• **COMPOUND INTEREST:** \[ A(t) = P \left(1 + \frac{r}{n}\right)^{nt} \] where

- \( A(t) \) = amount after \( t \) years
- \( P \) = principal (amount invested or borrowed)
- \( r \) = interest rate (written as a decimal)
- \( n \) = number of times interest is compounded per year
- \( t \) = number of years

1. If $4000 is borrowed at a rate of 16% interest per year, compounded quarterly, find the amount due at the end of 4 years? 8 years?

2. If $15000 is borrowed at a rate of 12% interest per year, find the amount due at the end of 5 years if the interest is compounded annually? monthly? daily?

• **CONTINUOUSLY COMPOUNDED INTEREST:** \[ A(t) = Pe^{rt} \] where

- \( A(t) \) = amount after \( t \) years
- \( P \) = principal (amount invested or borrowed)
- \( r \) = interest rate (written as a decimal)
- \( t \) = number of years

1. If $15000 is borrowed at a rate of 12% interest per year, find that amount due at the end of 5 years if the interest is compounded continuously.

2. Following the birth of a child, a parent wants to make an initial investment that will grow to $5000 by the child’s 20th birthday. Interest is compounded continuously at 6%. What should the initial investment be?
Depreciation by a fixed percentage means that an item loses a fixed percentage of its value each year.

1. A car worth $20,000 depreciates in value by 40% each year. How much is it worth after 4 years?

Nominal rate of interest is the stated rate.

Annual Percentage Rate (APR) is the actual percentage increase during 1 year. It is the simple interest rate that would produce the same accumulated amount in 1 year as the nominal rate compounded \( n \) times per year. This is also called the Effective rate of interest.

- **EFFECTIVE RATE OF INTEREST FORMULA:**
  \[
  r_{\text{eff}} = \left(1 + \frac{r}{n}\right)^n - 1
  \]
  where

  \( r_{\text{eff}} \) = effective rate of interest  
  \( r \) = nominal rate of interest per year  
  \( n \) = number of times compounded per year

1. Find the effective rate of interest corresponding to a nominal rate of 8% per year compounded (a) semianually, (b) quarterly, (c) monthly, and (d) daily.

Homework: pp284-285; #13–19 odd, 23–27 odd