

$$\begin{aligned}
 \ln(7-3x) &= 1 \\
 7-3x &= e^1 = e \\
 7-3x &= e \\
 -3x &= e-7 \\
 x &= \frac{e-7}{-3}
 \end{aligned}$$

E.g. $\log_7(x^2-2) = \log_7(x)$ $x=2$; ~~$x=1$~~

$$\begin{aligned}
 x^2-2 &= x \\
 x^2-x-2 &= 0 \\
 (x-2)(x+1) &= 0
 \end{aligned}$$

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E.g. $\log(x+5) - \log(x) = \log(78)$

$$\log\left(\frac{x+5}{x}\right) = \log(78)$$

Quotient Rule $x \cdot \frac{x+5}{x} = 78 \cdot x$

$$\begin{aligned}
 x+5 &= 78x \\
 5 &= 77x \\
 x &= \frac{5}{77}
 \end{aligned}$$

* Compounded continuously $A = P \cdot e^{rt}$

$$6500 = 4000 e^{(0.04)t}$$

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$$\begin{aligned}
 e^{0.04t} &= \frac{6500}{4000} \\
 \ln(e^{0.04t}) &= \ln\left(\frac{6500}{4000}\right) \\
 0.04t &= \ln\left(\frac{6500}{4000}\right) \\
 t &= \frac{\ln\left(\frac{6500}{4000}\right)}{0.04} \approx 12 \text{ years}
 \end{aligned}$$

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