SDMFD Tea Party Relay

Round 1 Problem 1

$4 \quad + 19 = 27$. What is x?

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Round 1 Problem 2

Let T be TNYWR. How many ways are there to rearrange 4 indistinguishable balls and T indistinguishable cubes into one line?

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Round 1 Problem 3

Let T be TNYWR. Sarah has T dollars and wants to buy oranges and apples. Oranges cost $3 each while apples cost $4 each. With her budget, what is the maximum number of fruits she can purchase?

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Round 2 Problem 1

The area of a regular hexagon is $24\sqrt{3}$. What is the perimeter of the hexagon?

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Round 2 Problem 2

Let T be TNYWR. There are T tricycles and bicycles on the playground, and a total of 57 wheels. If tricycles have three wheels and bicycles have two wheels, how many bicycles are there?

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Round 2 Problem 3

Let T be TNYWR. How many zeros are in T! (For example, 4! = 4*3*2*1)

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Round 3 Problem 1

Ben is thinking of a two digit number. This two digit number is prime. It is also equal to the sum of two positive perfect squares! What is the smallest possible number that Ben could be thinking of?

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Round 3 Problem 2

Let T be TNYWR. Let ABC be a triangle with side lengths 5, 12, and T. What is the area of the triangle?

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Round 3 Problem 3

Let T be TNYWR. How many positive numbers divide T?

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Round 4 Problem 1

A parallelogram and a square have equal area. The square has a side length that is 5 less than the height of the parallelogram and 3 more than the base of the parallelogram. What is the sidelength of the square?

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Round 4 Problem 2

Let T be TYNWR. Let S = 2T. Two perfect squares differ by S. What is the largest possible value for one of these perfect squares?

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Round 4 Problem 3

Let T be TNYWR. How many positive integers less than T are two more than a multiple of 3?

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Round 5 Problem 1

A positive integer has 9 positive divisors. What is the smallest positive integer that this can be?

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Round 5 Problem 2

Let T be TNYWR. Two real numbers multiply to T. What is the smallest possible value for their sum?

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Round 5 Problem 3

Let T be TNYWR. What is the sum of all of the odd positive integers less than T?

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Round 6 Problem 1

What is the units digit of $2017^{2016^{2015}}$? (By the way, this means that you would first evaluate 2016^{2015}, and then raise 2017 to that power, and NOT evaluating 2017^{2016} and then raising that to the 2015-th power).

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Round 6 Problem 2

Let T be TNYWR. An unfair coin comes up heads with probability T /3. You give your friend Mary this coin and tell her to keep flipping this coin until she gets a heads. What is the expected number of times that she will flip?

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Round 6 Problem 3

Let T be TNYWR. An equilateral triangle has a perimeter of T. Then, Jimmy is going to rotate the equilateral triangle around the center once. What is the total area swept out by the equilateral triangle? Leave your answer in terms of π, though keep it in simplest form.

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BONUS ROUND Problem 1

The results of this round will <u>not</u> affect your team score

This round is going to be meta. Let T be the number that you will pass back to the person behind you. Pass back the average of T and 27/T.

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BONUS ROUND Problem 2

The results of this round will <u>not</u> affect your team score

Let T be TNYWR. The person in front of you should have passed you a real number, though there were actually two correct answers to the question. Therefore, there should be two possible correct answers to this problem. The product of the two possible answers is −27. Randomly select one of these possible answers of T to pass back. Don't worry, the person behind you will know what to do.

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BONUS ROUND Problem 3

The results of this round will <u>not</u> affect your team score

Let T be TNYWR. Now, this round is particularly tricky, and the person in front of you had to guess their answer! Let A be the answer that you are going to submit. Let r and s be the solutions for x to the quadratic $^{2} + \quad + \quad = 0$. Submit $^{2} + \quad ^{2}$.

Tea Party Relay (9) Solutions

Round 1

5

Round 2

3

Round 3

8

Round 4

21

Round 5

256

Round 6

$\frac{\pi}{12}$

Bonus

9