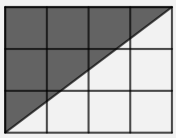
CEMC at Home
Grade 7/8 - Friday, June 19, 2020
Relay Day - Part 1

As part of the CEMC's Canadian Team Mathematics Contest, students participate in Math Relays. Just like a relay in track, you "pass the baton" from teammate to teammate in order to finish the race, but in the case of a Math Relay, the "baton" you pass is actually a number!

Read the following set of problems carefully.

Problem 1: Twelve 1 unit by 1 unit squares form a rectangle, as shown. What is the area of the shaded region?



Problem 2: *Replace N below with the number you receive.*
In a sequence of numbers, the first term is 3. Each term after the first is determined by multiplying the previous term by 2 and then adding 1. For example, the second term is $2 \times 3 + 1 = 7$ and the third term is $2 \times 7 + 1 = 15$. What is the value of term N?

Problem 3: *Replace N below with the number you receive.*
In the diagram, an equal-armed balance is shown. The mass of each circle is N grams. The rectangles all have the same mass. What is the mass (in grams) of one rectangle?

Notice that you can answer Problem 1 without any additional information.

In order to answer Problem 2, you first need to know the mystery value of N. The value of N used in Problem 2 will be the *answer* to Problem 1. (For example, if the answer you got for Problem 1 was 5 then you would start Problem 2 by replacing N with 5 in the problem statement.)

Similarly, you need the answer to Problem 2 to answer Problem 3. The value of N in Problem 3 is the *answer* that you got in Problem 2.

Now try the relay! You can use this tool to check your answers.

Follow-up Activity: Can you come up with your own Math Relay?
What do you have to think about when making up the three problems in the relay?

In Part 1 of this resource, you were asked to complete a relay on your own. But, of course, relays are meant to be completed in teams! In a team relay, three different people are in charge of answering the problems. Player 1 answers Problem 1 and passes their answer to Player 2; Player 2 takes Player 1's answer and uses it to answer Problem 2; Player 2 passes their answer to Player 3; and so on.

In Part 2 of this resource, you will find instructions on how to run a relay game for your friends and family. We will provide a relay for you to use, but you can also come up with your own!