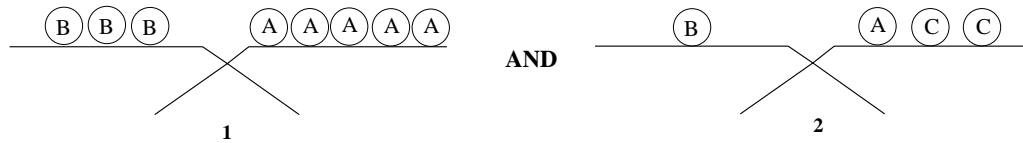


Balance the cookies, or balance the variables Problem

The idea for this problem sequence came from a problem in a Japanese textbook.

- At the bake sale, cookies are sold by weight. All apple cookies (A) weigh the same. All banana cookies (B) weigh the same (but are a different weight than the apple cookies). And all chocolate cookies (C) weigh the same (and are a different weight than the apple and banana cookies). The cookies can be balanced in the following way:



How many chocolate cookies will it take to balance one apple cookie?

- Write equations for the left and right balances in problem one.
- Provide both algebraic expressions and corresponding pictures for every step of your solution to problem one.

Hints

Hint to problem 1. Substitute some cookies with other cookies that balance them.

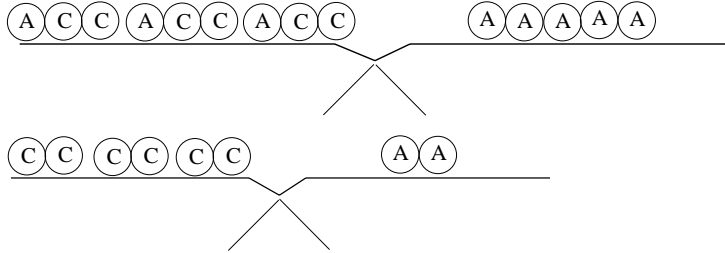
Answers

1. One apple cookie balances three chocolate cookies.

2. (a) $3B = 5A$

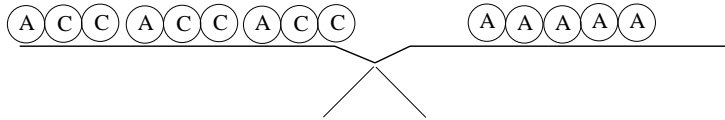
(b) $B = A + 2C$

3.



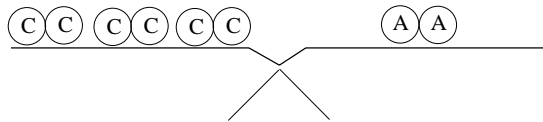
Solutions

1. From balance 2 (on the right side) we know that one banana cookie is balanced by one apple cookie and two chocolate cookies. So, if we substitute all three banana cookies for apple and chocolate cookies in the first balance we'll get:



You can substitute cookies that balance each other in a number of different ways. This solution presents one of the possible ways.

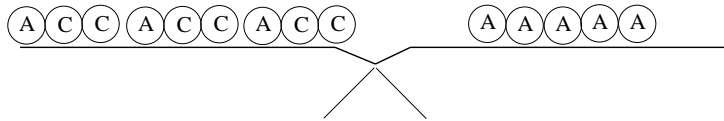
Remove 3 apple cookies on each side:



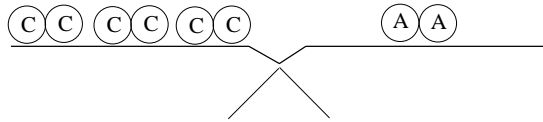
We see that 2 apple cookies balance 6 chocolate cookies, or one apple cookie balances three chocolate cookies.

2. (a) $3B = 5A$
 (b) $B = A + 2C$

3.



$$3(A + 2C) = 5A$$



$$6C = 2A$$