**Notes**

1. A town’s population declined exponentially from 225 in the year 2000 to 105 in the year 2004.
   1. Define the variables.
   2. Before writing the exponential function, predict whether or . Justify.
   3. Write the exponential equation using function notation. **Show all work.** Round to 3 decimal places.
   4. What is the value of the factor? Does this correspond to your prediction in **part b**?
   5. Determine the rate AND interpret it in the context of the problem.
   6. When will the population be equal to 75? Show all work.
2. A town’s population in 1980 was 200,000 and since then has grown by 7.8% each year.
   1. Write the equation to model this situation where the population, *P*, is a function of the time in years since 1980, *t*. Use function notation.
   2. Evaluate and interpret this answer in the context of the problem. Show all work.
   3. Solve  and interpret this answer in the context of the problem. Show all work.
3. Honda Civic DX has a purchase price of $16,630 that depreciates by 10% per year. Write the equation of the function *using function notation* that describes the price of the Honda, *P*, as a function of the time in years, *t.*
4. At the beginning of the semester, FMP instructors reported 873 total office visits by students. Sixty days later, the total number of office visits had risen to 7,570. Let ***N*** represent the total number of office visits and ***t*** represent the number of days after the beginning of the semester.
   1. Mary Kay thinks this relationship is growing at a constant rate of change. Write the function that would model Mary Kay’s view using function notation. Round to three decimals if necessary. **Show all work.**
   2. Write a sentence that describes the slope in context of the problem.
   3. Amy thinks this relationship is growing by a constant factor. Write the function that would model Amy’s view using function notation. Round to three decimals if necessary. **Show all work**
   4. Write a sentence that describes the rate in the context of the problem.
   5. Using Mary Kay’s model, solve AND interpret *N(t)=12000.* **Show all work.**
   6. Using Amy’s model, solve AND interpret *N(t)=12000.* **Show all work.**
5. The table below summarizes different options for retirement investment.

* Let *A*, the dependent variable, be the value of the investment.
* Let *t*, the independent variable, be the number of years invested.

Fill in the blanks. **Show your work below the table with the Option indicated**.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Option** | **Age at time of investment** | **Initial Investment** | **Rate in %** | **Compounding period** | **Model** | **Time t** | **Balance at age of retirement (65 years)** |
| **A** | 25 | $1000 | 5% | Quarterly |  |  |  |
| **B** | 45 |  | 6% | Quarterly |  |  | $7298 |
| **C** |  |  |  |  |  |  | $35,000 |
| **D** |  |  |  |  |  |  | $35,000 |
| **E** | 45 | $5000 |  | Continuously |  | 20 | $35,000 |