

Probe 1: $a \cdot 3^{x-1} + b \cdot 3^x = c$

$$a \cdot 3^x \cdot 3^{-1} + b \cdot 3^x = c$$

$$3^x \cdot \left(\frac{a}{3} + b \right) = c \quad | : \left(\frac{a}{3} + b \right)$$

$$3^x = \frac{c}{\left(\frac{a}{3} + b \right)} \quad | \ln$$

$$\ln(3) \cdot x = \ln\left(\frac{c}{\frac{a}{3} + b} \right) \quad | : \ln(3)$$

$$x = \frac{\ln\left(\frac{c}{\frac{a}{3} + b} \right)}{\ln(3)}$$

Probe 2: $a \cdot 4^{x+1} + b \cdot 4^{x-1} = c$

$$a \cdot 4^x \cdot 4^1 + b \cdot 4^x \cdot 4^{-1} = c$$

$$4^x \cdot \left(\cancel{4a} + \frac{b}{4} \right) = c \quad | : \left(4a + \frac{b}{4} \right)$$

$$4^x = \frac{c}{\left(4a + \frac{b}{4} \right)} \quad | \cdot \ln$$

$$\ln 4 \cdot x = \ln\left(\frac{c}{4a + \frac{b}{4}} \right) \quad | : \ln 4$$

$$x = \frac{\ln\left(\frac{c}{4a + \frac{b}{4}} \right)}{\ln 4}$$