In the following problems show both the formula work and fill in the TVM solver window. Circle your solution.

1. Julia wants to buy a new car. Her old car is worth $5000 as a trade-in, and she can afford monthly payments of $300. If she finances the car over a 6 year period at 5.99% compounded monthly, what is the total amount that she can spend on a new car?

\[
\begin{align*}
N &= 6 \times 12 = 72 \\
I &= 5.99 \\
PV &= 18107.01 \\
PMT &= -300 \\
FV &= 0 \\
P/Y &= 12 \\
C/Y &= 12 \\
PMT &= \text{END BEGIN}
\end{align*}
\]

\[
\begin{align*}
\text{How much can she finance?} \\
P &= 300 \left[ \frac{(1-(1+\frac{.0599}{12})^{-72})}{.0599/12} \right] = \$18,107.01 \\
\text{Total she can afford} &= \$18,107.01 + 5000 \\
&= \$23,107.01
\end{align*}
\]

2. A speculator agrees to pay $15,000 for an acre of land. He will pay this amount, with interest, over a 4-year period, making two payments per year at an interest rate of 10% compounded semiannually. Find the amount of each payment that he must make.

\[
\begin{align*}
N &= 2 \times 4 = 8 \\
I &= 10 \\
PV &= 15000 \\
PMT &= -2320.83 \\
FV &= 0 \\
P/Y &= 2 \\
C/Y &= 2 \\
PMT &= \text{END BEGIN}
\end{align*}
\]

\[
\begin{align*}
P &= R \left[ \frac{1-(1+c)^{-n}}{c} \right] \\
15000 &= R \left[ \frac{(1-(1+.1/2)^{-8})}{.1/2} \right] \\
15000 &= 6.463212759R \\
R &= \$2320.83
\end{align*}
\]

3. George and Debbie Ashton purchase a house for $190,000. After paying 20% as a down payment, they finance the balance through Suntrust Bank by obtaining a 30 year fixed rate mortgage of 7.38% (compounded monthly).

a. Determine the size of the down payment.

\[
190,000 \times 0.2 = \$38,000
\]

b. Determine the amount financed.

\[
190,000 - 38,000 = \$152,000
\]

c. Determine the monthly payments needed to amortize the loan.

\[
\begin{align*}
P &= 152,000, \ R = ? , \ c = \frac{.0738}{12}, \ n = 12 \times 30 = 360 \\
152,000 &= R \left[ \frac{(1-(1+\frac{.0738}{12})^{-360})}{.0738/12} \right] \\
152,000 &= 144.7144602R \\
R &= \$1050.34
\end{align*}
\]

d. Find the total interest that George and Debbie will pay if they amortize the mortgage on schedule.

\[
(360 \times 1050.34) - 152,000 = \$226,122.40
\]

e. Determine the unpaid balance on the mortgage after 10 years, 15 years, 20 years.

\[
\text{10 years: } \$81,572.31, \text{ 15 years: } \$114,142.25, \text{ 20 years: } \$89,954.63
\]

4. Irene deposits $200 each month into a retirement account earning 6.5% interest compounded monthly for 30 years. Then she retires and withdraws equal monthly payments from the account for 25 years, at which time the account balance is $50. What monthly payment will Irene receive for the last 25 years?

\[
S = 200 \left[ \frac{(1+\frac{.065}{12})^{360} - 1}{(\frac{.065}{12})} \right] = \$271,235.62
\]
5. Steve starts his career at the age of 25, and makes equal monthly deposits into an annuity that earns 6.25% compounded monthly. He plans on retiring at age 60, and would like to withdraw $3000 monthly for 25 years, bringing the account balance to $0. How much should Mike deposit monthly to accumulate enough to provide him with these $3000 payments?

\[ P = \frac{221,235.62}{i} \left[ \frac{1 - (1 + i)^{-n}}{i} \right] \]
\[ 221,235.62 = R \left[ \frac{1 - (1 + 0.065/12)^{-300}}{(0.065/12)} \right] \]
\[ R = \$1493.80 \]

7. An ordinary annuity that earns 7.5% compounded monthly has a current balance of $500000. The owner of the account is about to retire and must decide how much to withdraw from the account each month. Determine how long, in years and months, that payments can be made under each of the following options before the money runs out. ONLY USE THE TVM SOLVER FOR THIS ONE!

a. $5000 monthly

\[ N = 157.423 \text{ months} \]

b. $4000 monthly

\[ N = 243.931 \text{ months} \]

c. $3000 monthly

Money will never run out
8. A $3000 computer can be financed by paying $100 per month for 3 years. What is the interest rate compounded monthly for this loan? **TVM SOLVER ONLY…**

<table>
<thead>
<tr>
<th>N</th>
<th>12 \cdot 3 = 36</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>12.249999998</td>
</tr>
<tr>
<td>PV</td>
<td>3000</td>
</tr>
<tr>
<td>PMT</td>
<td>-$100</td>
</tr>
<tr>
<td>FV</td>
<td>0</td>
</tr>
<tr>
<td>P/Y</td>
<td>12</td>
</tr>
<tr>
<td>C/Y</td>
<td>12</td>
</tr>
<tr>
<td>PMT:</td>
<td>END</td>
</tr>
</tbody>
</table>

\[ r = 12.249\% \]

9. Large delivery trucks cost $98,000 each. Ace Trucking buys such a truck, and agrees to pay for it with a loan that will be amortized with 8 semiannual payments at 10% compounded semiannually. Fill out the amortization schedule for this loan.

<table>
<thead>
<tr>
<th>Payment Number</th>
<th>Amount of Payment</th>
<th>Interest for Period</th>
<th>Reduction of Unpaid Balance</th>
<th>Unpaid Balance (Principal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>$98,000</td>
</tr>
<tr>
<td>1</td>
<td>15,162.74</td>
<td>(98,000 \times 0.12)</td>
<td>19,262.74</td>
<td>87,737.26</td>
</tr>
<tr>
<td>2</td>
<td>15,162.74</td>
<td>4,386.86</td>
<td>10,775.88</td>
<td>76,961.38</td>
</tr>
<tr>
<td>3</td>
<td>15,162.74</td>
<td>3,848.07</td>
<td>11,314.67</td>
<td>65,646.71</td>
</tr>
<tr>
<td>4</td>
<td>15,162.74</td>
<td>3,282.34</td>
<td>11,980.40</td>
<td>53,766.31</td>
</tr>
<tr>
<td>5</td>
<td>15,162.74</td>
<td>2,688.32</td>
<td>12,474.42</td>
<td>41,291.89</td>
</tr>
<tr>
<td>6</td>
<td>15,162.74</td>
<td>2,064.59</td>
<td>13,098.15</td>
<td>28,193.74</td>
</tr>
<tr>
<td>7</td>
<td>15,162.74</td>
<td>1,409.69</td>
<td>13,753.05</td>
<td>14,440.69</td>
</tr>
<tr>
<td>8</td>
<td>15,162.72</td>
<td>722.03</td>
<td>14,440.69</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>$121,301.90</strong></td>
<td><strong>$23,301.90</strong></td>
<td><strong>$98,000</strong></td>
<td><strong>$98,000</strong></td>
</tr>
</tbody>
</table>

\[
98,000 = R \left[ \frac{1 - (1 + 0.12)^{-8}}{0.12} \right] \\
98,000 = 6.463212759R \\
15,162.74 = R
\]