Grade

Grade out of 37

31.00

Current grade in gradebook

31.00

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You did a good job of completing all the calculations! Well done! The only small problem is that the taxes you calculated were annual, so you would need to divide them by 12.

The communication sections needed some more work. You needed to actually calculate the differences (i.e. subtract. You would have noticed some interesting patterns, similar to the conclusions you drew. You pay less each month if you have a longer mortgage period, but you pay more interest over time. What is more important to you? How do these amounts change with a larger or smaller down payment?

Also, you should be submitting ONE file only (the attachment for the house is supposed to be part of the same PDF file).

31

MCR3U

Rosedale Academy

2-7 Evaluation- Ordinary Simple Annuities: Mortgage Assignment

COMMUNICATION	/11	THINKING	/26
	5		26

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.

4

Marking Scheme (4 marks) (this is supposed to be in the same document)

- 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 $\frac{principal+interest+taxes+heat}{gross\ income}$. 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)

22

- 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)

Option 1:

What is the price of the house?

$2,202,256 ✓ 1

If you wanted to put a 5% down payment on the house, what amount would this be?

$2,202,256 \times 5\% = 110112.8$ $ ✓ 1

After the 5% down payment, what is the mortgage amount?

$2202256 - 110112.8 = 2092143.2$ $ ✓ 1

Calculate the payment, "R," if the mortgage is paid **monthly** at an annual interest rate of 4.44% for 25 years. 6

$i = \frac{4.44\%}{12} = \frac{0.0444}{12}$

$r = (1+i)^{-1} = (\frac{12.0444}{12})^{-1}$

$n = 25 \times 12 = 300$

$\frac{R(1-r^n)}{1-r} = 2092143.2$

$\frac{R[1-(1+i)^{-n}]}{i} = 2092143.2$ ✓

$R \approx 1155.66$ $

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

$i = \frac{4.44\%}{12} = \frac{0.0444}{12}$

$r = (1+i)^{-1} = (1+\frac{0.0444}{12})^{-1}$

$n = 12 \times 20 = 240$

$\frac{R[1-(1+i)^{-n}]}{i} = 2092143.2$ ✓

$R \approx 13168.27$ $

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

$2202256 \times 0.5\% = 11011.28$ $ ✓ 1

What would your income need to be in order to afford this house (given that you have no other debts)? 2

25 years

$\text{income} = \frac{1155.66 + \frac{11011.28}{300} + 100}{35\%}$ 2 ok

$= 3341.47$ $

20 years

$\text{income} = \frac{13168.27 + \frac{11011.28}{240} + 100}{35\%}$ 2 ok

$= 3804.43$ $

Option 2:

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

$2,202,256

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

$2202256 \times 20\% = 440451.2$ $

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

$2202256 - 440451.2 = 1761804.8$ $

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

$r = (1+i)^{-1} = (1+\frac{4.44\%}{12})^{-1} = (1+\frac{0.0444}{12})$

$n = 25 \times 12 = 300$

$$\frac{R\left[1-\left(1+\frac{0.0444}{12}\right)^{-n}\right]}{\frac{0.0444}{12}} = 1761804.8$$

$R \approx 9732.78$ $

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

$r = (1+i)^{-1} = (1+\frac{0.0444}{12})^{-1}$

$n = 20 \times 12 = 240$

$$\frac{R\left[1-\left(1+\frac{0.0444}{12}\right)^{-n}\right]}{\frac{0.0444}{12}} = 1761804.8$$

$R \approx 11088.07$ $

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

$0.5\% \times 2202256 = 11011.28$ $

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

25 years

$$\text{income} = \frac{9732.78 + \frac{11011.28}{12} + 100}{35\%} = 28198.53\ \$$$

20 years

$$\text{income} = \frac{11088.07 + \frac{11011.28}{12} + 100}{35\%} = 32099.86\ \$$$

5

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?

2

Because I like Toronto and the environment is good. And the house is very nice and big. ✓ what about the price?

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)

1 -2

The longer you return the money to the bank, the less money you will pay each month.

I like to pay the money back in 25 years because I can pay less money each month ok

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)

1 -2

The longer you return the money to the bank, the less money you will pay each month.

I like to pay the money back in 25 years because I can pay less money each month. this is the same as your last answer

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)

1 -2

The more money you put down, the less money you will borrow from the bank, so you will pay less interest. ok

I like put 20% down because I can pay less interest to the bank