LOGARITMID

$\log(10, 2) = 3.322$

$\log(10, 10) = 1$

$\log(0.1) = -1$

$\log(3, 3) = 1$

$\log(10) = 1$

$\log(9, 3) = 2$

$\log(100) = 2$

$\log(27, 3) = 3$

$\log(1000) = 3$

$\log(10000) = 4$

$\log(100000) = 5$

$a := 100$

$b := 1000$

$\log(a \cdot b) = 5$

$\log(100 \cdot 1000) = \log(100) + \log(1000) = 2 + 3 = 5$

$n := 3$

$\log(a \cdot b) = \log(a) + \log(b)$

$a := 1000$

$\log\left(1000^3\right) = \log(1000 \cdot 1000 \cdot 1000) = 9$

$\log\left(a^n\right) = n \cdot \log(a)$

$\log\left(a^n\right) = 9$

$\log(a, b) = \dfrac{1}{\log(b, a)}$

$\log(10, 1000) = \dfrac{1}{\log(1000, 10)} = \dfrac{1}{3} = 0.333$

$b := 10$

$a := 1000$

$\log(b, a) = 0.333$

$$\log(a, b) = c \quad \Rightarrow \quad b^{\log(a, b)} = b^c \quad \Rightarrow \quad a = b^c$$

$$a = b^c \quad \Rightarrow \quad \log(a, b) = \log\left(b^c, b\right) \quad \Rightarrow \quad \log(a, b) = c \cdot \log(b, b) \quad \Rightarrow$$

$$\Rightarrow \quad \log(a, b) = c \cdot 1$$

$$\log(1024, 1024) = 1$$

26.

g) $\quad \log(x, 4) = 3$

$\quad 4^{\log(x, 4)} = 4^3$

$\quad\quad x = 4^3$

$\quad\quad x := 4^3 = 64$

$\quad \log(x, 4) = 3$

j) $\quad \ln(x) = \log(x, e)$

$\quad \log[(2 \cdot x + 3), e] = \ln(2 \cdot x + 3) = 2$

$\quad\quad e^{\ln(2 \cdot x + 3)} = e^2$

$\quad\quad 2x + 3 = e^2$

$\quad\quad 2x = e^2 - 3$

$\quad\quad x := \dfrac{\left(e^2 - 3\right)}{2} = 2.195$

$\quad \ln(2 \cdot x + 3) = 2$

$$\log(a, b) = c \quad \Rightarrow \quad b^{\log(a, b)} = b^c \quad \Rightarrow \quad a = b^c$$

l) $\quad \log(\log(x)) = 1$

$\quad 10^{\log(\log(x))} = 10^1$

$\quad \log(x) = 10$

$\quad 10^{\log(x)} = 10^{10}$

$\quad x := 10^{10} = 1 \times 10^{10}$

$\quad \log(\log(x)) = 1$

i) $\quad \ln(x + 3) = 0$

$\quad e^{\ln(x + 3)} = e^0$

$\quad\quad x + 3 = 1$

$\quad\quad x := 1 - 3 = -2$

$\quad \ln(x + 3) = 0$

$\quad \ln(1) = 0$

$s := -5 .. 5$

$i := \sqrt{-1}$

$e^{i \cdot \theta} = \cos(\theta) + i \cdot \sin(\theta)$

$\ln(-1) = 3.142i$

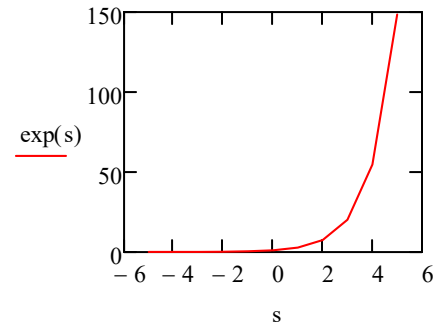$e^{i \cdot 45} = \dfrac{\sqrt{2}}{2} + i \cdot \dfrac{\sqrt{2}}{2}$

$\ln(-i) = -1.571i$

$e^{i \cdot \pi} = \cos(\pi) + i \cdot \sin(\pi)$

$i^2 = -1$

exp(s)

$e^{i \cdot \pi} = -1$ $\qquad$ $e^{i \cdot \pi} + 1 = 0$ $\qquad$ $\dfrac{\pi}{2} = 1.571$

$\ln\left(e^{i \cdot \pi}\right) = \ln(-1)$

$\ln(-1) = i \cdot \pi \cdot \ln(e) = \pi \cdot i$

a) $\quad \log(2x - 1) + \log(2x + 1) = 2$ $\qquad\qquad$ $\log(a \cdot b) = \log(a) + \log(b)$

$\qquad \log[(2x - 1) \cdot (2x + 1)] = 2$

$\qquad \log\left(4x^2 - 1\right) = 2$ $\qquad\qquad$ $\log(a, b) = c \;\; \Rightarrow \;\; b^{\log(a, b)} = b^c \;\; \Rightarrow \;\; a = b^c$

$\qquad 10^{\log\left(4x^2 - 1\right)} = 10^2$

$\qquad 4x^2 - 1 = 100$

$\qquad 4x^2 = 101$

$\qquad x = \sqrt{\dfrac{101}{4}} = \sqrt{\dfrac{101}{2^2}} = \dfrac{\sqrt{101}}{\sqrt{2^2}}$ $\qquad$ $x := \dfrac{\sqrt{101}}{2} = 5.025$

c) $\quad (\log(x))^2 - 2 \cdot \log(x) = 3$ $\qquad\qquad$ $\log\left(\dfrac{a}{b}\right) = \log(a) - \log(b)$

$\qquad a \leftarrow \log(x)$

$\qquad a^2 - 2a - 3 = 0$ $\qquad$ $b := -2$ $\qquad$ $c := -3$

$\qquad m := \dfrac{-(b)}{2} = 1$

$\qquad d := \left(m^2 - c\right) = 4$

$\qquad a = m + \sqrt{d}$

$\qquad a1 := m + \sqrt{d} = 3$ $\qquad\qquad$ $a2 := m - \sqrt{d} = -1$

$\log(x) = 3$

$\log(x) = -1$

$10^x = 10^3$

$10^{\log(x)} = 10^{-1}$

$x1 := 10^3 = 1 \times 10^3$

$x2 := \dfrac{1}{10}$

$vp1 := (\log(x1))^2 - 2 \cdot \log(x1) = 3$

$vp2 := (\log(x2))^2 - 2 \cdot \log(x2) = 3$

$pp1 := 3$

$pp2 := 3$

$$vp = pp$$

$\log(a,b) = c \quad \Rightarrow \quad b^{\log(a,b)} = b^c \quad \Rightarrow \quad a = b^c$

e) $\log(2x, x) = 2$

$x^{\log(2x, x)} = x^2$

$2x = x^2$

$x^2 - 2x = 0$

$x \cdot (x - 2) = 0$

$x = 0 \qquad\qquad x - 2 = 0$

$x1 := 0$ x1 on väärlahend $x2 := 2$ $\log(2, 2) = 1$

$\log(2 \cdot x2, x2) = 2$ $\log(4, 2) = 2$

$\log(8, 2) = 3$

$$\log\left(\frac{a}{b}\right) = \log(a) - \log(b)$$

g) $1 - \log[(x + 3), 5] = \log(2, 5)$

b) $\log(2x - 1) - \log(2x + 1) = 2$

$1 = \log[(x + 3), 5] + \log(2, 5)$

$\log[2(x + 3), 5] = 1$

$\log\left[\dfrac{(2x - 1)}{(2x + 1)}\right] = 2$

$5^{\log[2(x+3), 5]} = 5^1$

$2 \cdot (x + 3) = 5$

$10^{\log\left[\frac{(2x-1)}{(2x+1)}\right]} = 10^2$

$2x = 5 - 6$

$\dfrac{(2x - 1)}{(2x + 1)} = 100$

$x := \dfrac{-1}{2}$

$(2x - 1) = 100 \cdot (2x + 1)$

d) $(\ln(x))^2 - 4 \cdot \ln(x) - 5 = 0$

$\eta \leftarrow \ln(x)$

$\eta^2 - 4\eta - 5 = 0$ $b := -4$ $c := -5$

$m := \dfrac{-(b)}{2} = 2$

$d := \left(m^2 - c\right) = 9$

$a = m + \sqrt{d}$

$\eta 1 := m + \sqrt{d} = 5$ $\eta 2 := m - \sqrt{d} = -1$

$\ln(x1) = 5$ $\ln(x2) = -1$

$x1 := e^5 = 148.413$ $x2 := \dfrac{1}{e} = 0.368$

$pp1 = pp2 = 0$

$vp1 := (\ln(x1))^2 - 4 \cdot \ln(x1) - 5 = 0$

$vp2 := (\ln(x2))^2 - 4 \cdot \ln(x2) - 5 = 0$

h) $\log\left[\left(x^2 - 8 \cdot x\right), 3\right] = 2 + \log(1,5)$

$\log\left[\left(x^2 - 8 \cdot x\right), 3\right] = 2$

$x^2 - 8 \cdot x - 9 = 0$

$b := -8$ $c := -9$

$m := \dfrac{-(b)}{2} = 4$

$d := \left(m^2 - c\right) = 25$

$a = m + \sqrt{d}$

$x1 := m + \sqrt{d} = 9$ $x2 := m - \sqrt{d} = -1$

$vp1 := \log\left[\left(x1^2 - 8 \cdot x1\right), 3\right] = 2$ $vp2 := \log\left[\left(x2^2 - 8 \cdot x2\right), 3\right] = 2$

$pp1 := 2 + \log(1,5) = 2$ $pp2 := 2 + \log(1,5) = 2$

$2x - 1 = 200x + 100$

$198x = -101$

$x := \dfrac{-101}{198}$

$\log(2x - 1) - \log(2x + 1) = 2$

$\log(a \cdot b) = \log(a) + \log(b)$

f) $\log(x) + \log(2) - \log(4) = \log\left(\dfrac{1}{4}\right)$

$\log(x) + \log(2) = \log(4) + \log\left(\dfrac{1}{4}\right)$

$\log(2x) = \log\left(4 \cdot \dfrac{1}{4}\right)$

$\log(2x) = \log(1)$

$2x = 1$

$x := \dfrac{1}{2}$