College Algebra
6.7-6.8 Homework

Use the following equations for this homework. Show your work for the most amount of points!

\[ A = Pe^{rt} \quad A = P\left(1 + \frac{r}{n}\right)^{nt} \quad y = a(1 - r)^t \quad y = a(1 + r)^t \]

Find the amount that result from each investment.
1. $500 invested at 8% compounded quarterly after a period of 2 \frac{1}{2} \text{ years}

Solve each problem.
3. Jerome will be buying a used car for $15,000 in 3 years. How much money should he ask his parents for now so that, if he invested it at 5% compounded continuously, he will have enough to buy the car?

5. Suppose $500 is invested at a 6% annual interest compounded twice a year. In how many years will the investment be worth $1000?

7. For Dave to buy a new car comparably equipped to the one he bought years ago would cost $12,000. Since Dave bought the car, the inflation rate for cars like his has been at an average annual rate of 5.1%. If Dave originally paid $8400 for the car, how long ago did he buy it?

9. A Global Positional Satellite (GPS) system uses satellite information to locate ground position. Ray’s surveying firm bought a GPS system for $12,500. The GPS depreciated by a fixed rate of 6% and is now worth $8600. How long ago did Ray buy the GPS system?

11. The size P of a certain insect population at time t (in days) obeys the function \[ P(t) = 500e^{0.02t} \]
   \( a) \) Determine the number of insects at t=0 days
   \( b) \) What is the population after 10 days?
   \( c) \) When will the insect population reach 800?
   \( d) \) When will the insect population double?

13. A colony of bacteria that grows according to the law of uninhibited growth is modeled by the function \[ N(t) = 100e^{0.045t} \], where N is measured in grams and t is measured in days.
   \( a) \) Determine the initial amount of bacteria.
   \( b) \) What is the population after 5 days?
   \( c) \) How long will it take for the population to reach 140 grams?
   \( d) \) What is the doubling time for the population?