

ΑΞΙΟΣΗΜΕΙΩΤΕΣ ΤΑΥΤΟΤΗΤΕΣ

1. $(\alpha + \beta)^2 = \alpha^2 + 2\alpha\beta + \beta^2$

Εφαρμογή-παράδειγμα:

$$\begin{array}{ccccccc} (2x + 3y)^2 & = & (2x)^2 & + & 2 \cdot 2x \cdot 3y & + & (3y)^2 = 4x^2 + 12xy + 9y^2 \\ \downarrow & & \downarrow & & \downarrow & & \downarrow \\ (\alpha + \beta)^2 & = & \alpha^2 & + & 2\alpha\beta & + & \beta^2 \end{array}$$

2. $(\alpha - \beta)^2 = \alpha^2 - 2\alpha\beta + \beta^2$

Εφαρμογή-παράδειγμα:

$$\begin{array}{ccccccc} (3x - 4y)^2 & = & (3x)^2 & - & 2 \cdot (3x) \cdot (4y) & + & (4y)^2 = 9x^2 - 24xy + 16y^2 \\ \downarrow & & \downarrow & & \downarrow & & \downarrow \\ (\alpha - \beta)^2 & = & \alpha^2 & - & 2\alpha\beta & + & \beta^2 \end{array}$$

3. $(\alpha + \beta)^3 = \alpha^3 + 3\alpha^2\beta + 3\alpha\beta^2 + \beta^3$

Εφαρμογή-παράδειγμα:

$$(x + 2)^3 = x^3 + 3 \cdot x^2 \cdot 2 + 3 \cdot x \cdot 2^2 + 2^3 = x^3 + 6x^2 + 12x + 8$$

4. $(\alpha - \beta)^3 = \alpha^3 - 3\alpha^2\beta + 3\alpha\beta^2 - \beta^3$

Εφαρμογή-παράδειγμα:

$$(2x - 5)^3 = (2x)^3 - 3 \cdot (2x)^2 \cdot 5 + 3 \cdot (2x) \cdot 5^2 - 5^3 = 8x^3 - 60x^2 + 150x - 125.$$

5. $(\alpha + \beta)(\alpha - \beta) = \alpha^2 - \beta^2$

Εφαρμογή-παράδειγμα:

$$(x + 2)(x - 2) = x^2 - 2^2 = x^2 - 4$$

$$(3\alpha + 2\beta)(3\alpha - 2\beta) = (3\alpha)^2 - (2\beta)^2 = 9\alpha^2 - 4\beta^2$$

6. $(\alpha - \beta)(\alpha^2 + \alpha\beta + \beta^2) = \alpha^3 - \beta^3$

7. $(\alpha + \beta)(\alpha^2 - \alpha\beta + \beta^2) = \alpha^3 + \beta^3$