Ideas to Theorems

Multiples are obtained by multiplying an integer by another integer

Consider 2 bags of marbles and the number of marbles in each bag can be shared (divided) equally between 3 people. Mathematically, we'd say the number of marbles in each bag is a multiple of 3.

If all the marbles were placed in one bag, is it still possible to share the marbles equally between the 3 people.

That suggests that if the number of apples in the first bag is *a* and the number of apples in the second bag is *b,* then we can still share (divide) the apples equally id they are all in the same bag.

Mathematically, we have:

$$3|a \text{ and } 3|b, \text{ then } 3|(a + b)$$

Theorem: For any integers, a, b and d

1) **If d|a and d|b, then d|(a + b)**
2) **If d|a and d∤b, then d∤(a+ b)**

Subtraction is defined in terms of addition, therefore

Theorem: For any integers, a, b and d

1) **If d|a and d|b, then d|(a – b)**
2) **If d|a and d∤b, then d∤(a – b)**