



# CEMC at Home

## Grade 4 to 12 - Friday, June 19, 2020

### Relay Day - Part 2

#### Relay for Family and Friends

In Part 1 of this resource, you learned how to do a Math Relay. Now, why not try one out with family and friends!

You can put together a relay team and

- play just for fun, not racing any other team, or
- compete against another team in your household (if you have at least 6 people in total), or
- compete with a team from another family or household by
  - timing your team and comparing times with other teams to declare a winner, or
  - competing live using a video chat.

Here are the instructions for how to play.

#### Relay Instructions:

1. Decide on a team of three players for the relay. The team will be competing together.
2. Find someone to help administer the relay; let's call them the "referee".
3. Each teammate will be assigned a number: 1, 2, or 3. Player 1 will be assigned Problem 1, Player 2 will be assigned Problem 2, and Player 3 will be assigned Problem 3.
4. The three teammates should not see any of the relay problems in advance and should not talk to each other during the relay.
5. Right before the relay starts, the referee should hand out the correct relay problem to each of the players, with the problem statement face down (not visible).
6. The referee will then start the relay. At this time *all three players* can start working on their problems.  
*Think about what Player 2 and Player 3 can do before they receive the value of  $N$  (the answer from the previous question passed to them by their teammate).*
7. When Player 1 thinks they have the correct answer to Problem 1, they record their answer on the answer sheet and pass the sheet to Player 2. When Player 2 thinks they have the correct answer to Problem 2, they record their answer to the answer sheet and pass the sheet to Player 3. When Player 3 thinks they have the correct answer to Problem 3, they record their answer on the answer sheet and pass the sheet to the referee.



8. If all three answers passed to the referee are correct, then the relay is complete! If at least one answer is incorrect, then the referee passes the sheet back to Player 3.
9. At any time during the relay, the players on the team can pass the answer sheet back and forth between them, as long as they write nothing but their current answers on it and do not discuss anything. (For example, if Player 2 is sure that Player 1's answer must be incorrect, then Player 2 can pass the answer sheet back to Player 1, silently. This is a cue for Player 1 to check their work and try again.)

**See the next page for a relay for family and friends!** This includes instructions for the referee. You can also come up with your own relays to play. You can find many more relays from past CTMC contests on the CEMC's [Past Contests webpage](#).

*Sample answer sheets are provided below for you to use for your relays if you wish.*

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**Answer Sheets:**

Problem 1 Answer	
Problem 2 Answer	
Problem 3 Answer	

Problem 1 Answer	
Problem 2 Answer	
Problem 3 Answer	

Problem 1 Answer	
Problem 2 Answer	
Problem 3 Answer	

Problem 1 Answer	
Problem 2 Answer	
Problem 3 Answer	



## Relay For Three

### Instructions for the Referee:

- Multiple questions at different levels of difficulty are given for the different relay positions.
  - Assign one of the first three problems (marked “Problem 1”) to Player 1.
  - Assign one of the next three problems (marked “Problem 2”) to Player 2.
  - Assign one of the last three problems (marked “Problem 3”) to Player 3.

Choose a problem so that each player is comfortable with the level of their question. The level of difficulty of each question is represented using the following symbols:

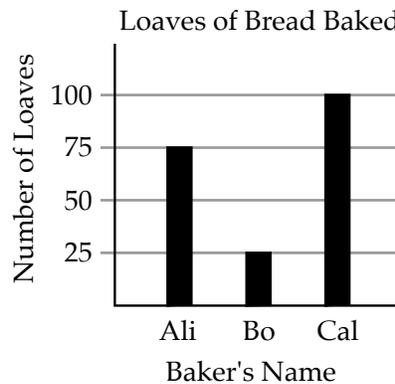
-  These questions should be accessible to most students in grade 4 or higher.
-  These questions should be accessible to most students in grade 7 or higher.
-  These questions should be accessible to most students in grade 9 or higher.

- Use this [tool](#) to find the answers for the relay problems in advance.

### Relay Problems (to cut out):

#### Problem 1

The graph shows the number of loaves of bread that three friends baked. How many loaves did Bo bake?

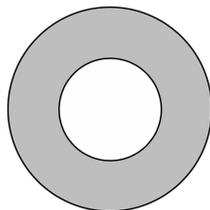


#### Problem 1

An equilateral triangle has sides of length  $x + 4$ ,  $y + 11$ , and 20. What is the value of  $x + y$ ?

#### Problem 1

In the figure shown, two circles are drawn. If the radius of the larger circle is 10 and the area of the shaded region (in between the two circles) is  $75\pi$ , then what is the *square* of the radius of the smaller circle?



Problem 2 ●

Replace  $N$  below with the number you receive.

Kwame writes the whole numbers in order from 1 to  $N$  (including 1 and  $N$ ). How many times does Kwame write the digit '2'?

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Problem 2 ■

Replace  $N$  below with the number you receive.

The total mass of three dogs is 43 kilograms. The largest dog has a mass of  $N$  kilograms, and the other two dogs have the same mass. What is the mass of each of the smaller dogs?

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Problem 2 ◆

Replace  $N$  below with the number you receive.

The points  $(6, 16)$ ,  $(8, 22)$ , and  $(x, N)$  lie on a straight line. Find the value of  $x$ .

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Problem 3 ●

Replace  $N$  below with the number you receive.

You have some boxes of the same size and shape. If  $N$  oranges can fit in one box, how many oranges can fit in two boxes, in total?

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Problem 3 ■

Replace  $N$  below with the number you receive.

One morning, a small farm sold 10 baskets of tomatoes, 2 baskets of peppers, and  $N$  baskets of zucchini. If the prices are as shown below, how much money, in dollars did the farm earn in total from these sales?

Basket of Tomatoes:	\$0.50
Basket of Peppers:	\$2.00
Basket of Zucchini:	\$1.00

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Problem 3 ◆

Replace  $N$  with the number you receive.

Elise has  $N$  boxes, each containing  $x$  apples. She gives 12 apples to her sister. She then gives 20% of her remaining apples to her brother. After this, she has 120 apples left. What is the value of  $x$ ?