

2.7 Evaluation: Ordinary Simple Annuities: Mortgage Assignment

COMMUNICATION	/11	THINKING	/26
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THINKING

26 MARKS

Instructions:

You are to research a house in either your area, or an area that you would like to live (ex. another country, city, province etc.). When you have the advertisement of your chosen house, copy and paste the advertisement, along with the URL link for your dream home in a word document to submit. The advertisement should include the address, price and the number of bedrooms and bathrooms.

For houses in Canada, you may find it useful to use realtor.ca or commfree.com.

Marking Scheme (4 marks)

- 4 marks for attaching the house advertisement including the address, price and the number of bedrooms and bathrooms

A **down payment** is an initial amount that you pay when you buy something on credit. It is custom in Canada to put a minimum of 5% "down" on a house, in order to protect yourself and the banks against market fluctuations, in the case of a forced sale.

The **mortgage amount** is the sale price of the house minus the down payment. This is the amount being borrowed.

Payments are commonly made monthly, bi-weekly or weekly. Since payments are made on the decreasing mortgage amount, a mortgage is a type of **simple annuity**.

In order to be approved for a mortgage, two main things have to fall into place: good credit and enough income to cover the debt.

The amount of **income required** to be approved for a mortgage is based on **GDSR**, gross debt service ratio. This means that an individual's debt payments (mortgage) can only account for 35% of their income. The ratio is calculated using the formula $\frac{\text{principal} + \text{interest} + \text{taxes} + \text{heat}}{\text{gross income}}$. For the scope of this assignment, we will use 0.5% of the house amount for the cost of the property tax and \$100 per month for heat.

Complete the following questions and submit these papers along with the attached advertisement.

Marking Scheme (total of 22 marks)

- 1 mark for listing the price of the house
- 1 mark for calculating the down payment (2 marks total)
- 1 mark for calculating the mortgage amount after the down payment (2 marks total)
- 3 marks for calculating the mortgage payment manually (12 marks total)
- 1 mark for calculating the property tax on the house
- 2 marks for calculating the income needed to be approved for the mortgage (4 marks total)



<p>Option 1:</p> <p>What is the price of the house?</p> <p>\$462,000</p>	
<p>If you wanted to put a 5% down payment on the house, what amount would this be?</p> <p>$462000 \times 5\% = \\$23,100$</p>	
<p>After the 5% down payment, what is the mortgage amount?</p> <p>$\\$462,000 - \\$23,100 = \\$438,900$</p>	
<p>Calculate the payment, "R," if the mortgage is paid monthly at an annual interest rate of 4.44% for 25 years.</p> <p>Simple Annuities</p> $FV = A = \frac{R[(1+i)^n - 1]}{i}$ $438900 = \frac{R[(1 + \frac{0.0444}{12})^{300} - 1]}{\frac{0.0444}{12}}$ $0 = \frac{R[(1 + 0.0037)^{300} - 1]}{0.0037 \cdot 438900}$ <p>$R = 800.70$</p>	<p>Calculate the payment, "R," if the mortgage is paid monthly at an annual interest rate of 4.44% for 20 years.</p> $FV = A = \frac{R[(1+i)^n - 1]}{i}$ $438900 = \frac{R[(1 + \frac{4.44\%}{12})^{240} - 1]}{\frac{4.44\%}{12}}$ <p>$R = 1138.57$</p>
<p>What is the cost of the property tax, based on 0.5% of the price of the house?</p> <p>$462000 \times 0.5\% = \\$2310$</p>	
<p>What would your income need to be in order to afford this house (given that you have no other debts)?</p> <p>20 years 3.5% = $\frac{462000 + 273256.8 + 23100 + 100 \times 25 \times 12}{X}$</p> <p>$X = 2235305.143$</p> <p>25 years 3.5% = $\frac{462000 + 240210 + 2310 + 100 \times 25 \times 12}{X}$</p> <p>$X = \\2098625.571</p>	



Option 2:

What is the price of the house (same as above)?

$$\$462000$$

If you wanted to put a 20% down payment on the house, what amount would this be?

$$\$462000 \times 20\% = \$92400$$

After the 20% down payment, what is the mortgage amount?

$$\$462000 - \$92400 = \$369600$$

Calculate the payment, "R," if the mortgage is paid monthly at an annual interest rate of 4.44% for 25 years.

Simple Annuities.

$$FV = A = \frac{R[C(1+i)^n - 1]}{i}$$

$$369600 = \frac{R[C(1 + \frac{4.44\%}{12})^{300} - 1]}{\frac{4.44\%}{12}}$$

$$R = 674.27$$

Calculate the payment, "R," if the mortgage is paid monthly at an annual interest rate of 4.44% for 20 years.

Simple Annuities

$$FV = A = \frac{R[C(1+i)^n - 1]}{i}$$

$$369600 = \frac{R[C(1 + \frac{4.44\%}{12})^{240} - 1]}{\frac{4.44\%}{12}}$$

$$R = 958.80$$

What is the cost of the property tax, based on 0.5% of the price of the house?

$$462000 \times 0.5\% = \$2310$$

What would your income need to be in order to afford this house (given that you have no other debts)?

$$\begin{aligned} & \cancel{\$462000} + \$2310 = \cancel{\$464310} \\ 25 \text{ years } 35\% &= \frac{462000 + 202281 + 2310 + 100 \times 25 \times 2}{X} \\ & X = \$1990260 \end{aligned}$$

$$\begin{aligned} 20 \text{ years } 35\% &= \frac{462000 + 2310 + 2310 \times 100 \times 20}{X} \\ & X = \$2076920 \end{aligned}$$



COMMUNICATION

11 MARKS

Complete the following questions:

Marking Scheme (total 11 marks)

- 2 marks for valid and thoughtful reasons why you chose this house
- 1 mark for each calculation on the differences (total 3 marks)
- 2 marks for each explanation of your opinion on the difference (total 6 marks)

Why did you choose this house?

The house ~~th~~ plus the garden has a total area of 624 square meters. It has a garage and a toilet and is air-conditioned. Three bedrooms and a new kitchen. Lakes and Toronto's central business district are five minutes away. have beautiful environment.

For the 5% down payment opinion, what is the difference in the payment amount between paying your mortgage off in 20 years and 25 years? What is your opinion on this difference?

(Hint: Compare Option 1 at 20 years and Option 1 at 25 years)

1138.577800.7

The mortgage off 20 years is more than the mortgage off 25 years of one month mortgage. The total of mortgage 25 years: $800.7 \times 25 \times 12 = 240210$ $1138.57 \times 20 \times 12 = 273256.8$ $200175 < 22771.4$ The total mortgage payment in 25 years is less than the monthly mortgage payment in 20 years. So it is recommended to choose 25 years.

For the 20% down payment opinion, what is the difference in the payment amount between paying your mortgage off in 20 years and 25 years? What is your opinion on this difference?

(Hint: Compare Option 2 at 20 years and Option 2 at 25 years)

958.807674.27 The mortgage off in 20 years is more than the mortgage off in 25 year of monthly. $958.80 \times 20 \times 12 = 230112$ $674.27 \times 25 \times 12 = 202281$ $230112 > 202281$

The total mortgage payment in 25 years is less than the mortgage payment in 20 years and the monthly mortgage payment in 25 years is less than the monthly mortgage payment in 20 years. So recommended to choose 25 years

What is the difference in the payment based on whether you put 5% down or 20% down? What is your opinion on this difference?

(Hint: Compare Option 1 at 5% down payment and Option 2 at 10% down payment)

	5%		20%
monthly mortgage payment in 25 years.	800.70	>	674.27
monthly mortgage payment in 20 years	1138.57	>	958.80
total mortgage payment in 25 years.	240210	>	202281
total mortgage payment in 20 years	273256.8	>	230112

total expand 263310.

$$5\% \text{ 25 years } 240210 + 433100 = 673310$$

$$20\% \text{ 25 years } 230112 + 92400 = 322512$$


$$5\% \text{ 20 years } 273256.8 + 23100 = 296356.8$$


$$20\% \text{ 20 years } 202281 + 92400 = 294681$$

It can be concluded from the above information that the monthly mortgage payment and total mortgage payment with a down payment of 5% are less than the monthly mortgage payment and total mortgage payment with a down payment of 20%, so it can be concluded that the down payment of 5% should be chosen.



<https://www.realestate.com.au/property-house-nsw-toronto-130262166>





Floorplan

\$450,000 - \$480,000

95 Milford Street, Toronto
House

3 1 1 624 m²

Agent:
Joel Thomas

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