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α) $\Delta \le 0 \Leftrightarrow 1 - 4 \cdot 1 \frac{\alpha}{4} \le 0 \Leftrightarrow \alpha \ge 1$

β) (i) $f(0) = \frac{1}{2} \Leftrightarrow \frac{\sqrt{\alpha}}{2} = \frac{1}{2} \Leftrightarrow \sqrt{\alpha} = 1 \Leftrightarrow \alpha = 1$.

$$f(x) = \sqrt{x^2 - x + \frac{1}{4}} = \sqrt{\left(x - \frac{1}{2}\right)^2} = \left|x - \frac{1}{2}\right|$$

(ii) $\left|x - \frac{1}{2}\right| = \frac{1}{2} \Leftrightarrow \begin{cases} x - \frac{1}{2} = \frac{1}{2} \\ \text{ή} \\ x - \frac{1}{2} = -\frac{1}{2} \end{cases} \Leftrightarrow \begin{cases} x = 1 \\ \text{ή} \\ x = 0 \end{cases}$