

$$\Gamma_{TA1}: 9x^2 - 6x + 1 = 0$$

$$\Leftrightarrow (3x)^2 - 2 \cdot 3x \cdot 1 + 1^2 = 0$$

$$\Leftrightarrow (3x - 1)^2 = 0 \quad | \sqrt{\quad}$$

$$\Leftrightarrow 3x - 1 = 0 \quad \Leftrightarrow 3x = 1 \quad \Leftrightarrow x = \frac{1}{3}$$

$$b) \quad \frac{x^2}{2} - \frac{x-3}{12} = \frac{1}{3} \quad | \cdot 12$$

$$\Leftrightarrow \frac{12 \cdot x^2}{2} - \frac{12(x-3)}{12} = \frac{12 \cdot 1}{3}$$

$$\Leftrightarrow 6x^2 - (x-3) = 4$$

$$\Leftrightarrow 6x^2 - x + 3 = 4 \quad \Leftrightarrow 6x^2 - x - 1 = 0$$

$$\begin{cases} a = 6 \\ b = -1 \\ c = -1 \end{cases}$$

$$\Leftrightarrow x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4 \cdot 6 \cdot (-1)}}{2 \cdot 6} = \frac{1 \pm \sqrt{1 + 24}}{12}$$

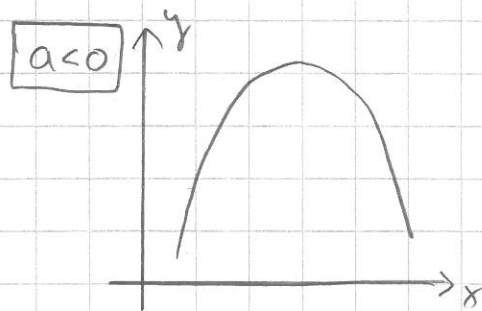
$$= \frac{1 \pm \sqrt{25}}{12} = \frac{1 \pm 5}{12} = \begin{cases} \frac{6}{12} = \frac{1}{2} \\ \frac{-4}{12} = -\frac{1}{3} \end{cases}$$

12. 2. asteen epäyhtälö  $ax^2 + bx + c < 0$   $\begin{cases} > \\ \leq \\ < \\ \geq \end{cases}$

2. asteen polynomifunktio  $ax^2 + bx + c$ ,  $a \neq 0$



paraboli aukeaa ylöspäin



paraboli aukeaa alaspäin

Esim.  $x^2 + x - 6 \geq 0$

Vastavaa yhtälö:  $x^2 + x - 6 = 0$

$$\Leftrightarrow x = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot (-6)}}{2} = \frac{-1 \pm \sqrt{1 + 24}}{2}$$

$$\begin{cases} a = 1 \\ b = 1 \\ c = -6 \end{cases}$$

$$= \frac{-1 \pm \sqrt{25}}{2} = \frac{-1 \pm 5}{2} = \begin{cases} \frac{4}{2} = 2 \\ \frac{-6}{2} = -3 \end{cases}$$

$a = 1 > 0 \Rightarrow$  paraboli aukeaa ylöspäin, ja 0-röydöt (x-akselin