

$$a^2 + b^2 + c^2 + 6b + 8c - 2a = -26, 2a + 3b - 4c = ?$$

**Solution.**

$$a^2 + b^2 + c^2 + 6b + 8c - 2a = (a^2 - 2a) + (b^2 + 6b) + (c^2 + 8c) =$$

$$(a - 1)^2 - 1 + (b + 3)^2 - 9 + (c + 4)^2 - 16 = (a - 1)^2 + (b + 3)^2 + (c + 4)^2 - 26;$$

Hence:

$$(a - 1)^2 + (b + 3)^2 + (c + 4)^2 - 26 = -26 \Rightarrow (a - 1)^2 + (b + 3)^2 + (c + 4)^2 = 0 \Rightarrow$$

Since the square of any number is non-negative, in the left-hand side we have non-negative value

$$\Rightarrow a = 1, b = -3, c = -4 \Rightarrow 2a + 3b - 4c = 2 \cdot 1 + 3 \cdot (-3) - 4 \cdot (-4) = 2 - 9 + 16 = 9.$$

**Answer.**

$$2a + 3b - 4c = 9$$