1. A new truck is purchased for $22,000 and is predicted to depreciate in value by 25% each year.
   a. At that rate, when will the truck be worth half of its original value? 2.4 years
   
   \[ A(t) = P \cdot (1 - r)^t \]
   \[ \frac{1}{2} P = P \cdot (0.75)^t \Rightarrow \frac{1}{2} = (0.75)^t \]
   \[ \log(0.5) = \log(0.75)^t \Rightarrow \log(0.5) = t \cdot \log(0.75) \]
   \[ t = \frac{\log(0.5)}{\log(0.75)} = 2.4 \]
   
   b. In reality, the truck is traded in two years later for $11,000. At what rate per year did it actually depreciate? 29.29%
   
   \[ A(t) = P \cdot (1 - r)^t \]
   \[ 11000 = 22000 \cdot (1 - r)^2 \Rightarrow \frac{1}{2} = (1 - r)^2 \]
   \[ \sqrt{\frac{1}{2}} = \sqrt{(1 - r)^2} \Rightarrow \sqrt{\frac{1}{2}} = 1 - r \]
   \[ r = 1 - \sqrt{\frac{1}{2}} = 0.2929 = 29.29\% \]

2. A local credit union offers a 5-year CD at 6% APR compounded monthly and a local bank offers a 5-year CD at 5.9% APR compounded continuously.
   What is the effective rate for the credit union CD? 6.17%
   BONUS: What is the effective rate for the bank CD? 6.08%
   
   Credit union: \[ r_e = \left(1 + \frac{0.06}{12}\right)^{12} - 1 = (1 + \frac{0.06}{12})^{12} - 1 = 0.0617 = 6.17\% \]
   Bank: \[ r_e = e^r - 1 = e^{0.059} - 1 = 0.0608 = 6.08\% \]