1. Derrick wants to buy a used Mazda RX7, priced at $3500. The car lot offers 'on the spot' financing for 36 months, with a 15% add-on interest rate.
   a. Interest included, how much will Derrick end up paying for the car?

   b. What is the APR of the financing offer?

   c. Another car lot offers a similar car for $3200. Their financing offer is 36 monthly payments of $160. Compute the total amount, principal plus interest, charged for the car under this offer:

      What is the interest rate of the offer?

      What is the APR of the offer?

2A. A painting is priced at $4500. The owner of the gallery offers on the spot financing:

   With 52 weekly payments of $100.

   a. What is the (simple) interest rate of the offer?

   b. What is the APR of the offer?

2B. An antiques dealer offers a Japanese Samurai sword on E-Bay for $5000. E-bay offers financing in the form of monthly payments of $100 for 5 years.

   Compute the total amount, principal plus interest, charged for the car under this offer:

   What is the interest rate of the offer?

   What is the APR of the offer?
3. William has inherited $1250.- from his aunt Betsy. The bank offers two options:
   - Type I account: a simple interest rate of 9%
   - Type II account: a monthly compound interest rate of 6.5%
Over a time span of 20 years,
a. How much would be in the account of Type I?

b. How much would be in the account of Type II?

4. The Average Daily Balance of Alysha’s credit card is $2148.34 over the month of October. If the APR is 21.5%, what is the finance charge (simple interest) incurred over this month?

5.a. Account A compounds monthly and has interest rate 4.5 %
   Starting with 1500.-, how much is in account
   - after 6 months?
   - after 25 years?

b. Account B compounds quarterly with interest rate 4¾ %
   Starting with 1500.-, how much is in account
   - after 6 months?
   - after 25 years?

c. For short term investments, account ___ is preferable
   while account ___ is has higher yield in the long run.

6. What is the effective interest rate of an account of 8% per year, compounding daily?

7. A cup of coffee costs $0.85. At a rate of yearly compound inflation of 4%, how much will a cup of coffee cost in ten years?

8a. What amount do you need to invest to have a college fund worth $30,000.- in 25 years, if the account has an 6% interest rate, compounded semi-annually?

b. What is the present value of $30,000,- in twenty five years, if the inflation rate is constant, 3.5%? (Inflation compounds yearly)
9. You want to buy a house of $170,000. Interest rate: 6.25% for 30 years. The closing cost (to be included in the loan) is $5000. Paying $25,000 down,
   a. What is the amount to be financed?

   b. What is the amount of your monthly payment?

   c. You can only afford $800 per month and $15,000 down payment. What is the price of a house you can afford to buy? (6.25% for 30 years). The closing cost (to be included in the loan) is $5000.

10. You want to start a college fund (6.5% quarterly) for a 3 year old.
   a. You can afford to pay $250 at the beginning of each quarter. How much is in the account by the time the child is 18?

   b. What is your quarterly payment if you want to have $50,000 by the time the child is 18?
11a. What car price can you afford if you are making payments of $350 At the start of each month for 5 years? (interest is 7.5% per year)

b. What is your monthly payment for a Mercedes of $85,000? r = 7.5% per year).

12. Analog Planet wants to open a store in Smyrna.
To do so, it needs to raise $750,000 in two years. Over this period, a fixed amount is paid by the end of each quarter at 7% per year. What is the quarterly payment?

13. You are offered to buy a business for $2,000,000. To finance the deal, Onion Planters Bank offers to amortize the amount in weekly payments, at a rate of 8.5% per year for 15 years.
a. Compute the amount in weekly payment

b. The bank offers you to ‘buy a point’: for an extra $100,000 (to be included in the loan), they will drop the interest rate to 7.5% for 15 years. What is your weekly payment amount under this offer?

The amount is amortized in daily payments at 6% per year, over a period of ten years. What is the amount of the daily payment?
Formulas for Interest Calculations:

Symbols used:

A: Future value of an account
P: Present value of an account or Principal
r: Yearly interest rate
t: time in years
n: number of compounding periods per year
i = r/n: periodic interest rate
N = nt: number of periods
m: periodic payment amount

I. Simple or Add-on Interest:

\[ A = P + I = Prt \]

\[ A = Nm \quad \text{Annual Percent Rate: APR} \quad \frac{2Nr}{N-1} \]

II. Compound Interest:

\[ A = P(1 + \frac{r}{n})^N \quad \text{or} \quad A = P(1 + \frac{i}{N})^t \]

Effective Interest Rate (Annual Percent Yield): \[ \text{APY} \quad r_e = (1 + i)^N - 1 \cdot 100\% \]

III. Ordinary Annuity (pay by the end of each period):

\[ A = \frac{m(1 + i)^N - 1}{i} \]

Annuity Due (payment due at beginning of each period):

\[ A = \frac{m(1 + i)^{N+1} - 1}{i} \]

IV. Present Value of an Annuity:

\[ P = \frac{m(1 + i)^N - 1}{i} \]
Answers to the exercises:

1. a. $5075   b. 29.2 %     c. $5760       51.9 %

2A. a. $5760   b. 51.9 %

2B. a. $6000   b. 4 % c. 7.87 %

3. a. $3500   b. $4570.56

4. $37.96

5. a. $1534.07   $4610.61

   b. $1534.84   $4884.02

6. 8.33 %

7. $1.26

8. a. $6843.21   b. $12694.41

9. a. $17,000 + $5000 - $25,000 = $150,000

   b. m = P/162.41 = $923.57

10. a. A = m (100.337) = $25,084.17

    b. m = A / 100.337 = $498.32

11. a. P = m (49.905) = $17,466.86

    b. m = P/49.905 = $1703.22

12. m = A/8.5451 = $87,769.02 per quarter

13. a. m = P/440.6407 = $4538.84 per week

    b. m = P/468.0584 = $4486.62 per week

14. m = P/2744.5646 = $728,713.04 per day