

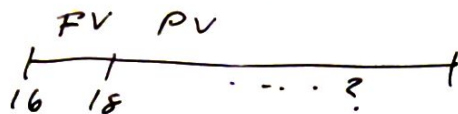
Clue 4:

2 yrs 4.35 yrs

15

Total for clue 4: 10

Q1: Given:



$$FV = R \left(\frac{(1+i)^n - 1}{i} \right) = 50 \left(\frac{(1 + \frac{0.038}{12})^{12 \cdot 2} - 1}{\frac{0.038}{12}} \right) = 1244.73 \checkmark$$

$$PV = R \left(\frac{1 - (1+i)^{-n}}{i} \right) = 25 \left(\frac{1 - (1 + \frac{0.022}{12})^{-12 \cdot t}}{\frac{0.022}{12}} \right) \checkmark \rightarrow \text{years}$$

$$1244.73 = 25 \left(\frac{1 - (1.00183)^{-12t}}{1.83 \times 10^{-3}} \right)$$

$$49.7892 = \frac{1 - (1.00183)^{-12t}}{1.83 \times 10^{-3}} \checkmark$$

$$+0.9087 = + (1.00183)^{-12t}$$

$$\log 0.9087 = -12t \log 1.00183$$

$$t = 4.35 \checkmark$$

$$\text{Age: } 16 + 2 + 4.35 = 22.35 \text{ years old} \checkmark$$

General Form:

$$t_n = -(-3)^n + 1$$

$$100,000 = -(-3)^n + 1$$

$$+100,001 = +3^n \checkmark$$

$$\log 100,001 = \log 3^n \checkmark$$

$$n = \frac{\log 100,001}{\log 3}$$

$$= 10.48 \checkmark$$

$$\approx 11 \checkmark$$

Q2:

$$\begin{array}{ccccccc} 7 & -17,55 & -161,487 & -1457 & 4375 & -13121 \\ \times -2.428 & \times 2.9 & -2.99 & -2.99 & & \end{array} \checkmark$$

It seems like the ratio gets closer to -3 as the sequence goes on. This means this geometric sequence must have a base of $(-3)^n \dots$. Let's first try this base.

$$-3, 9, -27, 81, -243, 729, -2187, 6561 \checkmark$$

↑ This seems very similar if you multiply each term by 2.

$$-6, 18, -54, 162, -486, 1458, -4374, 13122$$

Now if we multiply by -1 and add 1, we get the sequence.