

It is also important to note that your net or take-home pay (after taxes) is less than your gross pay (before taxes). Assuming that your net pay is 73% of your gross pay, what minimum gross annual salary will you need to make to have the monthly net salary stated above? Show your work for making this calculation.

Show work here.

$$\text{Net Pay} = \frac{2766.71}{.73}$$

$$\text{Net Pay} = 3,790.02$$

Minimum gross annual salary = \$ 3,790.02

Part II: Selling the House

Let's suppose that after living in the house for 10 years, you want to sell. The economy experiences ups and downs, but in general the value of real estate increases over time. To calculate the value of an investment such as real estate, we use continuously compounded interest.

Find the value of the home 10 years after purchase assuming a continuous interest rate of 4%. Use the full purchase price as the principal. Show your work.

Show work here.

$$A = Pe^{rt} = 201,000e^{(.04)(10)}$$

$$A = 299,856.76$$

Value of home 10 years after purchase \$299,856.76

Assuming that you can sell the house for this amount, use the following information to calculate your gains or losses:

Selling price of your house \$299,856.76

Original down payment \$20,100

Mortgage paid over the ten years \$9,683.50

The principal balance on your loan after ten years \$147,036.48

Do you gain or lose money over the 10 years? How much? Show your amounts and summarize your results:

\$123,036.79 gain after the 10 years.

Part III: 15 year Mortgage

Using the same purchase price and down payment, we will investigate a 15 year mortgage.

Monthly Payment: Calculate the monthly payment for a 15 year loan (rounding up to the nearest cent) by using the following formula. Show your work! [PMT is the monthly loan payment, P is the mortgage amount, r is the annual percent rate for the loan in decimal, and Y is the number of years to pay off the loan.] For the 15 year loan use an annual interest rate of 4.735%.

$$PMT = \frac{P \left(\frac{r}{12} \right)}{1 - \left(1 + \frac{r}{12} \right)^{-12Y}}$$

Show work here.

$$\begin{aligned} PMT &= \frac{180,900 \left(\frac{.04735}{12} \right)}{1 - \left(1 + \frac{.04735}{12} \right)^{-12(15)}} = \frac{713.80}{1 - (1.00395)^{-180}} \\ &= \frac{713.80}{0.5078} = 1,405.67 \end{aligned}$$

Monthly Payment for a 15 year mortgage = \$1,405.67