

1. Polettujen määritellyt pisteet

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

1°  $x \leq 0: x^2 - 3 = 0 \Leftrightarrow x^2 = 3 \quad | \sqrt{\quad} \Leftrightarrow x = \pm\sqrt{3}$

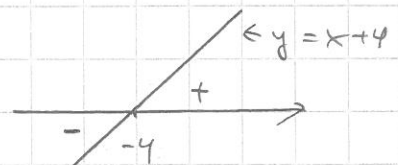
2°  $x > 0: 3x^2 - x = 0 \Leftrightarrow x(3x - 1) = 0 \Leftrightarrow x = 0 \text{ tai } 3x - 1 = 0$   
 $\Leftrightarrow x = 0 \text{ tai } x = \frac{1}{3}$

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

1.3 a)  $|x + 4|$

0-piste:  $x + 4 = 0 \Leftrightarrow x = -4$

$|x + 4| = \begin{cases} x + 4, & x \geq -4 \\ -(x + 4) = -x - 4, & x < -4 \end{cases}$



Testipisteet:

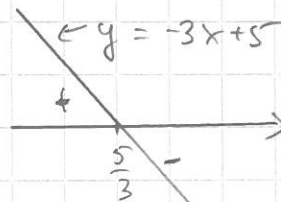
$\begin{cases} x = -5: x + 4 = -5 + 4 = -1 < 0 \\ x = 0: x + 4 = 0 + 4 = 4 > 0 \end{cases}$

$|a| = \begin{cases} a, & a \geq 0 \\ -a, & a < 0 \end{cases}$

b)  $|5 - 3x|$

0-piste:  $5 - 3x = 0 \Leftrightarrow x = \frac{5}{3}$

$|5 - 3x| = \begin{cases} 5 - 3x, & x < \frac{5}{3} \\ -(5 - 3x) = 3x - 5, & x \geq \frac{5}{3} \end{cases}$

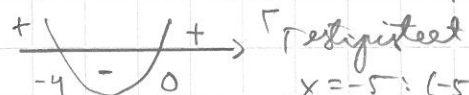


Testipisteet:

$\begin{cases} x = 0: 5 - 3 \cdot 0 = 5 > 0 \\ x = 2: 5 - 3 \cdot 2 = -1 < 0 \end{cases}$

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

0-piste:  $x^2 + 4x = 0 \Leftrightarrow x(x + 4) = 0 \Leftrightarrow x = 0 \text{ tai } x = -4$



Testipisteet

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

$x = -5: (-5)^2 + 4 \cdot (-5) = 5 > 0$

$x = -2: (-2)^2 + 4 \cdot (-2) = -4 < 0$

$x = 1: 1^2 + 4 \cdot 1 = 5 > 0$