

2nd Rochester Area Math Competition 2020

12 September 2020

Elementary II Individual

1. Amelia has 89 cents left to pay at the candy store after using a gift card. She has quarters, nickels, and pennies. What is the smallest number of coins she can use to pay the 89 cents?
2. A square has the same perimeter as an equilateral triangle. If the square has an area of 81 square inches, what is the side length of the triangle in inches?
3. The square below in the picture must be filled in a way such that each of the numbers 1, 2, 3, and 4 appears in each row and in each column exactly once. What number can be in the square marked with a question mark?

| | | | |
|---|---|---|---|
| | | 2 | ? |
| 1 | | 3 | |
| | 4 | 1 | |
| | | | 1 |

4. Three cubes have side lengths of 1, 2, and 4. If X is equal to the sum of the volumes of these cubes, what is the sum of the digits of X ?
5. Toby, Sparky, and Dexter share 20 dog biscuits. Toby ends up eating the same number of dog biscuits as Sparky and Dexter combined. If Sparky eats two more dog biscuits than Dexter, how many dog biscuits does Dexter eat?



6. Triangle $\triangle DEF$ is an isosceles triangle. The measure of angle D is 54 degrees. What is the measure of angle E? Express your answer in degrees.
7. Sam and Kat plan to meet up at some point between their houses. The distance between their houses is 2.75 miles. Sam starts walking towards Kat's house at 3 : 00, walking at a constant speed of 3 mph. Kat starts biking towards Sam's house at 3 : 15, biking at a constant speed of 9 mph. If the time when they met can be displayed on a digital clock as $a : bc$, what is the 3 digit number abc ?

8. Let a , b , and c be the next 3 terms in the following sequence in that order.

9, 10, 12, 15, 19, 24, ...

For reference, the first 9 terms of the sequence are 9, 10, 12, 15, 19, 24, a , b , c . Find $a + b + c$.

9. Lucas buys square tiles of side length 9 inches for an area in his bathroom, but doesn't know how many he should buy. What is the minimum number of square tiles required to cover a rectangular area that is 54 inches long and 36 inches wide?
10. For the first 31 odd numbers, let the ratio of perfect squares to the number of primes be $\frac{m}{n}$, where m and n are positive integers who share no common divisors other than 1. Find $m + n$.
11. There are 20 apples and pears in total at one Sunny's Farmer Market stand. The ratio of apples to pears is 3 : 2. Sonya randomly chooses two fruits from the stand without replacement. The probability of Sonya choosing one apple and one pear can be expressed as a fraction in simplest form, $\frac{m}{n}$, where m and n are positive integers who share no common divisors other than 1. What is $m + n$?



12. Kate and Fred work together to paint the four walls of a room. All four walls are congruent, meaning they are the same size and shape. Kate works alone for one hour, and finishes painting one wall. Fred joins in, and the two of them finish painting the other three walls in 1 hour and 48 minutes. Assuming both Kate and Fred were painting at constant rates the entire time, how long, in hours, would it have taken Fred to paint all four walls by himself at the same rate?
13. Mr. Krabs is thinking of all the ways he can arrange the items in a Krabby Patty. The items are a piece of lettuce, a slice of tomato, a slice of cheese, a slice of onion, and a sea patty. Assuming the items are placed one on top of another, how many ways can Mr. Krabs arrange the items in a Krabby Patty?
14. Candice chooses 3 pieces of candy from her teacher's prize bucket. In the bucket, there are 7 caramels, 3 lollipops, and 5 truffles. She randomly picks one candy. The probability she chooses a lollipop can be expressed as a fraction in the simplest form, $\frac{m}{n}$, where m and n are positive integers with no common divisors other than 1. What is $m+n$?



15. Isosceles triangle ABC lies on a coordinate plane. Its base is parallel to the x -axis, with an apex at coordinate $(14, 17)$. The height of triangle ABC is 12 units and the length of one of the two longer sides is 13 units. Let k_1 be the sum of the coordinates of point A and let k_2 be the sum of the coordinates of point B . What is $k_1 + k_2$?

