1. Huntington Bank offers an account that pays 3%, compounded daily. Lafayette Bank offers an account with the same annual effective rate, but compounded twice a year. Lafayette Bank's nominal interest rate is i% per year, compounded twice a year. Find i.

> $AEF := \left(1 + \frac{.03}{365}\right)^{365};$

$$AEF := 1.030453346 \quad \textbf{(1)}$$

> $2 \cdot \left(AEF^{\frac{1}{2}} - 1\right);$

$$0.030224958 \quad \textbf{(2)}$$

2) You receive an award that pays $1,000 at the beginning of year 0, $2,000 at the beginning of year 1, and $3,000 at the beginning of year 2. What is the present value of this award at 5% interest per year?

> $i := .05;$

$$i := 0.05 \quad \textbf{(3)}$$

> $1000 + (1+i)^{-1} \cdot 2000 + (1+i)^{-2} \cdot 3000$

$$5625.850341 \quad \textbf{(4)}$$

(5)

3) You borrow $250,000 to buy a house. Compute the monthly payments on a 25 year loan at 5% interest, compounded monthly?

> $i := \frac{.05}{12};$

$$i := 0.004166666667 \quad \textbf{(6)}$$

> $solve\left((1+i)^{25 \cdot 12} \cdot 250000 - \frac{P \cdot \left((1+i)^{25 \cdot 12} - 1\right)}{i} = 0, P\right);$

$$1461.475045 \quad \textbf{(7)}$$

4) On Jan. 1, 2007, you won a contest that pays $400 dollars at the end of each month for the next 10 years together with an additional payment of $100,000 at the end of the last month. Find the present value on Jan. 1, 2007 of this prize at 3% interest, compounded monthly?

> $i := \frac{.03}{12};$

$$i := 0.002500000000 \quad \textbf{(8)}$$

> $FV := 100000 + \frac{400 \cdot \left((1+i)^{10 \cdot 12} - 1\right)}{i};$

$$FV := 1.558965675\ 10^{5} \quad \textbf{(9)}$$

> $PV := FV \cdot (1+i)^{-10 \cdot 12};$

$$PV := 1.155342629\ 10^{5} \quad \textbf{(10)}$$

5) Bob Roarman will sell you a slightly used car for $5,000 cash or you can buy the same car for 48 payments of only $135 each (made at the end of each month). What rate of interest is Bob charging? Hint: Try each answer.

6) What is the least amount I can have in my retirement fund to allow me to withdraw $500 a month at the end of each month for the next 30 years, assuming that my fund earns 4% interest, compounded monthly?

> $i := \frac{.04}{12};$

$$i := 0.003333333333 \quad \textbf{(11)}$$

> $solve\left((1+i)^{30\cdot 12}\cdot \mathrm{B} - \frac{500\cdot\left((1+i)^{30\cdot 12}-1\right)}{i} = 0, B \right);$

$$1.047306148\ 10^{5} \quad \textbf{(12)}$$

>

7) I borrow $100,000 for 20 years at 5% interest per year with annual payments of $8, 024.25 made at the end of the year. What do I still owe immediately after the 5th payment?

> $i := .05;$

$$i := 0.05 \quad \textbf{(13)}$$

> $PP := 8024.25;$

$$PP := 8024.25 \quad \textbf{(14)}$$

> $BB := (1+i)^{5}\cdot 100000 - \frac{\mathrm{PP}\cdot\left((1+i)^{5}-1\right)}{i};$

$$BB := 83289.10972 \quad \textbf{(15)}$$

8) In problem 7, immediately after the 5th payment, I refinance the loan at 4% interest per year. Assuming that the answer to Problem 7 is $50,000 (which is not correct), find the new annual payment.

> $\mathrm{i} := .04;$

$$i := 0.04 \quad \textbf{(16)}$$

> $PP2 := solve\left((1+i)^{15}\cdot 50000 - \frac{\mathrm{P}\cdot\left((1+i)^{15}-1\right)}{i} = 0, P \right);$

$$PP2 := 4497.055017 \quad \textbf{(17)}$$

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