

Dimensional Analysis

Try to complete the problems without consulting the answer key. Try to complete the problems without a calculator. If you are having troubles I can assist you, but you will need to come see me to get that help.

1. If 35% of a natural area is to be developed, leaving 500 acres untouched, how many acres are to be developed?
2. Calculate the percentage growth rate for a country with a population of 6 million: in a year in which it had 100,000 births, 70,000 deaths, 30,000 immigrants, and 50,000 emigrants.
3. If I have central air conditioning connected to a thermostat, the one unit cools the entire home and it shuts off when the temperature reaches its set point. The unit pulls 3,500 W but only runs for 6 hours per day total (it runs for about 15 minutes per hour or so). How much does it cost me to run it (\$0.14 per kWh) per month?
4. I can buy a new air conditioning unit (compressor & coils) for \$3,200 and it will reduce my cooling bill by 40%. Assume that I run it for 3 months per year, in how many years will I recover my initial cost of it?
5. **If**, one BTU is the energy required to raise the temperature of one pound of water by one degree Fahrenheit, and the density of water is 1 gram/milliliter or approximately 8 pounds/gallon (U.S.), then how much energy is required to raise the temperature of one thousand gallons of water by 25°F?