Problem of the Week
Problem A
Black Box Calculations

The CEMC has created black box machines that process numbers. The machines accept an input number, then do calculations based on that number, then produce an output.

Ronit set up his black box machine to first multiply the input number by 2, and then add 8 to the result.

For example, if Ronit inputs the number 10, his black box machine will first multiply it by 2 to produce the number 20. Then it will take the number 20 and add 8 to produce the final output of 28.

Amrita set up her black box machine to first multiply the input number by 4, and then subtract 6 from the result.

(a) Amrita inputs the number 10 into her black box machine. What number will the machine output?

(b) Ronit and Amrita are the same age and they are older than 3. They each put their age number into their black box machine and were surprised to get the same output as each other. How old are Ronit and Amrita?

(c) Write two black box machine setups that have an input of 10 and and output of 16. You can use any two of the following operations: addition, subtraction, multiplication, or division.