

Answer Sheet for Student Name: \_\_\_\_\_

#	Answer	Points (0/1)
1		
2		
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4		
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10		

Total:

## Problems

1. Each mayor in the city of Clownsville is mayor for 3 years. What is the maximum number of mayors that Clownsville could have over 8 years?
2. A palindrome is a number that reads the same forwards and backwards. An example of a palindrome is 1001. Find the biggest palindrome less than 1001 that is a multiple of 11.
3. Iris opens up her favorite book to a random page and realizes that the product of the two page numbers she can see is 1260. What is the smaller page number she can see?
4. Andrew, Brian, Daniel, and Grace are part of either the green team or the red team. Members of the green team always tell the truth and the members of the red team always lie. The four of them each make a statement shown below. There is only one person on the green team. Who is it?

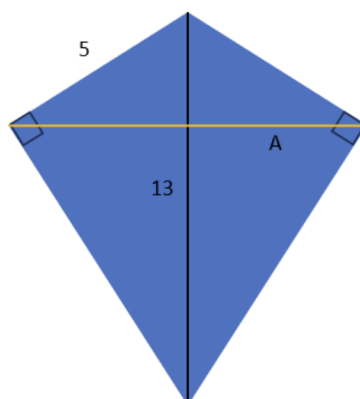
Andrew: "I'm the person on the green team."

Brian: "Andrew is the person on the green team."

Daniel: "Andrew and Brian are on the red team."

Grace: "Everybody is on the green team."

5. The kite below has diagonals of length 13 and length A. If two sides of the kite have length 5 and there are two right angles (90 degrees), what is the length of A as an improper fraction?



6. What is the units digit of  $2023^{2023} * 2024^{2024}$ ?
7. In Townsville, the only things taught are math, science, and philosophy. 15 students are studying math, 9 students are studying science, and 7 students are studying philosophy. If there are 8 students studying 2 or more subjects and 3 students studying all 3 subjects, how many students are there?
8. What is the value of the following sequence:  $-1024 - 512 - 256 - 128 - 64 - 32 - 16 - 8 - 4 - 2 + 2 + 8 + 16 + 32$ ?
9. Two spheres share the same center. One sphere has a volume of  $36\pi$  and the other has a radius of 6. What is the volume of the space between the smaller sphere and the larger sphere? Express your answer in terms of pi.
10. Ellie has many robot building kits with 5 parts and Ben has many kits with 6 parts. What is the greatest number of parts Iris can have so that the total number of parts she has cannot be expressed as a combination of Ellie and Ben's kits?

**Solutions**

1. 4
2. 979
3. 35
4. Daniel
5.  $\frac{120}{13}$
6. 2
7. 26
8. -1984
9. 288
10. 19