

# Orange County Math Circle

All-Girls Math Tournament

7th-8th Target Round

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1. How many edges does a rectangular prism have?
2. A “holey number” is defined as a whole number whose digits consist only of 0, 4, 6, 8, and 9 (digits may be repeated). How many 3-digit holey numbers are there?
3. Square  $AGMT$  shares vertices  $A$ ,  $M$ , and  $T$  with quadrilateral  $MATH$ , such that  $M$  is the midpoint of  $GH$ . What is the ratio of the area of  $GATH$  to the area of  $AGMT$ ? Express your answer as a common fraction.
4. Triangle  $XYZ$  has integer side lengths. If  $XY$  and  $YZ$  are 9 in and 13 in respectively, what is the sum of all the possible lengths of  $XZ$ ?
5. At a certain store, 5 books and 1 pencil cost twice as much as 2 books and 2 pencils. 1 pencil usually costs 1 dollar. On a special savings day, 4 pencils are given for every purchase of a book. If you need at least 4 books and 30 pencils, what is the least amount of money you can spend?
6. James is flying to New York from Los Angeles, a distance of 2500 miles. He flies at a rate of 50 miles an hour, but has to stop for 1 hour every 4 hours of flying to rest his wings. Jessie, on the other hand, swims there. She swims nonstop, but has a longer distance of 3100 miles to travel. If they start and arrive at the same time, how fast does Jessie swim in miles per hour?
7. A triangle has side lengths 20, 21, and 29. Find the absolute value of the difference between the length of its inradius and circumradius. Express your answer as a common fraction.
8. For integers  $x, y, z$  with  $x < y < z$ :

$$x + y + z = -6$$

$$xy + yz + zx = -19$$

$$xyz = 24$$

Compute  $x$ .