Γ ΛΥΚΕΙΟΥ ΜΕΡΟΣ Α

15.54

Είναι

$$\boxed{f'(x)} = \ln x + \cancel{x}\frac{1}{\cancel{x}} + \alpha\sigma\upsilon\nu(\ln x) - \alpha\cancel{x}\eta\mu(\ln x)\frac{1}{\cancel{x}} + \beta\eta\mu(\ln x) + \beta\cancel{x}\sigma\upsilon\nu(\ln x)\frac{1}{\cancel{x}}$$

$$= \ln x + 1 + \alpha\sigma\upsilon\nu(\ln x) - \alpha\eta\mu(\ln x) + \beta\eta\mu(\ln x) + \beta\sigma\upsilon\nu(\ln x) =$$

$$= \boxed{\ln x + 1 + (\alpha+\beta)\sigma\upsilon\nu(\ln x) + (\beta-\alpha)\eta\mu(\ln x)}$$

και

$$\boxed{f''(x)} = \frac{1}{x} - \frac{(\alpha+\beta)\eta\mu(\ln x)}{x} + \frac{(\beta-\alpha)\sigma\upsilon\nu(\ln x)}{x} =$$

$$= \boxed{\frac{1-(\alpha+\beta)\eta\mu(\ln x)+(\beta-\alpha)\sigma\upsilon\nu(\ln x)}{x}}$$

Οπότε

$$\boxed{x^2 f''(x) - x f'(x) + 2f(x)} =$$

$$x^{\cancel{2}}\frac{1-(\alpha+\beta)\eta\mu(\ln x)+(\beta-\alpha)\sigma\upsilon\nu(\ln x)}{\cancel{x}} -$$

$$-x\left[\ln x + 1 + (\alpha+\beta)\sigma\upsilon\nu(\ln x) + (\beta-\alpha)\eta\mu(\ln x)\right] +$$

$$+2\left[x\ln x + \alpha x\sigma\upsilon\nu(\ln x) + \beta x\eta\mu(\ln x)\right] =$$

$$\cancel{x} - (\alpha+\beta)x\eta\mu(\ln x) + (\beta-\alpha)x\sigma\upsilon\nu(\ln x) - \cancel{x\ln x} - \cancel{x} - (\alpha+\beta)x\sigma\upsilon\nu(\ln x) -$$

$$-(\beta-\alpha)x\eta\mu(\ln x) + \cancel{2}x\ln x + 2\alpha x\sigma\upsilon\nu(\ln x) + 2\beta x\eta\mu(\ln x) =$$

$$x\eta\mu(\ln x)\left[-\cancel{\alpha} - \cancel{\beta} - \cancel{\beta} + \cancel{\alpha} + \cancel{2\beta}\right] + x\sigma\upsilon\nu(\ln x)\left[\cancel{\beta} - \cancel{\alpha} - \cancel{\alpha} - \cancel{\beta} + \cancel{2\alpha}\right] + x\ln x = \boxed{x\ln x}$$