Assignment 1 - Submission

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1. (a) The present value of the investment inflow cash is:

$$PV_{inflow} = \frac{1,500}{1+r} + \frac{1,000}{(1+r)^2} + \frac{10,000}{(1+r)^{10}} = 10,635.24$$

Then

$$NPV = PV_{inflow} - PV_{outflow} = 10,635.24 - 10,000 = 635.24$$

We should take this opportunity.

(b)

$$EAR = \left(1 + \frac{APR}{2}\right)^2 - 1 = 6.09\%$$

Then

$$PV_{inflow} = 7,839.13$$
$$NPV = -2,160.86$$

We should not take it.

2. Let C be amount to be paid each year:

$$300,000 = \frac{C}{r}\left(1 - \frac{1}{(1+r)^{30}}\right)$$

Then

$$C = \begin{cases} 19,515.43, & \text{if } r = 5\% \\ 24,175.92, & \text{if } r = 7\% \end{cases}$$

3. After 29 years, I have repaid $\frac{22,500}{r}\left(1 - \frac{1}{(1+r)^{29}}\right) = \$276,247.66$ in present value. I have $\$23,752.34$ left in debt (PV). This translate to:

$$C_{30} = 23,752.34 \times 1.07^{30} = \$180,808.86$$

4.

$$PV_{inflow} = 20$$
$$PV_{outflow} = \frac{2}{r}$$

Calculate IRR:

$$IRR = \frac{2}{20} = 10\%$$

The IRR says to only accept this deal if $r > 10\%$
Calculate NPV:

$$NPV = 20 - \frac{2}{0.08} = -5$$

I should not take the deal.
If the rules deviate, I should follow NPV because of its more relaxed assumptions.

5.

$$\begin{aligned} r &= \sqrt[4]{1 + EAR} - 1 = 0.012 \\ PV_{payments} &= 200 \times \left(1 + \frac{1}{1+r} + \cdots + \frac{1}{(1+r)^4}\right) \\ &= 976.05 \end{aligned}$$

My minimal evaluatino for the console is $976.05 in present value to consider buying it.