You are a financial advisor that wishes to investigate the best options for investment available to your clients.

You currently have the following 3 clients to advise:

|  |  |  |
| --- | --- | --- |
| **Client 1** | **Client 2** | **Client 3** |
| Investment amount$50,000 | Investment Amount$150,000 | Investment Amount$250,000 |

The investment options available are:

|  |  |  |
| --- | --- | --- |
|  | Option A | Option B |
| Interest p.a. | 8.5% | 8.5% |
| Compounding period | Monthly | Quarterly |
| Annual Fee | $250 | $200 |

Task:

Investigate the investment amount after 10 years.

Your task is to investigate the different options for each client and choose the appropriate option for each. You will need to justify your choice and show the sequence equation (using the effective interest rate) used to calculate their investment amount after 10 years. Based on the investment choices, also investigate the maximum amount each client can withdraw yearly if they make the investment in perpetuity. Present your findings as a report with an introduction (including objective, method, and assumptions), body (calculations and analysis) and conclusion.

|  |  |
| --- | --- |
| Grade Description |  |
| Research to obtain relevant data for investigation | Identifies the objective, method and all the important data needed to conduct the investigation in the conclusion. (6 marks) |
| Creates effective models and methods to present data | Uses all relevant data and converts it to an effective presentation model using graphs, tables, and calculations with all relevant headings. (15 marks) |
| Analyses select the correct loan option  | In-depth data analysis to justify correct investment options for all clients using recurrence and/or other financial models. (10 marks) |
| Comparison of Options | Compares all clients and investment options and justifies selection (9 marks) |
| Conclusion and Report of Investigation | Writes a comprehensive report in a clear concise manner that is supported with explicit mathematical evidence. (6 marks) |

Using the effective interest rate formula: (1 + r / n) ^ n.

 Where ‘r’ is the interest rate and ‘n’ is the number of compounding periods per year.

**Option A:**

 (1 + 0.085 / 12) ^ 12 = 1.088390906

Effective interest rate: 1.088390906

**Option B:**

(1 + 0.085 / 4) ^ 4 = 1.087747962

Effective interest rate: 1.087747962

**Find the investment amount using Option A for all the clients.**

*Client 1:*

Tn + 1 = Tn \* 1.088390906 - $250, T0 = $50,000

T10 = $112,863.17

*Client 2:*

Tn + 1 = Tn \* 1.088390906 - $250, T0 = $150,000

T10 = $346,127.88

*Client 3:*

Tn + 1 = Tn \* 1.088390906 - $250, T0 = $150,000

T10 = $579,392.59

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**Find the investment amount using Option B for all the clients.**

*Client 1:*

Tn + 1 = Tn \* 1.087747962- $200, T0 = $50,000

T10 = $112,939.08

*Client 2:*

Tn + 1 = Tn \* 1.087747962- $200, T0 = $150,000

T10 = $344,829.49

*Client 3:*

Tn + 1 = Tn \* 1.087747962- $200, T0 = $250,000

T10 = $576,719.898

Part 2:

Based on the investment choices, also investigate the maximum amount each client can withdraw yearly if they make the investment in perpetuity.

Tutor: If all clients wanted to convert their long-term investment into perpetuity, then calculate the maximum, withdraw money per year, and solve for the interest. The account will be produced in 1 year.
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The interest in 1 year of Client 1 using Option B is:

I = P \* effective interest rate – cost – P

Client 1 Principal value = $50,000

Annual Fee (cost) = $200

Effective interest rate = 1.087747962

50,000 \* 1.087747962 – (cost + principal)

$54.387.389 – (200 + 50,000) = $4187.398

Client 1 can withdraw $4187.398.

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The interest in 1 year of Client 2 using Option A is:

I = P \* effective interest rate – cost – P

Client 1 Principal value = $150,000

Annual Fee (cost) = $250

Effective interest rate = 1.088390906

150,000 \* 1.088390906 – (cost + principal)

$163,258.6359 – (250 + 150,000) = $13,008.6359

Client 2 can withdraw $13,008.6359 each year.

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The interest in 1 year of Client 2 using Option A is:

I = P \* effective interest rate – cost – P

Client 1 Principal value = $250,000

Annual Fee (cost) = $250

Effective interest rate = 1.088390906

250,000 \* 1.088390906 – (cost + principal)

$272097.7265 – (250 + 150,000) = $21847.7265

Client 2 can withdraw $21,847.7265 each year.

Annuity Example:

Let’s say the investment of Client 1 ($50,000) will have a value of 0 in the next 20 years.

Using sequences:

Tn + 1 = Tn \* Interest rate – cost, T0 = $50,000

Using Finance Function in Classpad:

N = 20 (Number of years)

I = 8.5 (Interest Rate)

PV = - 50,000 (Starting value

PMT =?

FV = 0 (Final Value)

P/Y = 1 (Number of instalment periods per year)

C/Y = 12 (Number of times interest compounded per year)

PMT = $5,414.659888

Now using sequences:

Effective interest rate = 1.088390906

Tn + 1 = Tn \* 1.088390906 – 5,414.659888, T0 = 50,000

By the 20th year, the investment amount value will reach 0.

Introduction

Body Para 1

Conclusion