# MET 352 Engineering Design <br> Department of Materials and Metallurgical Engineering <br> South Dakota School of Mines and Technology 

## Assignment 9: Engineering Economics

Submit digitally before 11:00 pm Monday 4-11-19

1. What is the difference in a car payment for a $\$ 20,000$ car financed for 60 months at $8 \%$ and the amount of money you would need to invest every month starting at the end of the first month (just like a car payment) to have $\$ 20,000$ at the end of five years? (Use $0.08 / 12$ for the monthly interest rate.)
2. If for the above problem, inflation increases the amount of money needed to have the same buying power at the end of 60 months from $\$ 20,000$ to $\$ 23,000$, how much would need to be invested at the end of each month to have the same buying power in 60 months?
3. How many years would you need to invest $\$ 1,000$ per year starting today at $8 \%$ to be able to withdraw $\$ 1,000$ per year from the accumulated investment starting a year after your last deposit? Assume the annual interest rate on your nest egg is $8 \%$.
4. Which of the two alternatives has the minimum annual cost?

A: Keeping your old car that is worth $\$ 2,000$ and costs $\$ 2,400$ to operate annually. B: Buying a new used car for $\$ 10,000$ that costs $\$ 1,000$ to operate annually.

The old car will have a salvage value of $\$ 1,000$ in three years while the new used car will have a salvage value of $\$ 4,000$ in three years. Assume the time value of your money is $10 \%$.
5. When is the break even if a new product costs $\$ 1 \mathrm{M}$ to launch and nets $\$ 0.2 \mathrm{M}$ annually if $\mathrm{i}=12 \%$ ?

