1) The Consumer Price Index (CPI) is a measure of inflation. The CPI for all urban consumers is the United States during 1999 was 2.7%. If this rate held, what should be the cost of a gallon of milk now if the inflation rate is compounded annually and the price of a gallon of milk was $2.29 in 1999?

\[ A = P(1 + r)^n \]
\[ A = 2.29(1 + 0.027)^9 \]
\[ A = \$2.91 \]

2) Gene received a $25000 holiday bonus from his employer. He placed the bonus in an account earning 4.25% interest compounded monthly. How much is in his account after 6 years?

\[ A = 25000 \left(1 + \frac{0.0425}{12}\right)^{6 \times 12} \]
\[ A = \$32,247.01 \]

3) Alec and Lexi figure that they will need $20,000 in 4 years to remodel their kitchen. How much should they invest now at 4.75% interest compounded quarterly to have the $20,000 in 4 years?

\[ 20,000 = P(1 + \frac{0.0475}{4})^{16} \]
\[ 20,000 = P(1.011875)^{16} \]
\[ P = \$16,557.70 \]
4) Jorge and Jenna have $10,000 to invest toward the purchase of a $16,000 ski boat. How many years will it take for the $10,000 to grow to at least $16,000 if it is invested at 5.25% compounded quarterly? You should either use logarithms or a graphical approach to solve this problem.

\[ A = P(1+i)^n \]
\[ 16,000 = 10,000(1+0.0525)^4t \]
\[ 16 = 1.013125^{4t} \]
\[ \frac{\log 1.6}{\log 1.013125} = 4t \]
\[ 9.011 = 4t \]
\[ t = 2.25275 \] years.

5) As of May 17, 2001, First Internet Bank of Indiana offered a money market account paying 4.50% compounded monthly. NetBank offered a money market account paying 4.40% interest compounded daily. Compute the effective rates for both accounts. Is one account a better investment than the other?

Effective Rate Formula: \( r_e = \left(1 + \frac{r}{m}\right)^m - 1 \)

F.I.B.I. 4.594% 
NetBank 4.498%

6) How long will it take an investment to double if it is invested at (a) 4% compounded annually? (b) 6% compounded annually? (c) 8% compounded annually? Use logarithms or a graphical approach to calculate the answers. (Round each answer to 3 decimal places.)

\[ A = P(1+i)^n \]
\[ 2 = (1.04)^n \]
\[ \log 2 = \log 1.04^n \]
\[ \frac{\log 2}{\log 1.04} = n \]
\[ n = \frac{\log 2}{\log 1.04} \approx 17.673 \] years.

(a) 17.673 yrs.
(b) 11.896 yrs.
(c) 9.006 yrs.

7) The rule of 70 states that the annual compound rate of growth \( r \) of an investment that doubles in \( t \) years can be approximated by \( r = \frac{70}{t} \) or \( t = \frac{70}{r} \). How does the rule of 70 work in the examples above?

\[ a) \frac{70}{4} = 17.5 \text{ yrs} \]
\[ b) \frac{70}{6} = 11.6 \text{ yrs} \]
\[ c) \frac{70}{8} = 8.75 \text{ yrs} \].
8) Determine the nominal rate if the effective rate is 6.25% compounded quarterly.

\[ r_E = (1 + \frac{r}{m})^m - 1 \]
\[ 0.0625 = (1 + \frac{r}{4})^4 - 1 \]
\[ 1.0625 = (1 + \frac{r}{4})^4 \]

\[ 4\sqrt[4]{1.0625} = 1 + \frac{r}{4} \]
\[ 1.01535525 = (1 + \frac{r}{4}) \]
\[ r = 4\left(\frac{1.0625}{4} - 1\right) = 0.06108637 \]

\[ \boxed{6.109\%} \]

9) One investment pays 9% simple interest and another pays 6% compounded monthly. Which investment should you choose? Explain, using a graphical approach. Make a sketch, and give the coordinates of the point of intersection.

Eventually the interest being compounded will always overcome the simple interest even though it has a lower rate.

![Graph showing the comparison between simple interest and compounded interest.](image)

The effect on each dollar invested would be.

If investment is for 13 or more years, 6% compounded account is best choice.

If investment is for 12 or less years, 9% simple interest account is best choice.