The method of false position

In this activity we will seek to understand the method of false position.

Exercise 1 *Solve the following algebra problem:*

$$x^2 + y^2 = 52$$
$$2x = 3y$$

Question 2 *While I am not sure which method you used to solve this problem, ancient Egyptians used the method of false position to solve problems like this. Moreover, such a method was taught in American schools until the mid 1800's. Here is the solution using false position—without any explanation!*

(a) *Set $x = 3$ and $y = 2$.*

(b) $3^2 + 2^2 = 13$.

(c) $52/13 = 4$.

(d) $\sqrt{4} = 2$.

(e) $x = 2 \cdot 3$ *and* $y = 2 \cdot 2$.

Explain the algorithm used and give another example to show you know how it is done.

Exploration 3 *Can you explain **why** the method of false position works?*

Exercise 4 *Solve the following problem: One hundred dollars is to be split among four siblings: Ali, Brad, Cara, and Denise where Brad gets four more dollars than Ali, Cara gets eight more dollars than Brad, and Denise gets twice as much as Cara. How much does each sibling get?*

Question 5 *Here is the solution by* double false position*:*

(a) *Suppose Ali gets 6 dollars.*

(b) *The total now is not 100, but 70. We are too low by 30.*

(c) *Now suppose Ali gets 8 dollars.*

(d) *The total now is not 100, but 80. We are too low by 20.*

(e) *Compute*
$$\frac{8 \cdot 30 - 6 \cdot 20}{30 - 20} = 12.$$
   This is the correct answer.

Explain the algorithm used and give another example to show you know how it is done.

Exploration 6 *Can you explain **why** the method of double false position works?*