### 11.2 - Discrete Compounding

*Add problem 11.2 to Chapter 11 Packet
*Interest and Compounding
*Compounding Interest Examples
*Assignment Time and Reading Time

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#### 11.2 : Idea of Interest and Compounding

**Simple vs. Compound Interest**

$5000 over 3 years at 10% per year.

<table>
<thead>
<tr>
<th>Simple</th>
<th>Discrete Compound</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year</strong></td>
<td><strong>$</strong></td>
</tr>
<tr>
<td>0</td>
<td>5,000</td>
</tr>
<tr>
<td>1</td>
<td>5,000 + 500</td>
</tr>
<tr>
<td>2</td>
<td>5,500 + 500</td>
</tr>
<tr>
<td>3</td>
<td>6,000 + 500</td>
</tr>
</tbody>
</table>

- **Yearly**: $5,500 + 550
- **Semi-annually**: $5,500 + 550 + $531.25
- **Annually**: $5,500 + 550 + $531.25
### 11.2: Applications of Exponential Functions

For 2 years compounded annually:

\[
\frac{5000 + (0.05)(5000)}{5000} = \left(1 + 0.05 \right)^2
\]

For 3 years:

\[
\frac{5000(1+0.05) + (0.05)(5000(1+0.05))}{5000(1+0.05)^2} = \left(1 + 0.05 \right)^3
\]

**Compound Interest**

\[
A = P \left(1 + \frac{r}{n}\right)^{nt}
\]

- **A** = Balance After
- **P** = Principal
- **r** = rate (annual)
- **t** = time amount (years)
- **n** = compoundings per rate time (per year)

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*Example*

A total of $15,000 is invested at an annual interest rate of 3% for ten years. Find the balance if the interest is compounded:

a) quarterly

\[
A = 15,000 \left(1 + \frac{0.03}{4}\right)^{4 \cdot 10} = 20,253.23
\]

b) monthly

\[
A = 15,000 \left(1 + \frac{0.03}{12}\right)^{12 \cdot 10} = 20,247.44
\]

c) daily

\[
A = 15,000 \left(1.0000833\right)^{365 \cdot 10} = 20,240.30
\]
A job pays a salary of $32,000 the first year. During the next 39 years, there is a 5.5% raise each year. What is the salary in the 40th year?

\[ 32,000 \left(1 + \frac{0.055}{1}\right)^1. \]

Assignment (Due Tuesday, January 19)

1) Chapter 11 Problems Packet
   a) 11.1, 11.2

   b) WS add 11.63, 11.64, 11.69, 11.70
      (leave all "continuous" as blank for now)
   c) WS 11.53 and 11.54

*) Make sure that each problem is DONE
   (Detailed, Organized, Neat, Effort)

3) Read Chapter 11 pg. 146-148 (first half)