Chapter 12: Annuities Due Answer Key by Michael Kremer
Business Math

Annuities due means that the payments take place at the beginning of the period and not the end of the period. So this means that our calculators need to be in begin mode.

To change your calculator to begin mode:

1. Press 2nd (PMT) BCN

It says END in the left corner to change modes you go 2nd (Enter) SET and then your calculator will say BCN (begin) in the left corner. Also, a BCN will appear at the top of your calculator screen in the right corner. We will still use the row of bottoms to do our calculations.

1. \( N \times 25 \text{ yrs} \times 12 = 300 \)
   \[
   \begin{align*}
   FV &= 3 \times 25 \times 300 = 291,919.97 \\
   FV &= 291,919.97 \\
   C/Y &= 12 \\
   P/Y &= 12 \\
   
   \end{align*}
   \]

2. Total paid = \( N \times \text{PMT} = 300 \times 350 = 105,000 \)
   \[
   \begin{align*}
   \text{Total} &= FV - \text{Total} = 291,919.97 - 105,000 \\
   \text{Total Interest} &= 196,919.97 \\
   \end{align*}
   \]

3. \( N \times 5 \text{ yrs} \times 2 = 10 \)
   \[
   \begin{align*}
   FV &= 4 \times 7.5 \\
   FV &= 4055.73 \\
   C/Y &= 4 \\
   P/Y &= 2 \\
   \end{align*}
   \]

4. Total paid = \( N \times \text{PMT} = 450 \times 10 = 4500 \)
   \[
   \begin{align*}
   \text{Total} &= \text{Total} - PV = 4500 - 4055.73 \\
   \text{Total Interest} &= 444.27 \\
   \end{align*}
   \]

Even though the word accumulated is being used in this question, the 500,000 is a PV because we want to withdraw money from it beginning today.
6. \[ N \times 5 \times 12 = 180 \]
   \[ \text{PV} = 5000 \]
   \[ \text{PMT} = 1000 \]
   \[ \text{FV} = \text{PV} \]
   \[ \text{C/Y} = 12 \]

7. \[ N \times 3.44 + 84 ÷ 4 = 21 \text{ years} \]
   \[ \text{PV} = \text{FV} \]
   \[ \text{PMT} = 1500 \]
   \[ \text{FV} = 500000 \]
   \[ \text{C/Y} = 4 \]

This time accumulate is future value because the question is asking how long it takes him to accumulate to $500,000.

8. This question will be done in end mode, but everything else is the same.

\[ N \times 4.34 + 85 ÷ 4 = 21.25 \]
\[ \text{PV} = \text{FV} \]
\[ \text{PMT} = -1500 \]
\[ \text{FV} = 500000 \]
\[ \text{C/Y} = 4 \]

21 years and 3 months