

Τ Α Υ Τ Ο Τ Η Τ Ε Σ

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

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

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

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

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

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

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

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

9. $(\alpha + \beta)^4 = \alpha^4 + 4\alpha^3\beta + 6\alpha^2\beta^2 + 4\alpha\beta^3 + \beta^4$

10. $(\alpha - \beta)^5 = \alpha^5 - 5\alpha^4\beta + 10\alpha^3\beta^2 - 10\alpha^2\beta^3 + 5\alpha\beta^4 - \beta^5$

10. $\alpha^3 + \beta^3 + \gamma^3 - 3\alpha\beta\gamma = (\alpha + \beta + \gamma)(\alpha^2 + \beta^2 + \gamma^2 - \alpha\beta - \beta\gamma - \gamma\alpha)$
 $= \frac{1}{2}(\alpha + \beta + \gamma)[(\alpha - \beta)^2 + (\beta - \gamma)^2 + (\gamma - \alpha)^2]$

Αν $\alpha + \beta + \gamma = 0$ ή $\alpha = \beta = \gamma$ τότε $\alpha^3 + \beta^3 + \gamma^3 - 3\alpha\beta\gamma = 0$

11. $\alpha^v + \beta^v = (\alpha + \beta)(\alpha^{v-1} - \alpha^{v-2}\beta + \alpha^{v-3}\beta^2 - \dots - \alpha\beta^{v-2} + \beta^{v-1})$, ν περιττός
Δεν παραγοντοποιείται αν ν άρτιος

12. $\alpha^v - \beta^v = (\alpha - \beta)(\alpha^{v-1} + \alpha^{v-2}\beta + \alpha^{v-3}\beta^2 + \dots + \alpha\beta^{v-2} + \beta^{v-1})$, ν περιττός
 $= (\alpha - \beta)(\alpha^{v-1} + \alpha^{v-2}\beta + \alpha^{v-3}\beta^2 + \dots + \alpha\beta^{v-2} + \beta^{v-1})$, ν άρτιος
 $= (\alpha + \beta)(\alpha^{v-1} - \alpha^{v-2}\beta + \alpha^{v-3}\beta^2 - \dots + \alpha\beta^{v-2} - \beta^{v-1})$, ν άρτιος

13. $(\alpha_1^2 + \alpha_2^2)(\beta_1^2 + \beta_2^2) - (\alpha_1\beta_1 + \alpha_2\beta_2)^2 = (\alpha_1\beta_2 - \alpha_2\beta_1)^2$