1 Question:

Prove that the sum of two even integers is always even.

2 Answer:

Let a and b be two even integers. By definition, an even integer can be written as:

$$a = 2m, \quad b = 2n, \quad \text{where } m, n \text{ are integers.} \tag{1}$$

The sum of a and b is:

$$a + b = 2m + 2n. \tag{2}$$

Factoring out 2:

$$a + b = 2(m + n). \tag{3}$$

Since $m + n$ is an integer, we conclude that $a + b$ is even.