This last WIR is based on homework problems.

Here are the problems we solved on 11/26/13.

5.3

1. - Question Details: TanFin10 5.3.031. [1652048]
Andrea, a self-employed individual, wishes to accumulate a retirement fund of $250,000. How much should she deposit each month into her retirement account, which pays interest at a rate of 5.5%/year compounded monthly, to reach her goal upon retirement 25 years from now? (Round your answer to the nearest cent.)

\[
\begin{align*}
N &= 12 \times 25 \\
I &= 5.5 \\
\therefore V &= 0 \\
\text{FV} &= 250000 \\
pV &= \text{CY} = 12 \\
\text{PMT} &= ? \\
\hline
\end{align*}
\]

2. - Question Details: TEAFMAC2 F.3.026.Custom.TAMU.141 [1926586]
A corporation creates a sinking fund in order to have $380,000 to replace some machinery in 8 years. How much should be placed in this account at the end of each week if the annual interest rate is 8.7% compounded weekly? (Round your answers to the nearest cent.)

How much interest would they earn over the life of the account?

Determine the value of the fund after 2, 4, and 6 years.

\[
\begin{align*}
N &= 2 \times 52 \\
\therefore V &= 632.89 \\
\hline
N &= 7 \times 52 \\
\therefore V &= 1572.9646 \\
\hline
N &= 6 \times 52 \\
\therefore V &= 258993.03 \\
\end{align*}
\]

3. - Question Details: TanFin10 5.3.028.Custom.TAMU [1918030]
Carl is the beneficiary of a $25,000 trust fund set up for him by his grandparents. Under the terms of the trust, he is to receive equal installments from this fund at the end of each year over a 7-year period. If the fund earns interest at the rate of 9%/year compounded annually, what amount will he receive each year? (Round your answer to the nearest cent.)

\[
\begin{align*}
N &= 7 \times 1 \\
I &= 9 \\
\therefore V &= 25000 \\
\text{PMT} &= ? \\
\hline
\end{align*}
\]

4. - Question Details: TEAFMAC2 F.4.014.Custom.TAMU [2009775]
Find the monthly payment needed to amortize a typical $100,000 mortgage loan amortized over 30 years at an annual interest rate of 4.7% compounded monthly. (Round your answers to the nearest cent.)

\[ \begin{align*}
N &= 12 \times 30 \\
FV &= 100,000 \\
I &= 4.7 \\
\text{PMT} &= ? \\
P_0 &= C \times 12 \\
\text{PMT} &= \frac{FV}{\frac{1 - (1 + I)^{-N}}{I}} \\
&= \frac{100,000}{\frac{1 - (1 + 0.047)^{-360}}{0.047}} \\
&= 518.64
\end{align*} \]

Find the total interest paid on the loan.

\[ 518.6378 \times 12 \times 30 - 100,000 = 86,709.61 \]

5. - **Question Details** TanFin10 5.3.024.Custom.TAMU [1918078]

A group of private investors purchased a condominium complex for $4 million. They made an initial down payment of 12% and obtained financing for the balance. The loan is to be amortized over 15 years at an interest rate of 15% per year compounded quarterly. (Round your answers to the nearest cent.)

What is the required quarterly payment?

\[ \frac{N \times I}{Q} = \frac{15 \times 0.15}{4} = 5.625 \]

\[ \text{PV} = 352,000 \]

\[ \text{PMT} = \frac{\text{PV} \times I}{Q} = \frac{352,000 \times 0.15}{4} = 148,285.97 \]

How much total interest will be paid on the loan?

\[ 148,285.97 \times 60 - 352,000 = 5,377,158.48 \]

6. - **Question Details** TanFin9 5.3.048 TAMU Custom [1093940]

Five years ago, Diane secured a bank loan of $300,000 to help finance the purchase of a loft in the San Francisco Bay area. The term of the mortgage was 30 years, and the interest rate was 9% per year compounded monthly on the unpaid balance. Because the interest rate for a conventional 30-year home mortgage has now dropped to 5% per year compounded monthly, Diane is thinking of refinancing her property. (Round your answers to the nearest cent.)

(a) What is Diane's current monthly mortgage payment?

\[ \frac{N \times I}{Q} = \frac{30 \times 0.09}{12} = 2.25 \]

\[ \text{PV} = 300,000 \]

\[ \text{FV} = 0 \]

\[ \text{PMT} = \frac{\text{PV} \times I}{Q} = \frac{300,000 \times 0.09}{12} = 2,483.75 \]

(b) What is Diane's current outstanding balance?

\[ \frac{N \times I}{Q} = \frac{60 \times 0.09}{5} = 1.08 \]

\[ \text{PV} = 300,000 \]

\[ \text{FV} = 0 \]

\[ \text{PMT} = 2413.8678 \]

\[ \text{PV} = (C \times 12) \]

\[ \text{FV} = 287,409.66 \]

(c) If Diane decides to refinance her property by securing a 30-year home mortgage loan in the amount of the current outstanding principal at the prevailing interest rate of 5% per year compounded monthly, what will be her monthly mortgage payment? Use the rounded outstanding balance.

\[ \frac{N \times I}{Q} = \frac{360 \times 0.05}{5} = 3.6 \]

\[ \text{PV} = 287,640.66 \]

\[ \text{FV} = 0 \]

\[ \text{PMT} = 1544.12 \]
(d) How much less would Diane's monthly mortgage payment be if she refinances? Use the rounded values from parts (a)-(c).

\[
\begin{array}{c}
2413.87 \\
- 1544.12 \\
\hline
\text{this much less!}
\end{array}
\]

7. - Question Details TanFin9 S.3.052 TAMU Custom [1093946]
The Martinezes are planning to refinance their home (assuming that there are no additional finance charges). The outstanding balance on their original loan is $200,000. Their finance company has offered them two options:

Option A: A fixed-rate mortgage at an interest rate of 6.5% per year compounded monthly, payable over a 25-year period in 300 equal monthly installments.

Option B: A fixed-rate mortgage at an interest rate of 6.25% per year compounded monthly, payable over a 12-year period in 144 equal monthly installments.

(a) Find the monthly payment required to amortize each of these loans over the life of the loan. (Round your answers to the nearest cent.)

Option A: $1350.41

\[
\begin{align*}
N &= 300 \\
I &= 6.5 \\
PV &= 200000 \\
\text{PMT} &= ? \\
FV &= 0 \\
PY &= CY = 12 \\
PMT &= 1350.41
\end{align*}
\]

Option B: $1977.67

\[
\begin{align*}
N &= 144 = 12 \times 12 \\
I &= 6.25 \\
PV &= 200000 \\
\text{PMT} &= ? = 1977.67 \\
FV &= 0 \\
PY &= CY = 12
\end{align*}
\]

(b) How much interest would the Martinezes save if they chose the 12-year mortgage instead of the 25-year mortgage? Use the rounded monthly payment values from part (a). (Round your answer to the nearest cent.)

$120,338.52

\[
\begin{align*}
1350.41 \times 300 - 200000 &= 205123 \\
1977.67 \times 144 - 200000 &= 84784.48 \\
\text{Interest saved} &= 205123 - 84784.48 = 120338.52
\end{align*}
\]

8. - Question Details TanFin10 S.3.028.Custom.TAMU [1918075]
The Turners have purchased a house for $170,000. They made an initial down payment of $10,000 and secured a mortgage with interest charged at the rate of 10% per year compounded monthly on the unpaid balance. The loan is to be amortized over 30 yr. (Round your answers to the nearest cent.)

(a) What monthly payment will the Turners be required to make?

\[
\begin{align*}
N &= 12 \times 30 \\
I \% &= 10 \\
PV &= 160,000 \\
FV &= 0 \\
\text{PMT} &= ? \\
\therefore 1404.11
\end{align*}
\]

(b) How much total interest will they pay on the loan?

\[
1404.11 \times 360 - 160000 = 345479.6
\]

(c) What will be their equity after 10 years?

\[
\begin{align*}
N &= 360 - 12 \times 10 = 240 \\
I &= 10 \\
PV &= \text{still owe} = 145,500.8309 \\
\text{PMT} &= 1404.11 \\
FV &= 0 \\
\text{PY} &= 12 \\
\text{CY} &= 12
\end{align*}
\]

\[
\text{Equity} = 160000 - 145500.8309 + 10000
\]

\[
= 144999.1691 + 10000
\]

\[
= 244999.1691
\]

(d) What will be their equity after 22 years?

\[
N = 360 - 12 \times 22 = 96
\]

Set up as in part (c)

\[
\begin{align*}
(160000 - 92533.23629) &= 67466.76371 + 10000 \\
\therefore 77466.76371
\end{align*}
\]