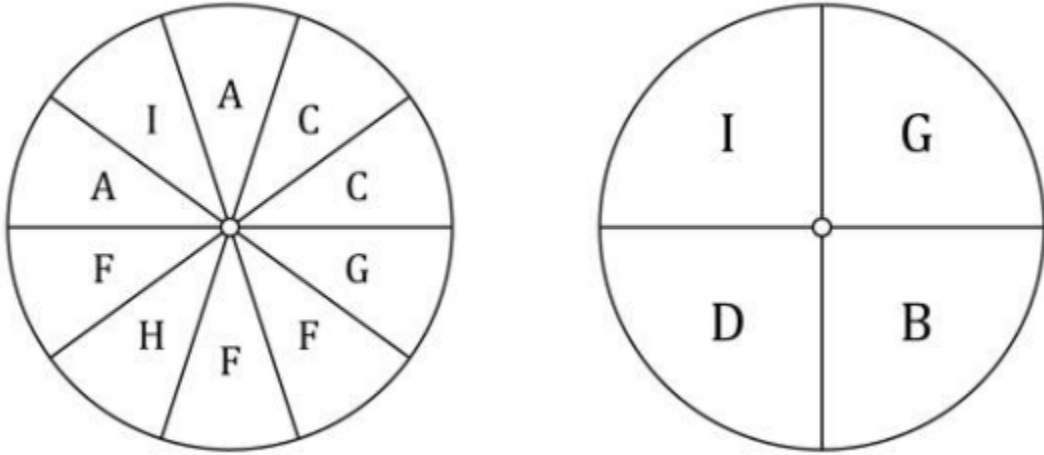## <u>No Calculator is allowed - 60 minutes</u>

1. Alberto has a large bag of chocolate bars and decides to share some with his friends. He gives half of what he has to his classmate Victoria. He takes a third of what is left and gives it to Gemma. Then he gives one fourth of what is remaining to Cameron. Jax then asks for 7 bars of chocolate and Alberto agrees and gives him 7. He keeps the last 4 chocolate bars for himself. How many chocolate bars did Alberto have to begin with?

2. A bus leaves Math Town at an approximate constant speed of 50 mph. It heads towards Algebra Alley. Another bus leaves Algebra Alley at an approximate constant speed of 40 mph and heads for Math town. If the route is 360 miles long, how many minutes will it take for the two buses to meet up?

3. Read the following problem. Choose all that apply.

> The local general store likes to keep a ratio of 4:5 for canned corn to canned green beans.
>
> Which statements are true about the canned corn and canned green beans in the local general store?
>
> A. The total number of canned corn and canned green beans will always be 9.
> B. If there are 8 cans of corn, there should be 10 cans of green beans.
> C. If there are 15 cans of green beans, there should be 18 cans of corn.
> D. The total number of canned corn and canned green beans is always a multiple of 9.
> E. If there are 12 cans of corn, there should be 15 cans of green beans.

4. The circle on the left is divided into ten equal sections and the circle on the right is divided into four equal sections.

- What fraction would be represented by 1/3 of section C?
- What fractional part of section D would give the same value as 1/2 of section H?
- Which of the following has a greater value, or are they equal in value?

  ½ of (H and C)   OR   ¼ of (A, F and H)

5. If the following pattern continued, which letter would occur in the 66th position?
   AMTNJAMTNJAMTNJAMTNJ…

   A. A   **B.** M

   C. T   **D.** N

6. Looking at the courtyard, I saw boys and dogs. Counting heads, I got 22. Counting legs, I got 68. How many boys and how many dogs were there?

7. What common fraction is one-third of the way from ¼ to ⅓?

8. In studying for his math test, Albert spent 18 minutes doing online math practice problems. This represents 30% of the total amount of time he spent studying for his math test. How many minutes did Albert spend studying math?

9. Using the digits 0-9 no more than once and at least once, create five ordered pairs that create a linear function which has a greater slope, or rate of change, than the line given.