

- Q1. The following table shows the monthly butter stocks (thousand tons) in UK for a particular year.

Yu  
Hong

Mar	Apr
216.9	225.1

- (a) Calculate a set of data  
(b) Calculate a set of data

OC.

(Q2)

	March	Apr	May	Jun	Jul	Aug	Sep
$g_0 =$	216.9	225.1	234.6	237.2	235.2	230.1	224.4

a) March

$$\frac{216.9}{216.9} \times 100 = 100$$

$$\frac{225.1}{216.9} \times 100 = 103.78$$

$$\frac{234.6}{216.9} \times 100 = 108.16$$

$$\frac{237.2}{216.9} \times 100 = 109.36$$

July

$$\frac{235.2}{216.9} \times 100 = 108.44$$

$$\frac{230.1}{216.9} \times 100 = 106.09$$

$$\frac{224.4}{216.9} \times 100 = 103.46$$

b) March

$$-\checkmark$$

$$\frac{103.78}{225.1} \times 100 = 104.22$$

$$\frac{234.6}{225.1} \times 100 = 101.11$$

$$\frac{237.2}{234.6} \times 100 = 99.16$$

$$\frac{230.1}{235.2} \times 100 = 97.83$$

$$\frac{224.4}{230.1} \times 100 = 97.52$$

Q2. The weights and prices of four commodities in years 1 and 2 are shown in the following table.

Ze  
Xuan

OC

Commodity	Weight	Price in year 1	Price in year 2
W	5	215	210
X	12	250	275
Y	2	1100	1300
Z	8	950	950

Using the year 1 as the base year, calculate the following indices for year 2.

- (a) Price relative index for commodity Y.
- (b) Simple aggregate price index.
- (c) Simple average of price relative index.
- (d) Weighted average of price relative index.
- (e) Weighted aggregate price index.

d) Weighted average for price relative index

$$= \frac{1}{\sum w} \sum w \left( \frac{P_2}{P_1} \times 100 \right)$$

$$= \frac{1}{27} (97.17 \times 5 + 110 \times 12 + 118.18 \times 2 + 100 \times 8)$$

$$= 105.36$$

e) Weighted aggregate price index

$$= \frac{\sum w P_2}{\sum w P_1} \times 100$$

$$= \frac{14450}{13875} \times 100$$

$$= 104.86$$

a)  $I_Y = \frac{\text{Price in year 2}}{\text{Price in year 1}} \times 100$

$$= \frac{1300}{1100} \times 100$$

$$= 118.18 \checkmark$$

b) Simple aggregate price index

$$= \frac{\sum \text{Price in year 2}}{\sum \text{Price in year 1}} \times 100$$

$$= \frac{2735}{2515} \times 100$$

$$= 108.75$$

c) Simple average of price relative index

$$= \frac{1}{N} \sum \left( \frac{\text{Price in year 2}}{\text{Price in year 1}} \times 100 \right)$$

$$= \frac{1}{4} (97.17 + 110 + 118.18 + 100)$$

$$= 106.46$$

- Q3. The following table shows the productions of 4 products of a factory from the year 2007 to year 2010.

Mavis

OK

Product	Average Price	Production (in thousand units)			
		2007	2007	2008	2009
A	2.00	62	65	66	90
B	3.00	138	120	110	80
C	0.50	500	540	580	800
D	4.50	10	10	10	10

Using average price in the year 2007 as the weight and the year 2007 as the base year, calculate the

- (a) production relative index of product A for the year 2009,
- (b) simple aggregate production index for the year 2008,
- (c) simple average of production relative index for the year 2009,

3) a) Production relative index of product A for year 2009 :

$$= \frac{q_{2009}}{q_{2007}} \times 100$$

$$= \frac{66}{62} \times 100$$

$$= 106.45$$

b) Simple aggregative production index :

$$= \frac{\sum q_{2008}}{\sum q_{2007}} \times 100$$

$$\sum q_{2007}$$

$$= \frac{735}{710} \times 100$$

$$= 103.52$$

c) Simple average of production relative index for year 2009 :

$$= \frac{1}{N} \sum \left( \frac{P_i}{q_i} \times 100 \right)$$

$$= \frac{1}{4} (106.45)$$

$$= 100.54$$

Product	$\frac{P_i}{q_i} \times 100$
A	106.45
B	79.71
C	116
D	100

- Q3. The following table shows the productions of 4 products of a factory from the year 2007 to year 2010.

Sean

OK

Product	Average Price	Production (in thousand units)				
		2007	2007	2008	2009	2010
A	2.00	62	65	66	90	
B	3.00	138	120	110	80	
C	0.50	500	540	580	800	
D	4.50	10	10	10	10	

Using average price in the year 2007 as the weight and the year 2007 as the base year, calculate the

- (d) weighted average of production relative index for the year 2009.  
 (e) weighted aggregate production index for the year 2010.

(d) Weighted average of product relative index for the year 2009

$$= \frac{1}{10} (960.03)$$

$$= 96.00$$

$$\rightarrow \sum_w \left( \frac{q_{09}}{q_{07}} \times w \right)$$

(e) Weighted aggregate production index for the year 2010

$$= \frac{8169}{835} \times 100$$

$$= 103.84$$

Q4. Calculate the cost of living index from the following table.

Eason  
OC

Category	Food	Transport	Housing	Durable House Good	Services	Clothing
Price Relative	103.4	112.5	111.2	115.3	100.6	107.2
Weight	25	12	11	6	8	8

Weighted index

$$\begin{aligned} 4) \text{ Cost living Index} \\ &= \frac{25(103.4) + 12(112.5) + 11(111.2) + 6(115.3) + 100.6(8) + 8(107.2)}{25 + 12 + 11 + 6 + 8} \\ &= \frac{7512.4}{70} \\ &= 107.32 \end{aligned}$$

5) Let 2005 as base,

- a) Price relative index for A      b) Quantity relative index

- Q5. The following table shows the prices and quantities sold for the items A and B in years 2005 and 2010.

Item	Price in 2005	Quantity in 2005	Price in 2010	Quantity in 2010
A	7	61	8	77
B	5	81	7	71

Mei  
Yi

Using the year 2005 as the base year, calculate the following indices for the year 2010.

- (a) Price relative index for item A.      (b) Quantity relative index for item B.  
 (c) Value relative index for item A.      (d) Laspeyres price index.

$$(a) \text{ Item A : price index} = \frac{P_1}{P_0} \times 100 \\ = \frac{8}{7} \times 100 \\ = 114.29$$

$$(b) \text{ Item B : quantity index} = \frac{Q_1}{Q_0} \times 100 \\ = \frac{71}{81} \times 100 \\ = 87.65$$

$$(c) \text{ Item A : value relative index} = \frac{P_1 Q_1}{P_0 Q_0} \times 100 \\ = \frac{8(77)}{7(61)} \times 100 \\ = \frac{616}{427} \times 100 \\ = 144.26$$

$$(d) \text{ Item A : } P_0 Q_0 = 5(81) = 405 \\ P_1 Q_1 = 5(71) = 355 \\ \text{Item B : } P_0 Q_0 = 7(61) = 427 \\ P_1 Q_1 = 7(77) = 539$$

$$\text{Laspeyres price index} = \frac{\sum Q_0 P_1}{\sum Q_0 P_0} \times 100 \\ = \frac{539 + 355}{427 + 405} \times 100 \\ = \frac{894}{832} \times 100 \\ = 107.45$$

Q5. The following table shows the prices and quantities sold for the items A and B in years 2005 and 2010.

Item	Price in 2005	Quantity in 2005	Price in 2010	Quantity in 2010
A	7	61	8	77
B	5	81	7	71

Using the year 2005 as the base year, calculate the following indices for the year 2010.

(e) Paasche price index.

(f) Laspeyres quantity index.

(g) Paasche quantity index

(h) Value index.

Date:

PPI

$$e. \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

$$= \frac{1113}{694} \times 100$$

$$= 124.50$$

LQI

$$f. \frac{\sum p_0 q_1}{\sum p_0 q_0} \times 100$$

$$= \frac{(7 \times 77) + (5 \times 71)}{(7 \times 61) + (5 \times 81)} \times 100$$

$$= 107.45$$

PQI

$$g. \frac{\sum p_1 q_1}{\sum p_1 q_0} \times 100$$

$$= \frac{1113}{1055} \times 100$$

$$= 105.50$$

$$h. \frac{\sum p_1 q_1}{\sum p_0 q_0} \times 100$$

$$= \frac{1113}{694} \times 100$$

$$= 163.77$$

$$= 133.77$$

- Q6. The following table lists the quantities and costs of materials of a company for two years.

BC

Jia  
Yu

Material	Quantity (tons)		Cost (RM'000)	
	Year 1 $q_0$	Year 2 $q_1$	Year 1 $P_0$	Year 2 $P_1$
A	175	201	15.4	18.3
B	32	46	12.7	14.9
C	48	43	27.6	24.9

Using the year 1 as the base year, calculate the

- (a) price (cost) relative index for material A in year 2,
- (b) quantity relative index for material C in year 2,
- (c) simple aggregate price and quantity indices for year 2,
- (d) simple average of price and quantity relative indices for year 2,

(d)

material A : $R = 114.86$	material A : $R = 118.83$
material B : $R = 143.75$	material B : $R = 117.32$
material C : $R = 89.58$	material C : $R = 90.22$
$\Sigma R = \underline{\underline{348.19}}$	$\Sigma R = \underline{\underline{325.82}}$

$\frac{1}{N} (\Sigma R) \times 100$

$= \frac{1}{3} (348.19)$

$= 116.06\%$

$\frac{1}{N} (\Sigma R) \times 100$

$= \frac{1}{3} (325.82)$

$= 108.60\%$

Question 6

(a)  $\frac{P_1}{P_0} \times 100\% = \frac{18.3}{15.4} \times 100\% = 118.83\%$

(b)  $\frac{q_1}{q_0} \times 100\% = \frac{43}{48} \times 100\% = 89.58\%$

(c)

$q_0$ : Year 1 Quantity	$P_1$ : Year 1 Cost
$q_1$ : Year 2 Quantity	$P_0$ : Year 2 Cost

$\Sigma q_0 = 175 + 32 + 48 = 255$

$\Sigma q_1 = 201 + 46 + 43 = 290$

$\frac{P_1}{P_0} \times 100 = \frac{58.1}{55.7} \times 100 = 104.51$

$\therefore$  Indicates that the costs in year 2 had increased by 4.31% compared to year 1

$\therefore$  Indicates that the quantity in year 2 had increased by 13.73% compared to year 1

Q6. The following table lists the quantities and costs of materials of a company for two years.

Janet

OL

Material	Quantity (tons)		Cost (RM'000)	
	Year 1	Year 2	Year 1	Year 2
A	175	201	15.4	18.3
B	32	46	12.7	14.9
C	48	43	27.6	24.9

Using the year 1 as the base year, calculate the

- (e) Laspeyres, Paasche and Fisher's Ideal price indices for year 2,
- (f) Laspeyres, Paasche and Fisher's Ideal quantity indices for year 2,
- (g) value index for year 2.

Q6 Material	$q_0$	$q_1$	$p_0$	$p_1$	$q_0 p_0$	$q_0 p_1$	$q_1 p_0$	$q_1 p_1$
A	175	201	15.4	18.3	2695	3202.5	3045.4	3674.3
B	32	46	12.7	14.9	406.4	476.8	584.2	685.4
C	48	43	27.6	24.9	1324.8	1195.2	1186.8	1070.7
	255	290	55.7	58.1	4426.2	4874.5	4866.4	5434.4

$$E. LPI = \frac{\sum q_1 p_1}{\sum q_0 p_0} \times 100 = \frac{4874.5}{4426.2} \times 100 = 110.13$$

$$PPI = \frac{\sum q_1 p_1}{\sum q_1 p_0} \times 100 = \frac{5434.4}{4866.4} \times 100 = 111.67$$

$$\boxed{LPI \times PPI = 110.13 \times 111.67 = 110.9}$$

$$F. LQI = \frac{\sum p_0 q_1}{\sum p_0 q_0} \times 100 = \frac{4866.4}{4426.2} \times 100 = 109.95$$

$$PQI = \frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100 = \frac{5434.4}{4874.5} \times 100 = 111.49$$

$$\boxed{LPI \times PQI = 109.95 \times 111.49 = 110.72}$$

$$G. Value Index = \frac{\sum p_1 q_1}{\sum p_0 q_0} \times 100 = \frac{5434.4}{4426.2} \times 100 = 122.78$$

**Q7.** The profits of two companies, A and B, expressed in terms of index numbers are given below.

Year	2004	2005	2006	2007	2008	2009	2010
Company A	-	-	100.00	110.61	123.45	136.23	151.16
Company B	100.00	109.16	118.32	127.61	136.21	145.56	156.23

Yeap

**Q1** Change the base of company B from year 2004 to year 2006. Comment on the result obtained.

四

Compare start from 2006  
rank.

Tajuk:		Year	2004	2005	2006	2007	2008	2009	2010
"factor"		A	-	-	100	110,61	123,45	136,23	151,16
B			100	101,16	118,32	127,61	136,21	145,56	156,23
=	$\frac{100}{118,32}$	B	$100 \times \frac{100}{118,32}$	$101,16 \times \frac{100}{118,32}$	$118,32 \times \frac{100}{118,32}$	$127,61 \times \frac{100}{118,32}$	$136,21 \times \frac{100}{118,32}$	$145,56 \times \frac{100}{118,32}$	$156,23 \times \frac{100}{118,32}$
old $\times$ factor = new	( $2006=100$ )		$= 84,52$	$= 92,26$	$= 100$	$= 107,85$	$= 115,12$	$= 123,02$	$= 132,04$

OY  
Cai  
Jie

Q8. In January 2009, a factory paid out a total of RM 64,000 to 120 employees on the payroll. In July 2009, the factory had 30 more employees on the payroll and paid out RM 11,800 more than in January 2009. Using January 2009 as the base month, calculate the

- (a) labour expenses index number (value relative) for July 2009,  
(b) employee index number (quantity relative) for July 2009.

No.:	Payroll	NO. OF EMPLOYEES
a)	Jan 2009 (base) 64000	120
	July 2009 75800	150

$$\text{a) Labour expenses index} = \frac{\text{Current}}{\text{base}} \times 100\% = \frac{75800}{64000} \times 100 \\ = 118.47$$

$$\text{b) Employee index} = \frac{\text{Current}}{\text{base}} \times 100\% = \frac{150}{120} \times 100 = 125$$

Payroll	No of employees
Jan 09 base	
Jul 09 current	

Date:  
Expense  
(a)

Quantity  
(b)

$$\text{Index} = \frac{\text{current}}{\text{base}} \times 100\%$$

Aaron  
Q9. The following table shows the yearly expenditures on petrol and servicing of a company and the petrol and servicing price index from the years 2004 to 2010.

Year	2004	2005	2006	2007	2008	2009	2010
Expenditure on petrol and servicing (\$'000)	166	220	360	528	664	763	912
Petrol and servicing price index	111	147	182	211	228	251	260

Calculate the **real** expenditure on petrol and servicing from the year 2004 to the year 2010.

Year	2004	2005	2006	2007	2008	2009	2010
Expenditure	166	220	360	528	664	763	912
price index.	111	147	182	211	228	251	260
real expenditure	$\frac{166}{111} \times 100$	$\frac{220}{147} \times 100$	$\frac{360}{182} \times 100$	$\frac{528}{211} \times 100$	$\frac{664}{228} \times 100$	$\frac{763}{251} \times 100$	$\frac{912}{260} \times 100$
=	149.55	149.66	197.30	250.24	291.23	303.98	350.77

