

# FINANCIAL MATHEMATICS 1

## CURRENCY CONVERSIONS

Chapter 7 pages 310 - 314

## CURRENCY CONVERSIONS

- Different countries have their own currency and the value of these currencies changes also.
- If you want to buy money of a different country, you need to buy it at the current exchange rate.
- The exchange rates in any country are usually given as the amount of foreign currency equal to one unit of local currency.

## CURRENCY CONVERSIONS

This chart, from a UK newspaper, has the exchange rates for the £ to 3 main currencies.

	Bank Buys	Bank Sells
Euro €	1.59	1.42
USA \$	1.966	1.745
Japan Yen	214.25	194.68

- From £ to €: The bank SELLS you the foreign money:
  - MULTIPLY £ amount by sell rate
- From € to £: The bank BUYS foreign money from you:
  - DIVIDE € amount by buy rate

$$£ 100 \times 1.42 = € 142$$

$$€ 142 \div 1.59 = £ 89.31$$

## CURRENCY CONVERSIONS

• Answers for financial questions have separate rules - always give your answer to the smallest unit of the currency. (usually 2 decimal places)

- Commission is a fixed % some banks charge when you change money.
- Commission is always deducted at the start of the transaction, and then the remaining money is converted.

(taken in the "country's currency")

### Worked Examples

1. a) Given that 1 South African rand (ZAR) = 0.1824 Singapore dollars (SGD), how many Singapore dollars can you buy for 2500 South African Rand?

$$1 \text{ ZAR} = 0.1824 \text{ SGD}$$

$$2500 \text{ ZAR} \times 0.1824 = \$456 \text{ SGD}$$

1. b) Given that 1 New Zealand dollar (NZD) = 0.34 Great Britain Pounds (GBP), how many pounds can you buy for 500 NZ dollars if the commission rate is 2.1%?

① calculate commission

$$500 \times \frac{2.1}{100} = \$10.50 \text{ NZD}$$

∴ amount left to change =  $500 - 10.50 = \$489.50 \text{ NZD}$

② Convert currency

$$\$489.50 \times 0.34 = £166.43$$

### Worked Examples

2. In 2001 Elke was planning to go on holiday from Germany to Greece. She changed 2000 euros to Greek drachma (GRD) at a rate of 1 EUR = 340.75 GRD.

a) Calculate how many drachma she received.

Elke became ill and she had to cancel her holiday. She sold the drachma back to the bank at a rate of 1 EUR = 347.82 GRD.

- b) i) How many euros did she receive?  
ii) How much did the bank gain from the two transactions?

c) Calculate Elke's loss as a percentage of her original 2000 EUR.

a)  $2000 \times 340.75 = 681,500 \text{ GRD}$

b)  $681,500 \div 347.82 = €1959.35$

ii)  $2000 - 1959.35 = €40.65$

c)  $\text{loss} = \frac{40.65}{2000} \times 100 = 2.03\%$

### Worked Examples

3. Use the currency conversion table below to answer the following questions:

	EUR	USD	JPY	GBP
Euros (EUR)	1	a	b	0.852 *
US dollars (USD)	0.759	1	81.92	0.647
Japanese yen (JPY)	0.00926	0.0122	1	0.0079
British pounds (GBP)	1.174 *	1.546	126.65	1

- a) Find the values of a and b.  
 b) Muriel wants to change money at a bank in London.  
 i) how many euros will she have to change to receive 150 GBP?  
 ii) The bank charges a 2.4% commission on all transactions. If she goes ahead, how many GBP will Muriel actually receive from the bank?

Conversion Tables  
 rates are reciprocals (x<sup>-1</sup>)  
 $a = \frac{1}{0.759} = 1.318$      $b = \frac{1}{0.00926} = 107.17$   
 $1.174 \text{ €} \rightarrow 1 \text{ £}$   
 $1.174 \times 150 = 176.1 \text{ €} \rightarrow 150 \text{ £}$  (commission)  
 $150 \rightarrow \text{GBP} = \frac{1}{1.546} = 0.647$   
 $150 \times \frac{2.4}{100} = 3.60$  ∴ she gets 146.40

### Examples to Try

4. Jin is travelling on business from Korea to Japan. The bank sells Japanese yen (JPY) at a rate of 1 Korean won (KRW) = 0.0728 JPY. A commission is charged at a rate of 2% in KRW.  
 Jin pays 1 million won. How much does she receive in JPY?

¥ 71,344

### Examples to Try

5. Zsolt travels from Budapest to London. He exchanges 300,000 forints (HUF) for British pounds before he leaves. The bank is selling GBP at a rate of 1 GBP = 321.452 HUF.

- a) Calculate how many GBP Zsolt receives.  
 b) Zsolt spends 622.54 GBP in London. He has a choice for his remaining pounds. He can:  
 i change all the money back to HUF in London. The rate is 1 GBP = 316.589 HUF but the bank charges commission of 1.6% or,  
 ii wait and do the exchange at home at a rate of 1 GBP = 310.58 HUF calculate which option is better for Zsolt.

a) £ 935.27  
 b) £ 310.73 left  
 opt 1

96 800.25 HUF

opt 2

96 506.52 HUF

### Examples to Try

6. Use the currency conversion table below to answer the following questions:

	AED	INR	JOD
UAE dirhams AED	1	14.7	0.192
Indian rupee INR	0.068	1	n
Jordanian dinar JOD	m	76.21	1

- a) Find the values of n and m.  
 b) Amit wants to change money at a bank in Dubai.  
 i) how many rupees will he have to change to receive 500 AED?  
 ii) The bank charges a 1.8% commission on all transactions. If he goes ahead, how many AED will Amit actually receive from the bank?

$n = \frac{1}{0.068} = 14.7$      $m = \frac{1}{76.21} = 0.013$   
 ① AED = 14.7 INR  
 ∴ 500 AED = 7350 INR  
 ②  $500 \times \frac{1.8}{100} = 9$  AED commission  
 ∴ receives 491 AED

# HOMEWORK

Exercise 7C p311 Q2, 5, 6, 8, 10, 11, 12