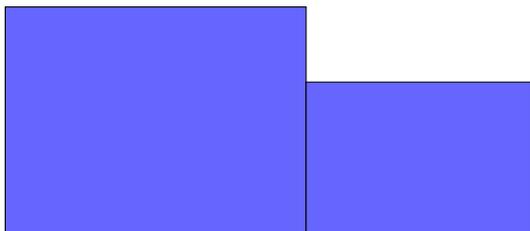


Orange County Math Circle

All-Girls Math Tournament

5th-6th Sprint Round

1. You have 20 apples. You eat half of your apples. Your friend gives you 6 more apples. How many apples do you have?
2. A parallelogram has an area of 15cm and height of 7.5cm. What is the length of its base?
3. $3x - 4y = 18$ and $4x - 3y = 10$. Compute $x - y$.
4. A square and an equilateral triangle have side length 5. Michelle glues one edge of the equilateral triangle to one edge of the square, keeping the square and the triangle touching at only one edge. What is the perimeter of this new figure?
5. How many lines of symmetry does the following figure have?



6. The angles of one triangle are $2x^\circ$, $3y^\circ$, and 80° . The angles of another triangle are 120° , x° , and $2y^\circ$. What is $x + y$?
7. Clarisse flips a coin twice. What is the probability that the two flips yield different results?
8. Suppose that $a \star b = \frac{ab}{a+b}$. Compute $2 \star (3 \star 6)$.
9. A school has some books. All the books can be split evenly among 6 classrooms and among 10 classrooms. What is the smallest number of books that the school can have?
10. Allison has to solve 15 math problems for homework. 5 are easy problems, 5 are medium problems, and 5 are hard problems. If it takes her 2 minute to solve an easy problem, 4 minutes to solve a medium problem, and 7 minutes to solve a hard problem, how many minutes does it take her to finish her homework?
11. Two chipmunks can build a treehouse in five hours. How much time will it take for ten chipmunks to build twenty treehouses?
12. In rectangle $ABCD$, AB is 1 less than twice the length of BC . If the perimeter is 22, what is the area of $ABCD$?
13. Matthew is sleeping through his math final, which happens to be 100 questions long. When he is woken up with 15 minutes remaining, he starts, but cannot finish his test. If Matt had answered three-fifths of the questions on his math final, how much longer would he have needed? Express your answer in minutes.

Orange County Math Circle

All-Girls Math Tournament

5th-6th Sprint Round

14. The sum of the area and the perimeter of a rectangle with integer sides is 38. What is the largest possible area of the rectangle?
15. Michael and Jason have a pizza eating competition. The pizzas are perfectly shaped squares with side lengths that are whole numbers greater than 1. If the total area of one pizza Michael ate is 25 in^2 less than the total area of one pizza Jason ate, what is the side length of the larger pizza?
16. Michael was very salty about losing the first eating competition against Jason, and called for a rematch. This time, they are eating extremely salty square saltine crackers. Half of the area of each salty square saltine cracker is covered in pure salt. If Michael eats 24 in^2 more salty saltine crackers than Michael, how much more salt does he consume?
17. Jason is a math student who has trouble reading diagrams- he flips the units and ones digits of every number he sees. For example, he reads 24 as 42, and 63 as 36. If he calculated the area of a 51 by 12 rectangle, what is the positive difference between his answer and the correct area?
18. There are two rectangles with integer side lengths, both with area 48. What is the greatest possible difference between the perimeters of the two rectangles?
19. Anh is trying to decide which books to read next, and so goes to her local bookstore. The book store has three sections: sci-fi, fantasy, and non-fiction, each with 10 books available. If she wants to choose two books from two different sections, how many ways can she choose them?
20. $A, B, C, D, E,$ and F are digits from 1 to 9 and ABC and DEF represent 3 digit numbers. If $ABC+DEF = 1024$, what is the maximum possible value of $CBA+ FED$?
21. Twelve girls are trying to figure out how to split up into two teams of six for the All-Girls Math tournament. 3 of them are from Generic Middle School, 4 are from Standard Middle School, 2 are from Normal Middle School, and the other 3 are homeschooled. If each non-homeschooled girl must be on the same team as the other girls from her school, how many ways are there to split them up into two teams?
22. Aleena has a collection of 12 identical lavender-colored Sharpie markers, and she wants to distribute them all among three of her friends. If each friend must receive at least 3 Sharpie markers, how many ways are there to distribute the markers?
23. The first two terms of an arithmetic series are 5 and 10. The first two terms of a geometric series are also 5 and 10. What is the positive difference between the 5th terms of each series?
24. Points $A, B, C,$ and D are on a line, from left to right in that order. B is the midpoint of AC , and C is the midpoint of AD . If point E is not on the same line, what is the

Orange County Math Circle

All-Girls Math Tournament

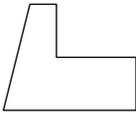
5th-6th Sprint Round

ratio of the area of ABE to the area of ADE ? Express your answer as a common fraction.

25. The library is a very popular place in the small town of Bookworm. Every other day, Anika goes there work on her homework. Every third day, Ben goes there to read. Every fifth day, Cassandra goes there to meet up with the local book club. Given that all three were there on December 31 last year, how many days were exactly two of them there in January this year?

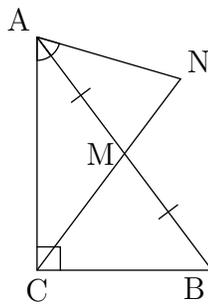
26. Triangle ABC with non-zero area has $AB = 42$ and $BC = 73$. If AC has integer length, how many different possible values can it be?

27. The coordinates of a polygon are $(0,0)$; $(1,4)$; $(5,0)$; $(2,4)$; $(2,2)$; and $(5,2)$. What is the area of the polygon?



28. Betty tosses a fair coin 6 times. What is the probability that she gets strictly more heads than tails?

29. Right triangle ABC has $AC = 8$ and $CB = 6$. M is the midpoint of AB . Pick point N on line CM with M between C and N such that $\angle CAB = \angle BAN$. Compute MN . Express your answer as a common fraction.



30. Two circles, O_1 and O_2 , of radius 6 and 8, respectively, intersect at points P and Q , as shown. AB is a line segment that passes through P and with one end on each circle. AQ is tangent to $\odot O_2$, and BQ is tangent to $\odot O_1$. Find the area of $\triangle AQB$.

Orange County Math Circle

All-Girls Math Tournament

5th-6th Sprint Round

