Business Math Review of Chapters 9, 10, 11

Answer Key by Michael Reimer

1) Solve for Effective Rate

<table>
<thead>
<tr>
<th>Effective Means Annual Compounding</th>
<th>2) disregard Monthly</th>
</tr>
</thead>
<tbody>
<tr>
<td>( N = 15 \times 1 = 15 )</td>
<td>( N = 7 \times 1 = 7 )</td>
</tr>
<tr>
<td>( I/Y )</td>
<td>( I/Y )</td>
</tr>
<tr>
<td>( 7.60% )</td>
<td>( 4.50% )</td>
</tr>
<tr>
<td>PV $1</td>
<td>PV $2300</td>
</tr>
<tr>
<td>PMT ( \theta )</td>
<td>PMT ( \theta )</td>
</tr>
<tr>
<td>FV $3</td>
<td>FV $3 130</td>
</tr>
<tr>
<td>( P/Y )</td>
<td>( P/Y )</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>(C/Y 1)</td>
<td>(C/Y 1)</td>
</tr>
</tbody>
</table>

2) Solve for Monthly Nominal Rate

<table>
<thead>
<tr>
<th>N ( 16 \times 12 = 192 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( I/Y )</td>
</tr>
<tr>
<td>3.65%</td>
</tr>
<tr>
<td>PV $5000</td>
</tr>
<tr>
<td>PMT ( \theta )</td>
</tr>
<tr>
<td>FV $7 200</td>
</tr>
<tr>
<td>( P/Y )</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>(C/Y 12)</td>
</tr>
</tbody>
</table>

5) Converting Effective to Nominal

\( 2^{nd} \) CELL

\( \text{NOM} = 12.60 \times 1.05 = 12.60\% \)
\( \text{EFF} = 6.46 \times 1.05 = 6.95\% \)
\( \text{C/Y 2} \)

6) Converting Nominal to Effective

\( \text{Nom} = 6.31 \times 1.05 = 6.63\% \)
\( \text{EFF} = 6.46 \times 1.05 = 6.95\% \)
\( \text{C/Y 4} \)
7) Converting Nominal to Effective
   i) \( 2.25\% \text{ per month} \times 12 = 27\% \)
   ii) 27\% compounded monthly
   iii) NOM 27
        Eff \( ? \quad 30.60 \) \( 99.999\% = 30.60\% \)
    (14 12)

8) Converting Nominal to Effective, dropping the Effective, converting the new Effective back to Nominal, converting new Nominal to periodic rate
   i) \( 1.89\% \text{ per month} \times 12 = 22.68\% \)
   ii) NOM 22.68
   iii) Eff \( ? \quad 25.19 \quad 26.2535 - 2.25\% = 22.94 \quad 26.2535 \)
    (14 12)
   iv) NOM \( ? \quad 20.83354224 \div 12 = 1.73 \quad 12.852\% = 1.74\% \)
      Eff 22.94 26.2535
    (14 12)

9) Solving PV given PMT
   \( N \quad 25 \times 2 = 50 \)
   \( i \quad 4.89\% \)
   \( PV \quad ? \quad 230.764.56 \)
   \( PMT \quad \# \quad 8000 \)
   \( FV \quad ? \)
   \( P1 \quad 2 \)
   \( C1 \quad 1 \)

10) Solving FV given PV and PMT
    \( N \quad \frac{4 \times 2}{8} = 2 \times 2 = 4 \)
    \( i \quad 3.62\% \)
    \( PV \quad \# \quad 25000 \)
    \( PMT \quad \# \quad 3500 \)
    \( FV \quad ? \quad 58724.51 \)
    \( P1 \quad 2 \)
    \( C1 \quad 4 \)
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11) Finding FV given PMT at start of time line and deferral at end of time line

- N 15 x 12 = 180
- I% 5.25%
- PV $0
- PMT $1000
- FV $272,420.5684

1. Find PMT

2. Find FV

12) Finding PV given PMT and a Downpayment

- N 24
- I% 5.35%
- PV $3520.46 + $500 = $4020.46
- PMT $155
- FV $0
- P/Y 12
- C/Y 12

Calculating Interest Paid

1. Amount Paid = N x PMT = 24 x $155 = $3720
2. Interest Paid = Amount Paid - PV = $3720 - $3520.46 = $199.54
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13) Finding PMT given FV
   N: 25 x 2 = 50
   I/Y: 6.27%
   PV: 0
   PMT: $3,382.20
   FV: $400,000
   P/Y: 2
   C/Y: 4

14) Finding PMT given PV
   N: 4 x 12 = 48
   I/Y: 4.52%
   PV: $10,000
   PMT: $228.12
   FV: 0
   P/Y: 12
   C/Y: 12

15) Finding I/Y given PV and PMT
   N: 25 x 2 = 50
   I/Y: 5.320786837% = 5.32%
   PV: $500,000
   PMT: $3,000
   FV: 0
   P/Y: 12
   C/Y: 2

16) Finding I/Y given FV and PMT
   N: 12 x 4 = 48
   I/Y: 7.10771633 = 7.11%
   PV: 0
   PMT: $4000
   FV: $306,000
   P/Y: 4
   C/Y: 12

17) Finding N (Years) Given FV and PMT
   N: $250,650 / 362 = 30.16
   I/Y: 5.93
   PV: 0
   PMT: - $250,650
   FV: $250,000
   P/Y: 12
   C/Y: 2 (Months)
   30 Years 2 Months
17) Interest Earned
   1. Amount Paid = N x PMT = 36.2 x $250.65 = $9,073.30
   2. Interest Earned = FV - Amount Paid = $250,000 - $9,073.30 = $150,926.70

18) Finding N given PV and PMT
   \[
   N = \frac{\ln \left( \frac{FV}{PV} \right)}{\ln(1 + I)}
   \]
   \[
   I = 1.81\% \\
   PV = $348,844.54 \\
   PMT = $2,275 \\
   FV = 0 \\
   I/Y = 12 \\
   C/Y = 1 (Effective)