CivE 392 Assignment 1

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Assignment 1

Question 1

a) See Figure 1 below. **Note**: the red plot is simple interest and the blue plot is compound interest

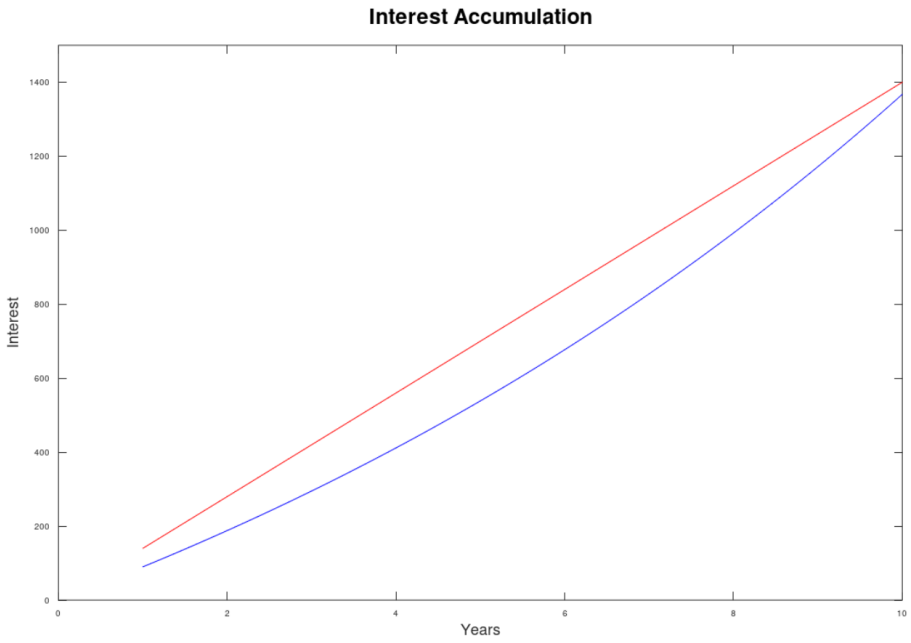

Figure 1: Interest as a function of years

b) As seen above, the simple interest rate would generate more interest over a 5 year period. This makes it better than the compound interest account over this timeframe

c) Using an online calculator, setting $140x = 1000(1.09)^x - 1000$, it was found that the compound equation passed the simple equation at 10.48 years. However, since it is compounded annually, it would need to be 11 years until the compound deposit would be preferable.

Question 2

a)Effective Rates: as below, it is clear that Evil Express has the best deal.

Evil Express: $(1 + \frac{0.27}{365})^{365} - 1 = 30.98\%$

Vicious Visa: $(1 + \frac{0.28}{52})^{52} - 1 = 32.21\%$

Menacing Mastercard: $(1 + \frac{0.29}{12})^{12} - 1 = 33.18\%$

b)He would owe the following:

Evil Express: $3000(1 + \frac{0.27}{365})^{365 \cdot 4} = \$8830.51$

Vicious Visa: $3000(1 + \frac{0.28}{52})^{52 \cdot 4} = \$9166.98$

Menacing Mastercard: $3000(1 + \frac{0.29}{12})^{12 \cdot 4} = \$9438.69$

Question 3

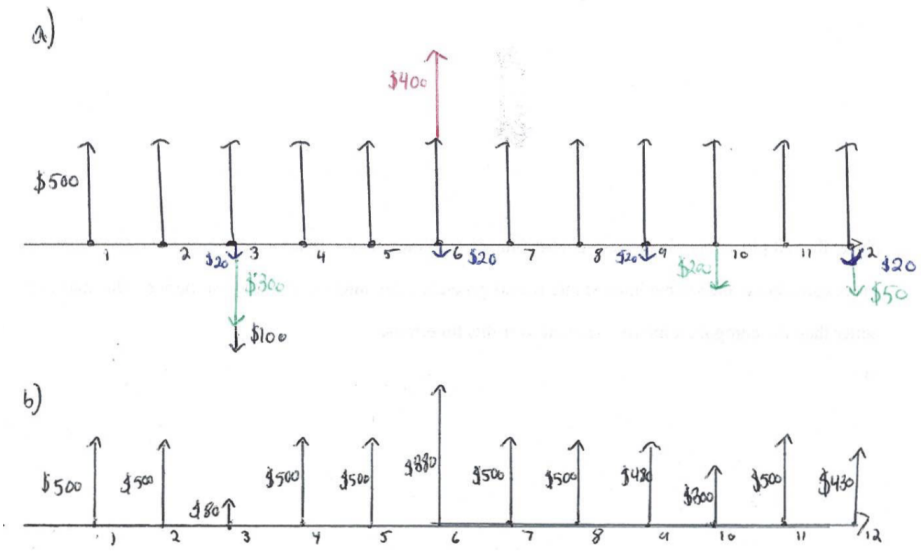

Figure 2: Hand-drawn Cash-Flow Diagrams

Question 4

Givens: P=250000; S=25000; N=4+3=7

a) $D_{sl}(n) = \frac{P-S}{N}$, $\therefore D_{sl}(n) = \frac{250000-25000}{7} = \$\frac{32142.86}{yr}$

b) $BV = 250000 - 4 \cdot 32142.86 = \$121428.56$

Question 5

Givens: P=150000, S=100000, n=3

a) $d = 1 - \sqrt[n]{\frac{S}{P}}$, $\therefore d = 1 - \sqrt[3]{\frac{100000}{150000}} = 12.64\%$

b) $BV(20) = 150000(1 - 0.126419535)^{20} = \$10049.62$