

## Financial Math Review Packet—November Questions

### 1. Give all answers in this question correct to two decimal places.

Estela lives in Brazil and wishes to exchange 4000 BRL (Brazil reais) for GBP (British pounds). The exchange rate is  $1.00 \text{ BRL} = 0.3071 \text{ GBP}$ . The bank charges 3 % commission on the amount in BRL.

(a) Find, **in BRL**, the amount of money Estela has after commission. (2)

(b) Find, in GBP, the amount of money Estela receives. (2)

After her trip to the United Kingdom Estela has 400 GBP left. At the airport she changes this money back into BRL. The exchange rate is now  $1.00 \text{ BRL} = 0.3125 \text{ GBP}$ .

(c) Find, in BRL, the amount of money that Estela should receive. (2)

Estela actually receives 1216.80 BRL after commission.

(d) Find, in BRL, the commission charged to Estela. (1)

(e) The commission rate is  $t\%$ . Find the value of  $t$ . (2)

(Total 9 marks)

### 2. Daniel invests \$1000 in an account that offers a nominal annual interest rate of 3.5 % compounded half yearly.

(a) Show that after three years Daniel will have \$1109.70 in his account, correct to two decimal places. (3)

(b) Write down the interest Daniel receives after three years. (1)

Helen invests \$1000 in an account that offers annual **simple interest**.

(c) Find the annual simple interest rate that would give Helen \$1109.70 after three years. (3)

(Total 7 marks)

3. The exchange rates between the British pound (GBP) and the United States dollar (USD) and between the USD and the euro (EUR) are given below.

1 GBP = 2.034 USD

1 USD = 0.632 EUR

- (a) Find the exchange rate between GBP and EUR in the form  $1 \text{ GBP} = k \text{ EUR}$ , where  $k$  is a constant. Give your answer correct to **two decimal places**.

(2)

Isabella changes 400 USD into euros and is charged 2 % commission.

- (b) Calculate how many euros she receives. Give your answer correct to **two decimal places**.

(4)

(Total 6 marks)

4. Mr Tan invested 5000 Swiss Francs (CHF) in Bank A at an annual simple interest rate of  $r\%$ , for four years. The total interest he received was 568 CHF.

- (a) Calculate the value of  $r$ .

(3)

Mr Black invested 5000 CHF in Bank B at a nominal annual interest rate of 3.6 %, **compounded quarterly** for four years.

- (b) Calculate the total interest he received at the end of the four years. Give your answer correct to **two decimal places**.

(3)

(Total 6 marks)

5. The exchange rate between Indian rupees (INR) and Singapore dollars (S\$) is  
 $100 \text{ INR} = \text{S}\$3.684$

Kwai Fan changes S\$500 to Indian rupees.

- (a) Calculate the number of Indian rupees she will receive using this exchange rate. **Give your answer correct to the nearest rupee.**

(2)

On her return to Singapore, Kwai Fan has 2500 Indian rupees left from her trip. She wishes to exchange these rupees back to Singapore dollars. There is a 3% commission charge for this transaction and the exchange rate is  $100 \text{ INR} = \text{S}\$3.672$ .

- (b) Calculate the commission in Indian rupees that she is charged for this exchange.

(2)

- (c) Calculate the amount of money she receives in Singapore dollars, **correct to two decimal places**.

(2)  
(Total 6 marks)

6. Eva invests USD2000 at a nominal annual interest rate of 8 % **compounded half-yearly**.

- (a) Calculate the value of her investment after 5 years, correct to the nearest dollar. (3)

Toni invests USD1500 at an annual interest rate of 7.8 % **compounded yearly**.

- (b) Find the number of **complete** years it will take for his investment to double in value. (3)  
(Total 6 marks)

7. Two brothers Adam and Ben each inherit \$6500. Adam invests his money in a bond that pays simple interest at a rate of 5 per annum. Ben invests his money in a bank that pays compound interest at a rate of 4.5 per annum.

- (a) Calculate the value of **Adam's** investment at the end of 6 years. (3)
- (b) Calculate the value of **Ben's** investment at the end of 6 years. Give your answer **correct to 2 decimal places**. (3)  
(Total 6 marks)

8. Robert, who lives in the UK, travels to Belgium. The exchange rate is 1.37 euros to one British Pound (GBP) with a commission of 3 GBP, which is subtracted before the exchange takes place. Robert gives the bank 120 GBP.

- (a) Calculate **correct to 2 decimal places** the amount of euros he receives. (3)

He buys 1 kilogram of Belgian chocolates at 1.35 euros per 100 g.

- (b) Calculate the cost of his chocolates in GBP **correct to 2 decimal places**. (3)  
(Total 6 marks)

9. Andrew invests 20 000 Swiss francs in a bank that offers a 2 simple interest per year for 8 years.

- (a) Find the interest he has after these 8 years.

Philip invests 20 000 Swiss francs for 6 years in a bank at a nominal rate of 5 interest **compounded quarterly**.

- (b) Find the **total amount** in Philip's account after these 6 years. (Total 6 marks)

**10.** Clara visits Britain from the United States and exchanges 1000 US dollars (USD) into pounds (GBP). The exchange rate is  $1 \text{ USD} = 0.543 \text{ GBP}$ . The bank charges 2 commission for each transaction.

(a) Calculate how many GBP she receives.

Next Clara wants to travel to France. She changes 150 GBP to euros (€) at a rate of  $1 \text{ GBP} = 1.35 \text{ €}$ . The bank charges commission and then gives Clara 200 €.

(b) Find the amount of commission in GBP.

**(Total 6 marks)**

**11.** A bank in Canada offers the following exchange rate between Canadian dollars (CAD) and euros (EUR). The bank sells 1 CAD for 1.5485 EUR and buys 1 CAD for 1.5162 EUR. A customer wishes to exchange 800 Canadian dollars for euros.

(a) Find how many euros the customer will receive.

(b) The customer has to cancel his trip and changes his money back later when the rates are “sells 1 CAD = 1.5546 EUR, buys 1 CAD = 1.5284 EUR”. Use the “we sell” information to find how many Canadian dollars he receives.

(c) How many Canadian dollars has he lost on the transaction?

**(Total 6 marks)**

**12.** Bob invests 600 EUR in a bank that offers a rate of 2.75% compounded annually. The interest is added on at the end of each year.

(a) Calculate how much money Bob has in the bank after 4 years.

(b) Calculate the number of years it will take for the investment to double.

Ann invests 600 EUR in another bank that offers interest compounded annually. Her investment doubles in 20 years.

(c) Find the rate that the bank is offering.

**(Total 6 marks)**

**13.** William invests \$1200 for 5 years at a rate of 3.75% compounded annually.

(a) Calculate the amount of money he has in total at the end of the 5 years.

(b) The interest rate then drops to 3.25%. If he continues to leave his money in the bank find how much it will be worth after a further 3 years.

**(Total 6 marks)**

**14.(i)** Celia has \$20,000 to invest. There are two different options from which she can choose.

Option 1: The investment grows at a rate of 3.5% compound interest each year.

Option 2: The total value of the investment increases by \$800 each year.

The money is to be invested for 15 years.

- (a) Complete the table below giving the values of the investments to the nearest dollar for the first 4 years.

(3)

Year	0	1	2	3	4
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**Option 1** 20 000 20 700

**Option 2** 20 000 20 800

- (b) Calculate the values of each investment at the end of 15 years.

(4)

- (c) If Option 1 is chosen find the total number of complete years before the value of the investment is first greater than \$25,000.

(2)

- (d) If Option 2 is chosen calculate the percentage increase in the investment for the final year.

(2)

- (ii) Two more Options are available to Celia. After 7 years she can change the investment conditions.

Option 3: If Celia has chosen Option 1 she can change and then receives \$800 each year until the end of the 15 years.

Option 4: If Celia has chosen Option 2 she can change and then receive 3.5% interest compounded annually.

If Celia wishes to receive the maximum amount of money at the end of the 15 years which option should she choose?

(7)

**(Total 18 marks)**

**15.** The table below shows the cost of travelling by train in Amsterdam between different areas (zones) of the city.

Number of zones travelled	Cost First Class	Cost Second Class
0–8	2.16 euros	1.36 euros
9–12	2.95 euros	1.93 euros
13–16	3.86 euros	2.50 euros
17–20	4.54 euros	2.95 euros
21–24	5.33 euros	3.40 euros

Janneke is travelling **first class** from one part of the city to another. She is travelling through 10 zones.

(a) Write down the cost of her ticket.

Joost has a student card that entitles him to a reduction of **40** on all fares.

(b) Calculate how much Joost pays for a **second class** ticket for 23 zones.

The student card costs **15** euros.

(c) Calculate how many journeys of 23 zones in **second class** that Joost must make to cover the cost of his student card.

**(Total 8 marks)**

16. Ali, Bob and Connie each have 3 000 USD (US dollar) to invest.

Ali invests his 3 000 USD in a firm that offers simple interest at 4.5 per annum. The interest is added at the end of each year.

Bob invests his 3 000 USD in a bank that offers interest compounded annually at a rate of 4 per annum. The interest is added at the end of each year.

Connie invests her 3 000 USD in another bank that offers interest compounded half-yearly at a rate of 3.8 per annum. The interest is added at the end of each half year.

- (a) Calculate how much money Ali and Bob have at the **beginning** of year 7. (6)
- (b) Show that Connie has 3 760.20 USD at the beginning of year 7. (3)
- (c) Calculate how many years it will take for Bob to have 6 000 USD in the bank. (3)

At the beginning of year 7, Connie moves to England.

She transfers her money into a Bank there at an exchange rate of 1 USD = 0.711 GBP (British pounds).

The bank charges 2 commission.

- (d)
    - (i) Calculate, in USD, the commission that the bank charges.
    - (ii) Calculate the amount of money, in GBP, that Connie transfers to the bank in England. (5)
- (Total 17 marks)**

17. In 2000 Herman joined a tennis club. The fees were £1200 a year. Each year the fees increase by 3%.

- (a) Calculate, **to the nearest £1**, the fees in 2002.
- (b) Calculate the **total** fees for Herman who joined the tennis club in 2000 and remained a member for five years.

**(Total 8 marks)**

**18.** Bobby is spending a year travelling from America to France and Britain. Consider the following exchange rates.

$$1 \text{ US dollar (USD)} = 0.983 \text{ Euros}$$

$$1 \text{ British Pound (GBP)} = 1.59 \text{ Euros}$$

- (a) Bobby changes 500 USD into Euros.
- (i) Calculate how many Euros he receives.

He spends 328 Euros in France and changes the remainder into GBP.

- (ii) Calculate how many GBP he receives.

While in Britain Bobby decides to put this money in a bank that pays 6% simple interest per annum, and he gets a part-time job to cover his expenses. Bobby remains in Britain for six months.

- (b) Calculate how much interest he receives for the six months.

**(Total 8 marks)**

**19.** David invests 6000 Australian dollars (AUD) in a bank offering 6% interest compounded annually.

- (a) Calculate the amount of money he has after 10 years.
- (b) David then withdraws 5000 AUD to invest in another bank offering 8% interest compounded annually. Calculate the **total** amount he will have in both banks at the end of one more year. Give your answer correct to the nearest Australian dollar.

**(Total 8 marks)**

**20.** A Swiss bank shows currency conversion rates in a table. Part of the table is shown below, which gives the exchange rate between British pounds (GBP), US dollars (USD) and Swiss francs (CHF).

	Buy	Sell
GBP	2.340 0	2.470 0
USD	1.690 0	1.770 0

This means that the bank will **sell** its British pounds to a client at an exchange rate of 1 GBP = 2.4700 CHF.

- (a) What will be the selling price for 1 USD?

Andrew is going to travel from Europe to the USA. He plans to exchange 1000 CHF into dollars. The bank sells him the dollars and charges 2% commission.

- (b) How many dollars will he receive? Give your answer to the nearest dollar.



(Total 8 marks)

21. Keisha had 10 000 USD to invest. She invested  $m$  USD at the *Midland Bank*, which gave her 8% annual interest. She invested  $f$  USD at the *First National Bank*, which gave 6% annual interest. She received a total of 640 USD in interest at the end of the year.

- (a) Write two equations that represent this information.
  
- (b) Find the amount of money Keisha invested at each bank.

(Total 8 marks)

22. Frederick had to change British pounds (GBP) into Swiss francs (CHF) in a bank. The exchange rate is  $1 \text{ GBP} = 2.5 \text{ CHF}$ . There is also a bank charge of 3 GBP for each transaction.

- (a) How many Swiss francs would Frederick buy with 133 GBP?
  
- (b) Let  $s$  be the number of Swiss francs received in exchange for  $b$  GBP. Express  $s$  in terms of  $b$ .
  
- (c) Frederick received 430 CHF. How many British pounds did he exchange?

(Total 8 marks)

23. On Vera's 18<sup>th</sup> birthday she was given an allowance from her parents. She was given the following choices.

Choice A \$100 every month of the year.

Choice B A fixed amount of \$1100 at the beginning of the year, to be invested at an interest rate of 12% per annum, compounded monthly.

Choice C \$75 the first month and an increase of \$5 every month thereafter.

Choice D \$80 the first month and an increase of 5% every month.

(a) Assuming that Vera does not spend any of her allowance during the year, calculate, for each of the choices, how much money she would have at the end of the year.

(8)

(b) Which of the choices do you think that Vera should choose? Give a reason for your answer.

(2)

(c) On her 19<sup>th</sup> birthday Vera invests \$1200 in a bank that pays interest at  $r\%$  per annum compounded annually. Vera would like to buy a scooter costing \$1452 on her 21<sup>st</sup> birthday. What rate will the bank have to offer her to enable her to buy the scooter?

(4)

**(Total 14 marks)**

24. The following is part of a display on the notice board of a bank in the United Kingdom. It shows the exchange rate between one British pound (GBP) and other currencies.

### EXCHANGE RATES

	Bank buys foreign currency	Bank sells foreign currency
Denmark (KR)	11.38	10.78
Finland (MKK)	7.00	6.60
France (FFR)	10.05	9.45
Germany (DM)	2.854	2.798
Greece (DR)	292	266

### NO COMMISSION CHARGED

Geraldine eats a meal in a restaurant while on holiday in Greece. The meal costs 4256 drachma (DR).

- (a) Use the **bank-selling** price to calculate the cost of the meal in British pounds.

The Williams family go to Germany. Before leaving, they change 600 GBP into German marks.

- (b) Calculate the number of German marks they receive for 600 GBP, giving your answer correct to two decimal places.

They spend 824 DM in Germany, and on returning to the United Kingdom, they change their remaining German marks into British pounds.

- (c) Calculate the number of British pounds they receive, correct to two decimal places.

**(Total 4 marks)**

**25.** The table below shows the deposits, in Australian dollars (AUD), made by Vicki in an investment account on the **first** day of each month for the first four months in 1999. The interest rate is 0.75% **per month** compounded monthly. The interest is added to the account at the **end** of each month.

Month	Deposit (AUD)
January	600
February	1300
March	230
April	710

(a) Show that the amount of money in Vicki's account at the **end** of February is 1918.78 AUD. (3)

(b) Calculate the amount of Australian dollars in Vicki's account at the **end** of April. (2)

Vicki makes no withdrawals or deposits after 1st April 1999.

(c) How much money is in Vicki's account at the end of December 1999? (2)

From 1st January 2000 the bank applies a new interest rate of 3.5% **per annum** compounded annually.

(d) In how many full years after December 1999 will Vicki's investment first exceed 3300 AUD? (2)  
**(Total 9 marks)**

- 26.** The table below gives the monthly repayments for a loan of 1000 Australian dollars (AUD). The interest rates are 18% per annum and 18.5% per annum, respectively.

Monthly repayments on AUD 1000

Number of years of the loan	18% p.a.	18.5% p.a.
1	94.75	95.07
2	51.45	51.72
3	37.15	37.43
4	30.11	30.39
5	26.14	26.26

From the table,

- (a) find the monthly repayment on a loan of AUD 1000 at 18.5% per annum taken over 1 year;
- (b) calculate the total amount to be repaid on a loan of AUD 8000 taken over 5 years, if the interest rate is 18% per annum.

**(Total 4 marks)**

**27. (a)** In city Y, house prices have increased by 3% each year for the last three years. If a house cost USD 180 000 three years ago, calculate, to the nearest dollar, its value today.

- (b) In city Z, a house worth USD 100 000 three years ago is now valued at USD 119 102. Calculate the yearly percentage increase in the value of this house.

**(Total 4 marks)**

**28.** The table shows part of a currency conversion chart. For example GBP 1 is equivalent to FFR 8.33.

GBP USD FFR

GBP 1  $p$  8.33

USD 0.64 1  $q$

FFR 0.12 0.19 1

For all calculations in this question give your answers correct to two decimal places.

(a) Calculate the value of

(i)  $p$ ;

(ii)  $q$ .

(4)

(b) Joe has USD 1500 to exchange at a bank.

(i) Assuming no commission is charged, how much in GBP will Joe receive from the bank?

(2)

(ii) Assuming the bank charges 1.5% commission,

(a) how much in GBP does Joe pay in commission?

(1)

(b) how much in GBP does Joe actually receive for his USD 1500?

(1)

(c) Joe decides to invest GBP 700 of his money in a savings account which pays interest at 5%, compounded annually.

(i) How much interest will the GBP 700 earn after 4 years?

(2)

(ii) For how many years must Joe invest his GBP 700 in order to earn at least GBP 200 in interest?

(2)

(d) After 4 years Joe has a total of GBP 900 in his savings account on an investment at 5% interest compounded annually. How much did he invest? Give your answer to the nearest one GBP.

(2)  
(Total 14 marks)

29. John invests  $X$  USD in a bank. The bank's stated rate of interest is 6% per annum, compounded **monthly**.

- (a) Write down, in terms of  $X$ , an expression for the value of John's investment after one year.
- (b) What rate of interest, when compounded **annually** (instead of monthly) will give the same value of John's investment as in part (a)? Give your answer correct to three significant figures.

(Total 4 marks)

30. Tony invested CHF 500 in a bank account at a constant rate of interest. The bank calculates his balance at the end of each year, **rounded to two decimal places**, as shown in the table below.

Year	Value at beginning of year	Value at end of year
1st	CHF 500	CHF 540
2nd	CHF 540	CHF 583.20
3rd	CHF 583.20	CHF 629.86
4th	CHF 629.86	CHF 680.25
5th	CHF 680.25	
6th		

- (a) What is the rate and type of interest?
- (b) Complete the table for the fifth and sixth year of investment.

(Total 4 marks)

31. Angela needs \$4000 to pay for a car. She was given two options by the car seller.

**Option A: Outright Loan**

A loan of \$4000 at a rate of 12% per annum compounded monthly.

- (a) Find
- (i) the cost of this loan for one year; (2)
  - (ii) the equivalent annual simple interest rate. (2)

**Option B: Friendly Credit Terms**

A 25% deposit, followed by 12 equal monthly payments of \$287.50.

- (b) (i) How much is to be paid as a deposit under this option? (1)
- (ii) Find the cost of the loan under *Friendly Credit Terms*. (2)
- (c) Give a reason why Angela might choose
- (i) **Option A**
  - (ii) **Option B** (2)

To help Angela, her employer agrees to give her an interest free loan of \$4000 to buy the car. The employer is to recover the money by making the following deductions from Angela's salary:

\$ $x$  in the first month,

\$ $y$  every subsequent month.

The total deductions after 20 months is \$1540 and after 30 months it is \$2140.

- (d) Find  $x$  and  $y$ . (4)
- (e) How many months will it take for Angela to completely pay off the \$4000 loan? (2)
- (Total 15 marks)**