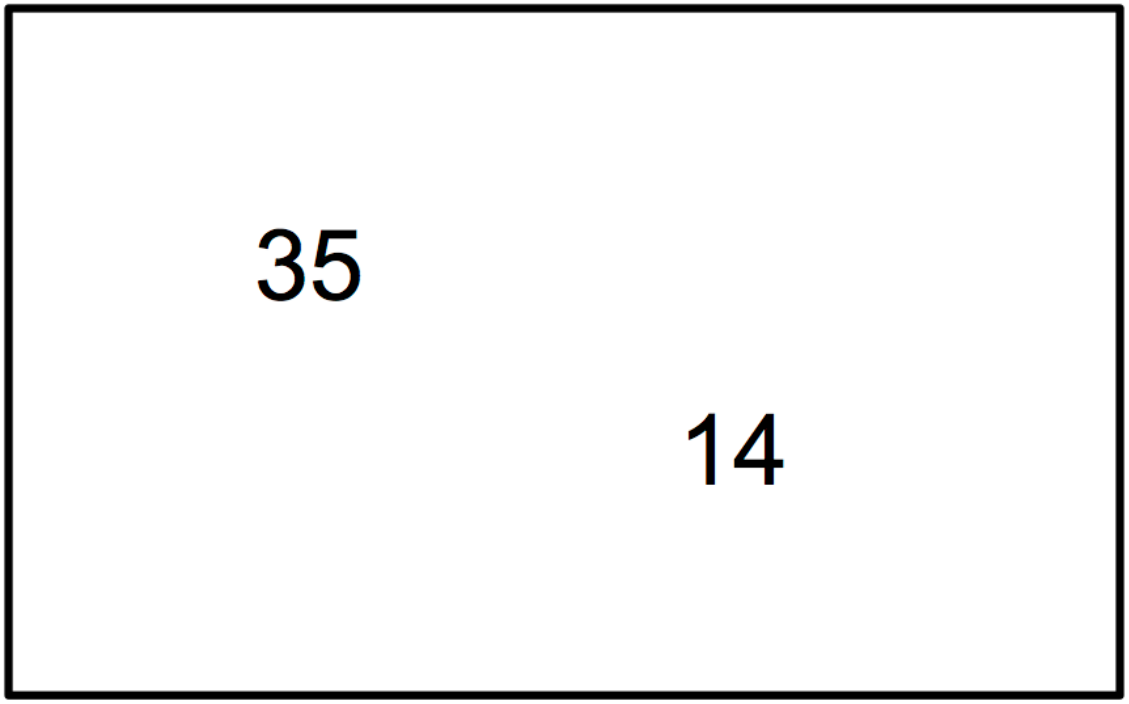
Elementary Group **Feb 18, 2017**

Euclid's Game

Start with two numbers in a box. Two players take turns writing a new number in the box that is the difference of two existing numbers in the box and is a positive number (not zero or a negative number). The player that can no longer make a move loses.



For each pair of starting numbers below, decide if you want to go first or second.

- 8 and 3
- 10 and 6
- 30 and 45
- 63 and 27
- 161 and 69

Given two starting numbers, how can you decide which other numbers will appear in the box? How can you decide if the first or second player will win?

Greatest Common Factor (Greatest Common Divisor)

1. Find the greatest common factor of the numbers 3^4x7x13 and $2^2x3^2x7^2$.

2. What is the greatest common factor of
    a. 165 and 4224?

    b. 847 and 539?

    c. 949 and 2701?

3. Andrea, Beatrice, and Caroline are each thinking of a number (A, B, and C)
    a. The GCF of A and B is 5.
    b. The GCF of B and C is 7.
    c. The GCF of C and A 4.
    d. Each number is less than 250.
    e. If you multiply all the numbers together, the product is divisible by 11.
    f. One of the numbers is a perfect square (this means, it is equal to a number squared).

    What are the three numbers A, B, and C?