Lesson 2: Compound Interest. Earning More Money

**Compound Interest**: The situation where interest is regularly added to the principal to, in turn, earn interest. Money invested with compound interest grows by multiplying by the growth factor \((1+i)\) so it is exponential.

For Compound Interest:

\[
A = P(1 + i)^n
\]

- \(A\) = Final Amount
- \(P\) = Principal
- \(i\) = interest rate per period (remember decimal form) \(\frac{Rate}{freq}\)
- \(n\) = number of compounding periods

**Ex 1**: (Complete the chart)

<table>
<thead>
<tr>
<th>Annual Rate</th>
<th>Time (Years)</th>
<th>Compounding Period</th>
<th>Freq: Periods in one year</th>
<th>(n)</th>
<th>(i = \frac{\text{rate}}{\text{freq}})</th>
</tr>
</thead>
<tbody>
<tr>
<td>8%</td>
<td>3</td>
<td>annually</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>7</td>
<td>semi-annually</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12%</td>
<td>2</td>
<td>quarterly</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10%</td>
<td>6</td>
<td>semi-annually</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12%</td>
<td>24</td>
<td>monthly</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example 2**: If Maria invests $2500 in an account that pays 8% compounded quarterly, how much will she have after four years?

\[
A = 2500 \times (1.02)^{16} = \$3431.96
\]

**Example 3**: What will a $10 000 Savings Bond be worth in two years if it pays 8% compounded quarterly? How much interest was earned?

\[
A = 10000 \times (1.02)^8 = \$11716.60
\]

\[
\text{Interest} = \$11716.60 - \$10000 = \$1716.60
\]