

1. Paloittain määritelty funktio

1.6 $f(x) = \begin{cases} x^2 - 3, & x \leq 0 \\ 3x^2 - x, & x > 0 \end{cases}$

$x \leq 0$: $f(x) = x^2 - 3 = 0 \Leftrightarrow x^2 = 3 \quad (\sqrt{} \Rightarrow x = (\pm)\sqrt{3}$

$x > 0$: $f(x) = 3x^2 - x = 0 \Leftrightarrow x(3x - 1) = 0 \Leftrightarrow x = 0$ tai $3x - 1 = 0$
 $\Downarrow \Rightarrow x = \frac{1}{3}$

Varh. $x = -\sqrt{3}$ tai $x = \frac{1}{3}$

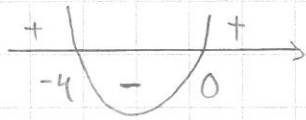
Graphere: $x^2 - 3, x \leq 0$
 $3x^2 - x, x > 0$

Ti-muotia: $f(x) := \begin{cases} x^2 - 3, & x \leq 0 \\ 3x^2 - x, & x > 0 \end{cases}$

$\boxed{\begin{matrix} 11 \\ 8 \end{matrix}}$

1.4 a) $|x^2 + 4x|$

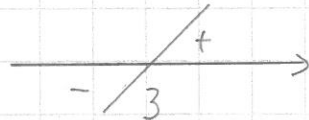
0-ratkot: $x^2 + 4x = 0 \Leftrightarrow x(x + 4) = 0 \Leftrightarrow x = \begin{cases} 0 \\ -4 \end{cases}$



$|x^2 + 4x| = \begin{cases} x^2 + 4x, & x \leq -4 \text{ tai } x \geq 0 \\ -(x^2 + 4x) = -x^2 - 4x, & -4 < x < 0 \end{cases}$

b) $x + |2x - 6|$

0-ratkot: $2x - 6 = 0 \Leftrightarrow x = 3$



$x + |2x - 6| = \begin{cases} x + (2x - 6) = 3x - 6, & x \geq 3 \\ x - (2x - 6) = -x + 6, & x < 3 \end{cases}$

1.14 a) $f: [0, 5] \rightarrow \mathbb{R}$

\uparrow
 määritellyillä $f = n$ arvot ovat reaalilukuja

a) $f(x) = \begin{cases} x + 2, & 0 \leq x < 3 \\ 3, & x = 3 \\ 4, & 3 < x \leq 5 \end{cases}$

b) $f(x) = \begin{cases} 3 - x, & -1 \leq x < 2 \\ 3, & x = 2 \\ 4x - x^2, & 2 < x \leq 4 \end{cases}$