

October 22nd

A simple test to see if a number is divisible by 3 is to show the sum of the digits is divisible by 3.

For example, 912 is divisible by 3, since $9+1+2=12$ and 12 is divisible by 3.

Show algebraically why this divisibility test works.

A three digit number "abc" can be written as

$$100a + 10b + c =$$

$$99a + 9b + a + b + c =$$

$$3(33a + 3b) + a + b + c$$

Hence it can only be a multiple of 3 if $a + b + c$ is a multiple of 3