

$$\begin{aligned}
 \text{ii)} \quad & 5 - 3(x+y)^2 + 2(x-y) \cdot (x+y) = \\
 & = 5 - 3(x^2 + 2xy + y^2) + 2(x^2 - y^2) = \\
 & = 5 - \underline{3x^2} - 6xy - \underline{3y^2} + \underline{2x^2} - \underline{2y^2} = \\
 & = 5 - 3x^2 + 2x^2 - 6xy - 3y^2 - 2y^2 = 5 - x^2 - 6xy - 5y^2.
 \end{aligned}$$

$$\begin{aligned}
 \text{iii)} \quad & (\alpha - \beta)^3 + 3\alpha\beta(\alpha - \beta) + 2\beta^3 = \\
 & = \alpha^3 - 3\alpha^2\beta + 3\alpha\beta^2 - \beta^3 + 3\alpha\beta \cdot \alpha - 3\alpha\beta \cdot \beta + 2\beta^3 = \\
 & = \alpha^3 - \underline{3\alpha^2\beta} + \underline{3\alpha\beta^2} - \beta^3 + \underline{3\alpha^2\beta} - \underline{3\alpha\beta^2} + \underline{2\beta^3} = \\
 & = \alpha^3 - 3\alpha^2\beta + 3\alpha^2\beta + 3\alpha\beta^2 - 3\alpha\beta^2 - \beta^3 + 2\beta^3 = \alpha^3 + \beta^3
 \end{aligned}$$

$$\begin{aligned}
 \text{iv)} \quad & (2x+1)^2 - (x+1)(x-1) - 3x^2 = \\
 & = (2x)^2 + 2 \cdot 2x \cdot 1 + 1^2 - (x^2 - 1^2) - 3x^2 = \\
 & = 4x^2 + 4x + 1 - (x^2 - 1) - 3x^2 = \\
 & = \underline{4x^2} + 4x + \underline{1} - \underline{x^2} + \underline{1} - \underline{3x^2} \\
 & = 4x^2 - x^2 - 3x^2 + 4x + 1 + 1 = 4x + 2
 \end{aligned}$$

3) Για να δείξουμε τις παρακάτω 4 ιδιότητες θα ξεκινήσουμε από το 1^ο μέλος και θα καταλήξουμε στο 2^ο.

$$\begin{aligned}
 \text{i)} \quad & (x+y)^2 - (x-y)^2 = \\
 & = x^2 + 2xy + y^2 - (x^2 - 2xy + y^2) = \\
 & = \underline{x^2} + \underline{2xy} + y^2 - \underline{x^2} + \underline{2xy} - \underline{y^2} = \\
 & = x^2 - x^2 + 2xy + 2xy + y^2 - y^2 = 4xy
 \end{aligned}$$