0 Practice Round

0.1 Problem 1

A leap year happens on a year if that year is divisible by 4, unless the year is a multiple of a hundred. However, if it is a multiple of 400, then it is a leap year. When is the next leap year (after 2020)?

0.2 Problem 2

Let x be the answer to Problem 1.

The area of a square is $x + 1$. What is the sidelength of this square?

0.3 Problem 3

Let y be the answer to Problem 2.

Michael is reading a short story with pages numbered from 1 to y. How many odd-numbered pages are there?

1 Round 1

1.1 Problem 1

What is $1 - 2 + 3 - 4 + 5 - 6 + \cdots + 99 - 100 + 101$?

1.2 Problem 2

Let x be the answer to Problem 1.

Cheryl has \$x. She gives a third of her money to her mom and half of the remaining amount to her sister. Finally, she makes \$8 from selling lemonade. How much money does Cheryl have left?

1.3 Problem 3

Let y be the answer to Problem 2.

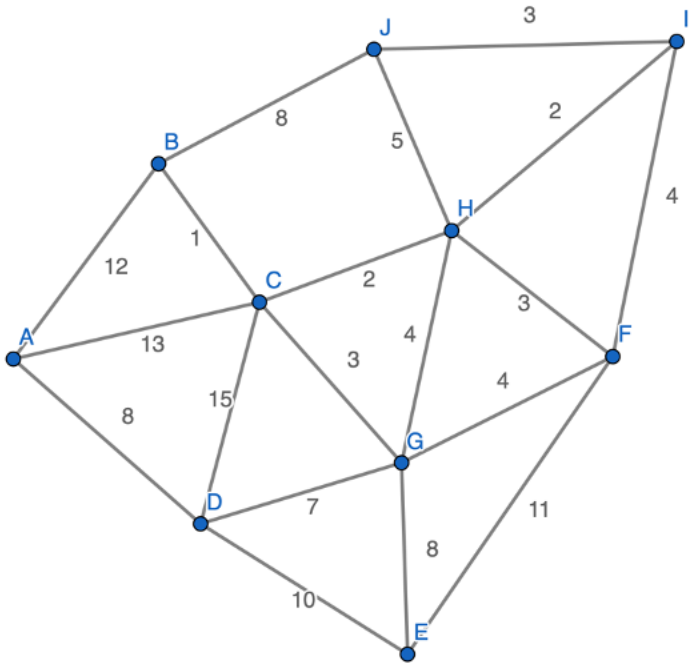
Larry and Harry each have a toy motor. Larry builds a toy car with his motor that travels 10 meters in 5 seconds. Harry also builds a toy car, but his travels 10 meters in $\frac{y}{3}$ seconds. Assuming that adding the

motors is the same as adding their speeds, how long (in seconds) will it take to travel 64 meters on a car that has both Harry and Larry's motors on it?

2 Round 2

2.1 Problem 1

Raiyana is driving through a city with many bridges, shown as lines below. To cross a bridge, she must pay its toll, indicated by the numbers on the graph. What is the smallest amount she can pay if she starts at point A, visits each city exactly once, and returns to point A?



2.2 Problem 2

Let x be the answer to Problem 1.

Berry owns a furniture store with several employees. One day, Berry realizes that the average number of items sold per employee up to that point was x. The very next day, Jerry sold 6 items, Andrew sold 7, Ryan sold 8, and the rest all sold 2 items each. This raised the average number of items sold per employee to 60. How many employees work at Berry's furniture store?

2.3 Problem 3

Let y be the answer to Problem 2.

One day, the boys and girls in Instructor Jerry's class decided to have a contest. To create stakes, each student brought 6 candies the next day, under the rules that whichever side wins splits up all the candy among themselves. The girls found out that if they won, they would all receive y candies. How many candies would each boy receive if the boys won?

3 Round 3

3.1 Problem 1

A triangular number is defined as a positive integer that can be expressed in the form $\frac{n(n+1)}{2}$, where n is a positive integer. Let S and L be the smallest and largest triangular numbers respectively such that they can each be expressed as a sum of exactly two triangular numbers, and $S < L < 50$. What is $S + L$?

3.2 Problem 2

Let x be the answer to Problem 1.

Howard has at least one friend with each of the following hair colours: black, brown, blue, and blonde. The number of possible combinations of hair colours is $2x$.

For example, if Howard has 8 friends, a possible combination could be 2 black, 1 brown, 3 blue, and 2 blonde, and another possible combination could be 5 black, 1 brown, 1 blue, and 1 blonde.

How many friends does Howard have?

3.3 Problem 3

Let y be the answer to Problem 2.

Amanda, Bernando, and Choliver are being pursued by a horde of engineers, who are chanting "pi = 3". In order to contain the spread of these engineers, they need to cover a distance of $18y$ km along a straight road to find a Totem of UnPi'ing. They have among them a motorcycle that can only carry 2 people at a time. The motorcycle can travel at a speed of 120 km/h while each of the 3 people can walk at 8 km/h. Assuming that the motorcycle does not run out of gas and that the time taken for the motorcycle to turn or for people to get on and off is negligible, what is the shortest time (in hours) it will take for ALL 3 of them to cover $18y$ km?