1. Assume you start investing for your retirement by opening a retirement account and depositing money into a mutual fund on a yearly basis. These deposits consist of $20,000 per year and are in the form of a 35-year annuity due. Assume this fund earns 10% per year over these 35 years.

   a. How much money will be in your retirement account the day you retire?

   \[
   \begin{align*}
   \text{Beg Mode} \\
   PMT &= 20,000 \\
   N &= 35 \\
   I &= 10\% \\
   \text{CPT} \\
   FV &= 5,962,536.11
   \end{align*}
   \]

   b. When you retire you move your retirement nest egg into a safer account earning 4% per year. Assume you wish to withdraw an equal annual amount for 30 years as an ordinary annuity until all the money is gone. How much can you withdrawal every year?

   \[
   \begin{align*}
   \text{End Mode} \\
   PV &= 5,962,536.11 \\
   N &= 30 \\
   I &= 4\% \\
   \text{CPT} \\
   PMT &= 344,814.25
   \end{align*}
   \]
2. You purchase a new house and finance this purchase with a mortgage of $420,000. This mortgage loan has a 30 year maturity, calls for monthly payments, and is contracted at an interest rate of 4.5%.

A. What is the monthly payment?

\[
\begin{align*}
P &= 420,000 \\
N &= 30 \times 12 \\
f &= 4.5/12 \\
\text{PMT} &= \frac{P \times f}{N} \\
\text{PMT} &= 2,128.07
\end{align*}
\]

B. How much of the first payment is interest?

\[420,000 \times (4.5/12) = 1,575.00\]

C. How much of the first payment is principal?

\[2,128.07 - 1,575.00 = 553.07\]

D. How much do you owe after making monthly payments for 8 years?

\[
\begin{align*}
PMT &= 2,128.07 \\
N &= 22 \times 12 = 264 \\
f &= 4.5/12 \\
PV &= \frac{PMT}{f} \times (1 - \frac{1}{(1 + f)^N}) \\
PV &= 356,231.84
\end{align*}
\]
3. An Intel Corporation bond pays a semi-annual 9% coupon and has 15 years to maturity. How much would you pay for this bond if you require a return of 11% on this bond?

\[ N = 15 \times 2 = 30 \]
\[ I = 11\% \times 2 = 22\% \]
\[ PV = \frac{854.47}{(1 + 0.05)^{30}} \]
\[ \theta T = 90 / 2 = 45 \]
\[ FV = 1,000 \]

4. The following bond quote from the Wall Street Journal is provided for the Google, Incorporated. This bond pays interest semi-annually.

<table>
<thead>
<tr>
<th>Company (ticker)</th>
<th>Coupon</th>
<th>Maturity</th>
<th>Last Price</th>
<th>Last Yield</th>
<th>Est Spread</th>
<th>UST</th>
<th>Est $ Vol (000's)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Google Inc (GOOG)</td>
<td>8.750</td>
<td>Feb 28, 2029</td>
<td>108.346</td>
<td>???</td>
<td>60</td>
<td>10</td>
<td>28,155</td>
</tr>
</tbody>
</table>

A. What is the current yield of this bond?

\[ \frac{87.50}{1083.46} \approx 8.09\% \]

B. What is the yield-to-maturity on this bond?

\[ N = 19 \times 2 = 38 \]
\[ I = 7.895 \times 2 \]
\[ PV = -1,053.46 \]
\[ \theta T = 87.50 / 2 = 43.75 \]
\[ FV = 1,000 \]
5. Your Investment Advisor has just sent you three Analyst Reports for a young, growing company named Vegas Chips, Incorporated. These Reports show this to be a speculative company, but each show different projections of the company's future growth rate in earnings and dividends. Vegas Chips paid a dividend of $1.20 per share in the just recently completed year \( D_0 = $1.20 \) and all three Reports show that there is consensus that a fair rate of return to investors for this common stock is 12%.

A. The Analyst who produced Report A makes the assumption that Vegas Chips will remain a small, regional company and although profitable is not expected to grow \( (g=0\%) \). Based on this Report, what is the expected value of a share of Vegas Chips common stock?

\[
P_0 = \frac{D}{r} = \frac{1.20}{0.12} = 10.00
\]

B. The Analyst who produced Report B makes the assumption that Vegas Chips will enter the national market and grow at a steady, constant rate of 7%. Based on this Report, what is the expected value of a share of Vegas Chips common stock?

\[
P_0 = \frac{D_1}{r - g} = \frac{1.20 \times (1.07)}{0.12 - 0.07} = \frac{1.284}{0.05} = 25.68
\]

C. The Analyst who produced Report C also makes the assumption that Vegas Chips will enter the national market, but expects a high level of initial excitement for the product that is then followed by growth at a constant rate. Earnings and dividends are expected to grow at a rate of 50% over the next two years, and then revert back to a constant growth rate of 9% thereafter. Based on this Report, what is the expected value of a share of Vegas Chips common stock?

\[
\begin{align*}
D_0 &= 1.20 \\
\Delta D_1 &= 1.80 \\
\Delta D_2 &= 2.70 \\
\Delta D_3 &= 2.943 \\
\end{align*}
\]

\[
P_0 = \frac{2.943}{0.12 - 0.09} = 98.16
\]

\[
81.964
\]