Solutions to Quiz 4

MATH 139-02
Tuesday, February 3, 2004

1. Solve each equation for t.

   (a) $4^t = 5$

   Solution: Apply the natural logarithm to both sides: $\ln(4^t) = \ln(5)$, so $t\ln(4) = \ln(5)$. Therefore, $t = \dfrac{\ln(5)}{\ln(4)} \approx 1.161$.

   (b) $5e^{-0.003t} = 1.25$.

   Solution: First divide both sides by 5: $e^{-0.003t} = 0.25$. Now apply the natural logarithm to both sides: $-0.003t = \ln(0.25)$. Therefore, $t = \dfrac{\ln(0.25)}{-0.003} \approx 462.1$.

2. Find k such that $\left(\dfrac{1}{3}\right)^t = e^{kt}$.

   Solution: $\ln\left(\dfrac{1}{3}\right)^t = \ln(e^{kt})$, so $t\ln(1/3) = kt$. Dividing both sides by t gives $k = \ln(1/3) \approx -1.099$.