Directions: Please answer the following questions and make sure your answer are legible. If you don’t show work and/or I can’t follow it, I won’t give partial credit. You may use a calculator (not the calculator function on other technology) and the Formula Sheet that I provide you, nothing else. Good Luck.

1. (8 points) Your small business takes out a $20,000 loan with a term of 4 years. The loan has an annual interest rate of 4.6% annually compounded interest. You will repay the entire loan (and accumulated interest) in 4 years. In the meantime, you set up a sinking fund into which you will make semiannual deposits to ensure you’ll have the money to pay off the loan. If the sinking fund earns 2.1% interest:

(a) How much total will you need to repay in 4 years?

(b) How much should each of your semiannual deposits be?

\[
FV = PV (1 + r)^n \quad \text{Comp. Int. Formula}
\]

\[
PV = 20,000 \\
\text{or} \quad i = 0.046/1 \\
\text{or} \quad n = 4 \cdot 1 = 4
\]

\[
FV = 20,000 \left(1 + 0.046\right)^4 = \$23,941.79649...
\]

\[
\text{(a) $23,941.79 \quad \text{or} \quad $23,942}
\]

\[
\text{either is ok but be consistent with (b)}
\]

\[
\text{b) This is an Annuity}
\]

\[
FV = PMT \cdot s_{\overline{n|}}
\]

\[
FV = 23,941.80 \quad \text{or} \quad 23,942
\]

\[
PMT = ?
\]

\[
n = 2 \cdot 4 = 8
\]

\[
i = 0.021/2
\]

\[
s_{\overline{n|}} = \frac{(1 + 0.021/2)^8 - 1}{(0.021/2)} = \frac{8.300255718}{(0.021/2)}
\]

\[
\text{There is a Question on the Back!}
\]
2. (7 points) You plan to buy a used car, the car you've picked out is $11,250, and you have $5,000 saved up for a down payment. Assuming you will take out a 4 year loan at 4.1% for the remaining cost, how much will each monthly payment be?

\[ \text{you will borrow (or need to borrow):} \]

\[ 11,250 - 5,000 = 6,250 \]

\[ \text{PV/ami/Loan type} & \text{ ord Ann (by default)} \]

\[ \text{PV} = \text{PMT} \times \text{ami} \]

\[ \text{PV} = 6,250 \]

\[ \text{PMT} = ? \]

\[ n = 4 \times 12 = 48 \]

\[ i = 0.041/12 \]

\[ \text{ami} = \frac{(1 + 0.041/12)^{48} - 1}{(0.041/12)} \]

\[ = 44.20117931 \]

\[ \left[ \text{or ami} = \frac{1 - (1 + 0.041/12)^{-48}}{0.041/12} \right] \]

\[ = 44.20117931 \]

\[ \text{PMT} = \frac{6,250}{44.20117931} \]

\[ \text{PMT} = 141.398943... \]

\[ $141.40 \text{ monthly pmr} \]

**Bonus (1pt):**

If your first payment is due the day you buy the car, how much will each monthly payment be?

\[ \text{PMT} = \frac{6,250}{44.20117931} \cdot (1.041/12) \]