International Institute for Technology and Management

Tutoring Sheet #2

Unit 76   :   Management Mathematics

1. **a. The following table shows the prices per unit of three commodities in 1995 and 2000 and the total value of purchases in those years :**

Commodity	Purchases		Prices	
	1995	**2000**	**1995**	**2000**
X	**9**	**15**	**24**	**20**
Y	**16**	**40**	**16**	**20**
Z	**18**	**13.5**	**10**	**15**

Calculate (a) Laspeyre's and (b) Paasche's indices for the prices.

b. Briefly discuss the differences between Relative and Aggregate indices.

2. a. Briefly discuss the difficulties in creating a suitable inflation type index to determine the changing cost of living for a population of a country.

b. A company wishes to know if sales in real terms have increased in the five years period 2000 – 2005.They would like to know if stock levels of their items were justified by the sales figures. Total sales for 2000 and 2005 were $ 600 000 and $ 120 000 respectively.

	Stock Holdings			
Year	**2000**		**2005**	
Items	**Number**	**Value$**	**Number**	**Value$**
A	**200**	**20 000**	**150**	**30 000**
B	**350**	**40 000**	**450**	**90 000**
C	**70**	**21 000**	**100**	**45 000**
D	**30**	**15 000**	**45**	**30 000**

(a.) Construct a weighted index of the price increases, 2005 against 2000, for the four items of stock together.

(b.) Calculate using the above index the percentage change of sales in real terms.

http://www.mathyards.com/lse

3. Every month a company purchases four items in the typical

Item	Unit	Weight	Price per Unit		
			June	July	August
A	Kg	240	45	46	48
B	Kg	100	60	61	62
C	Liters	120	80	70	66
D	Thousands	200	120	130	140

Quantities and at the prices shown in the following table:

Using June as a base, find for July and August:
   a.)   **The simple aggregate price index.**
   b.)   **The weighted aggregate price index.**
   c.)   **If in September of the same year commodities A and B are expected to increase by 1% per kg and the price of commodity D to increase by 10% per thousand. How much must the cost per Liter of C decrease in Order that the weighted aggregate price index for September remains the same as for August?**

LSE Previous Papers

4.(a)   Briefly discuss the advantages and disadvantages of using Laspeyre's as opposed to Paasche's type price indices.

(b)   The following table gives a index of agricultural production in the country of Groland using two index methods (The "Foodpro" index based in 1970 and the "FarmFood" index based in 2000). Also given is an estimate of population of Groland.

Year	"Foodpro" index (Base 1970=100)	"FarmFood" index (Base 2000=100)	Groland's Estimated Population (million)
1997	560.6		1.94
1998	589.5		1.98
1999	630.2		2.04
2000	640.3	100.0	2.11
2001		104.5	2.23
2002		120.3	2.31
2003		115.3	2.40
2004		132.1	2.45

   i.   Briefly discuss the likely difficulties that there will have been in determining the agricultural production indices?
   ii.   Combine the two production indices for agricultural production so that the resultant series has a common base.
   iii.   Produce a fixed base index series for agricultural production per head of population. Comment thoroughly upon the validity and interpretation of your results.

5.(a)   Define an Ideal Index, explain why it might be useful and state how you might calculate one.

(b)   Workers in a company are from four different ethnic groups (labelled A,B,C and D). During a three year period the number of workers employed by the Emensy company in each group and their average weekly earnings (per person) are:

	Year 1		Year 2		Year 3	
Ethnic Group	Number	Earnings	Number	Earnings	Number	Earnings
A	182	505	225	531	232	584
B	103	245	66	268	71	293
C	7	908	9	873	18	821
D	45	125	55	133	60	143

Use suitable indices (Base year 1) for the three years to show the changes in each of the following:

i.   Total earnings paid by Emensy,

ii.   Average earnings for their workers as a whole, and

iii.   The total number of workers employed.

(c)   The following table shows the price of four daily newspapers sold in a particular city.

	Daily Planet	The Times	The News	The Globe
Year 1	90	65	80	80
Year 2	105	85	90	80
Year 3	120	90	105	90
Year 4	150	100	120	50

i.   Find the simple aggregate price index and average price relative index for each year . (Use Year 1 as a base throughout).

ii.   How could you improve the above analysis if your aim was to assess the general cost of newspapers in year 4 as opposed to year 1 ?