Question 2

Use a direct proof to show that the sum of two even integers is even.

Suppose a and b are even integers. There exists integers c and d such that $a = 2c$ and $b = 2d$. Adding, we obtain that $a + b = 2c + 2d = 2(c + d)$. $a + b$ is 2 times the integer $c + d$. Therefore, $a + b$ is even.