

INTENSIVE REVISION QUESTIONS (ERQ)

SET 11-INDEX NUMDER

Name :

Form :

Teacher:

1.

Item	Price index in the year 2003 based on the year 2000	Price index in the year 2005 based on the year 2000	Price index in the year 2005 based on the year 2003	Weightage
Orange	p	100	80	1
Durian	115	92	r	2
Pineapple	110	q	110	5

The table above shows the prices indices and the corresponding weightages of three types of fruits.

(a) Find the values of p , q and r . [6 marks]

(b) Hence, find the composite index representing the price indices of these fruits in the year 2005 based on the year 2003.

[4 marks]

2. A healthcare product T consists of four components, K , L , M and N . The following table shows the average prices and the price indices of these components as well as the percentages of these components used in manufacturing the product.

Component	K	L	M	N
Price in the year 1997 (RM)	60	80	x	100
Price in the year 2001 (RM)	81	88	88	y
Price index for the year 2001 based on the year 1997	135	z	110	135
Percentage used in the product (%)	h	25	35	10

(a) Find the values of x , y and z . [3 marks]

(b) State the value of h . Hence, find the composite index representing the cost of the components used in the product in the year 2001 based on the year 1997.

[3 marks]

(c) If the cost of components used to produce one unit of product T in the year 1997 is RM1000, find the cost of components used to produce one unit of product T in the year 2001.

[2 marks]

(d) If the price of every component used in product T increases by 26% from the year 2001 to the year 2005, find the composite index representing the cost of components used in the year 2005 using the year 1997 as the base year.

[2 marks]

3. A technology product T consists of four components, K , L , M and N . The following table shows the average prices and the price indices of these components as well as the

percentages of these components used in manufacturing the product.

Component	<i>K</i>	<i>L</i>	<i>M</i>	<i>N</i>
Price in the year 1995 (RM)	100	116	x	60
Price in the year 1999 (RM)	170	y	200	120
Price index for the year 1999 based on the year 1995	170	175	200	z
Percentage used in the product (%)	h	10	20	50

- (a) Find the values of x , y and z . [3 marks]
- (b) State the value of h . Hence, find the composite index representing the cost of the components used in the product in the year 1999 based on the year 1995. [3 marks]
- (c) If the cost of components used to produce one unit of product T in the year 1995 is RM800, find the cost of components used to produce one unit of product T in the year 1999. [2 marks]
- (d) If the price of every component used in product T increases by 14% from the year 1999 to the year 2003, find the composite index representing the cost of components used in the year 2003 using the year 1995 as the base year. [2 marks]

4.

Item	Consumer Price index in 2005 based on 2000	Average monthly expenditure in 2000 (RM)
Transport	140	315
Food	125	810
Clothing	120	975
Travel	115	960

The table above shows the consumer price indices of four major items that constituted basic household expenditure in the year 2005 based on the year 2000 and their corresponding average monthly expenditure in the year 2000.

- (a) Determine the composite index for the basic household expenditure in the year 2005 based on the year 2000. [3 marks]
- (b) Calculate the total monthly basic household expenditure in the year 2005. [3 marks]
- (c) Given that the consumer price index of clothing in the year 2000 based on the year 1995 was 145, calculate the consumer price index of clothing in the year 2005 based on the year 1995. [4 marks]

5.

Item	Price index in the year 2004 based on the year 2001	Price index in the year 2006 based on the year 2001	Price index in the year 2006 based on the year 2004	Weightage
Apple	140	q	140	6
Pineapple	p	95	100	2
Coconut	120	168	r	8

The table above shows the prices indices and the corresponding weightages of three types of fruits.

- (a) Find the values of p , q and r . [6 marks]
 (b) Hence, find the composite index representing the price indices of these fruits in the year 2006 based on the year 2004.

[4 marks]

6.

Ingredient	Price index for the year 2004 based on the year 2003	Percentage of usage (%)
S	107	19
T	118	10
U	x	14
V	149	57

The table above shows the price indices and the percentage of usage of four major ingredients used to produce a certain kind of food.

- (a) Calculate
 (i) the price of ingredient S in the year 2003 if the price in the year 2004 is RM83,
 (ii) the price index of ingredient T in the year 2004 based on the year 2000 if the price index in the year 2003 based on the year 2000 is 131.

[4 marks]

- (b) The composite index representing the cost of production of the food in the year 2004 based on the year 2003 is 134. Calculate
 (i) the value of x ,
 (ii) the cost of one unit of the food in the year 2003 if one unit of the food costs RM67.00 in the year 2004.

[6 marks]

7.

Item	Consumer Price index in 2004 based on 2000	Average monthly expenditure in 2000 (RM)
Education	115	570
Travel	120	510
Transport	125	525
Utility	110	120

The table above shows the consumer price indices of four major items that constituted basic household expenditure in the year 2004 based on the year 2000 and their corresponding average monthly expenditure in the year 2000.

- (a) Determine the composite index for the basic household expenditure in the year 2004 based on the year 2000.

[3 marks]

- (b) Calculate the total monthly basic household expenditure in the year 2004.

[3 marks]

- (c) Given that the consumer price index of transport in the year 2000 based on the year 1996 was 105, calculate the consumer price index of transport in the year 2004 based on the year 1996.

[4 marks]

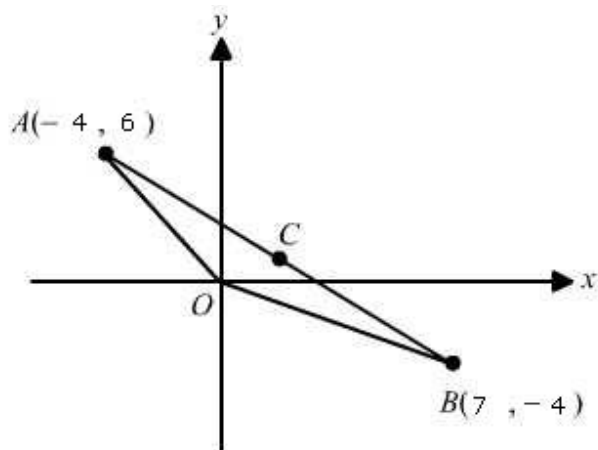
8.

Raw material	Price per unit		Weightage
	1997	1999	
<i>A</i>	RM57.30	RM42.98	8
<i>B</i>	RM72.10	RM36.05	8
<i>C</i>	RM84.20	RM117.88	2
<i>D</i>	RM90.10	RM166.69	5

The table above shows the prices of four raw materials, *A*, *B*, *C* and *D*, used to produce a technology product in the years 1997 and 1999, and their corresponding weightages.

- (a) Calculate the composite index representing the prices of the four raw materials in the year 1999 based on the year 1997. [6 marks]
- (b) If the prices of the raw materials, *A*, *B*, *C* and *D* changed by +14%, +12%, +54% and +75% respectively in the year 2003 based on the year 1999, find the composite index representing the prices of the four raw materials in the year 2003 based on the year 1999. [4 marks]

9.



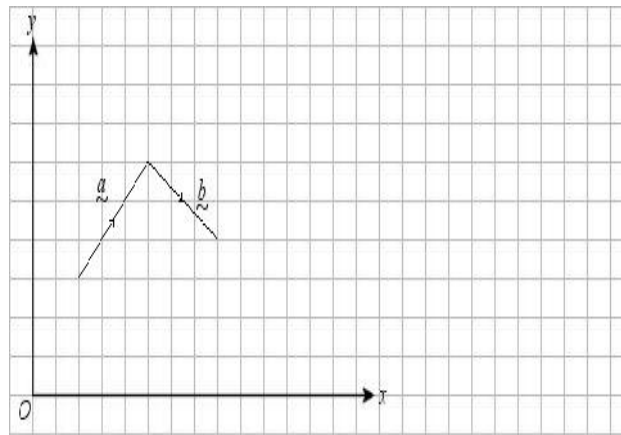
A mechanical product consists of five raw materials, *V*, *W*, *X*, *Y* and *Z*. The diagram above is a pie chart showing the percentages of the raw materials used to produce the mechanical product. The following table shows the prices and the price indices of the raw materials.

Raw materials	Price in the year 2002 (RM)	Price in the year 2005 (RM)	Price index in 2005 based on 2002
<i>V</i>	18.20	27.30	150
<i>W</i>	<i>z</i>	14.00	112
<i>X</i>	7.50	<i>x</i>	130
<i>Y</i>	7.00	10.50	150
<i>Z</i>	10.00	13.80	<i>y</i>

- (a) Find the values of x , y and z . [3 marks]
- (b) Calculate the composite index representing the cost of the mechanical product in the year 2005 using the year 2002 as the base year. [3 marks]
- (c) If the total monthly cost of the raw materials in the year 2002 is RM1.8 million, find the total monthly cost of the raw materials in the year 2005. [2 marks]
- (d) If the cost of each raw materials rises by 12% from the year 2005 to 2008, find the composite index representing the cost of the mechanical product in the year 2008 based on the year 2002.

[2 marks]

10.



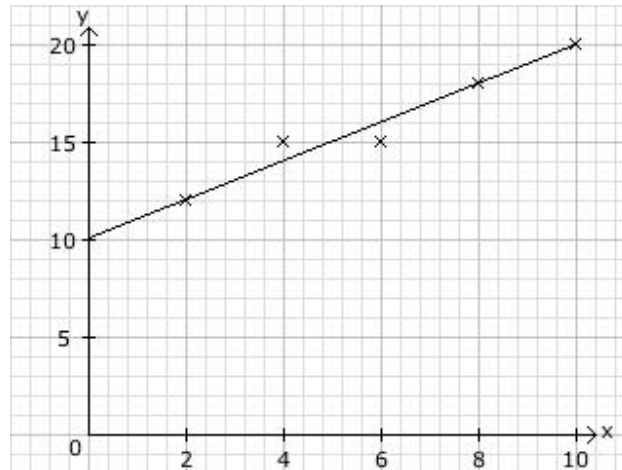
The pie chart above shows the usage of four raw materials, C , D , E and F , to produce a food product in years 1998 and 2002. The following table shows the prices of these materials in years 1998 and 2002.

Raw material	Price per unit	
	1998	2002
C	RM23.60	RM16.52
D	RM62.50	RM65.63
E	RM83.40	RM70.89
F	RM21.70	RM20.61

- (a) Calculate the composite index representing the prices of the four raw materials in the year 2002 based on the year 1998. [4 marks]
- (b) If the prices of raw materials, C , D , E and F changed by -11% , -29% , $+87\%$ and $+36\%$ respectively in the year 2003 based on the year 2002, find the composite index representing the prices of the four raw materials in the year 2003 based on the year 2002.

[6 marks]

11.



A healthcare product T consists of four components, K , L , M and N . The diagram above is a pie chart showing the percentages of these components used in the manufacturing of the product. The following table shows the average prices and the price indices of these components.

Component	K	L	M	N
Price in the year 2000 (RM)	80	68	x	75
Price in the year 2002 (RM)	124	119	140	y
Price index for the year 2002 based on the year 2000	z	175	140	200

- (a) Find the values of x , y and z . [3 marks]
- (b) State the value of h . Hence, find the composite index representing the cost of the components used in the product in the year 2002 based on the year 2000 [3 marks]
- (c) If the cost of components used to produce one unit of product T in the year 2000 is RM950, find the cost of components used to produce one unit of product T in the year 2002. [2 marks]
- (d) If the price of every component used in product T increases by 27% from the year 2002 to the year 2004, find the composite index representing the cost of components used in the year 2004 using the year 2000 as the base year. [2 marks]

12.

Ingredient	Price index for the year 2004 based on the year 2003	Percentage of usage (%)
W	121	11
X	x	21
Y	139	13
Z	113	55

The table above shows the price indices and the percentage of usage of four major ingredients used to produce a certain kind of food.

- (a) Calculate
- the price of ingredient *Y* in the year 2003 if the price in the year 2004 is RM99,
 - the price index of ingredient *Z* in the year 2004 based on the year 2001 if the price index in the year 2003 based on the year 2001 is 140.
- [4 marks]
- (b) The composite index representing the cost of production of the food in the year 2004 based on the year 2003 is 116. Calculate
- the value of *x*,
 - the cost of one unit of the food in the year 2003 if one unit of the food costs RM14.50 in the year 2004.

[6 marks]

13.

Raw material	Price per unit		Weightage
	1998	1999	
<i>A</i>	RM84.30	RM109.59	7
<i>B</i>	RM20.30	RM33.49	7
<i>C</i>	RM73.00	RM105.85	3
<i>D</i>	RM60.70	RM42.49	6

The table above shows the prices of four raw materials, *A*, *B*, *C* and *D*, used to produce a healthcare product in the years 1998 and 1999, and their corresponding weightages.

- (a) Calculate the composite index representing the prices of the four raw materials in the year 1999 based on the year 1998.
- [6 marks]
- (b) If the prices of the raw materials, *A*, *B*, *C* and *D* changed by -36% , -7% , $+5\%$ and $+71\%$ respectively in the year 2001 based on the year 1999, find the composite index representing the prices of the four raw materials in the year 2001 based on the year 1999.

[4 marks]

14.

Raw material	Price per unit		Weightage
	1998	2001	
<i>A</i>	RM97.30	RM116.76	3
<i>B</i>	RM84.60	RM122.67	4
<i>C</i>	RM50.90	RM68.72	5
<i>D</i>	RM31.00	RM17.05	4

The table above shows the prices of four raw materials, *A*, *B*, *C* and *D*, used to produce a technology product in the years 1998 and 2001, and their corresponding weightages.

- (a) Calculate the composite index representing the prices of the four raw materials in the year 2001 based on the year 1998.
- [6 marks]
- (b) If the prices of the raw materials, *A*, *B*, *C* and *D* changed by $+43\%$, $+82\%$, $+65\%$ and $+2\%$ respectively in the year 2004 based on the year 2001, find the composite index representing the prices of the four raw materials in the year 2004 based on the year 2001.

[4 marks]

15.

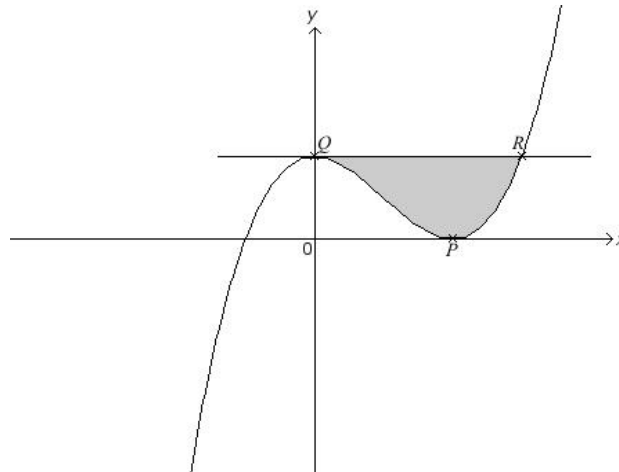
Item	Price index in the year 2003 based on the year 2000	Price index in the year 2004 based on the year 2000	Price index in the year 2004 based on the year 2003	Weightage
Papaya	p	126	105	4
Coconut	135	108	r	4
Rambutan	120	q	100	6

The table above shows the prices indices and the corresponding weightages of three types of fruits.

- (a) Find the values of p , q and r . [6 marks]
 (b) Hence, find the composite index representing the price indices of these fruits in the year 2004 based on the year 2003.

[4 marks]

16.



A mechanical product consists of five components, S , T , U , V and W . The diagram above is a bar chart showing the daily usage of the components used to produce the mechanical product. The following table shows the prices and the price indices of the components.

Component	Price in the year 2002 (RM)	Price in the year 2004 (RM)	Price index in 2004 based on 2002
S	9.00	11.70	y
T	13.00	18.20	140
U	4.00	5.40	135
V	z	2.20	110
W	5.00	x	149

- (a) Find the values of x , y and z . [3 marks]
 (b) Calculate the composite index representing the cost of the mechanical product in the year 2004 using the year 2002 as the base year. [3 marks]
 (c) If the total monthly cost of the components in the year 2002 is RM1.1 million, find the total monthly cost of the components in the year 2004. [2 marks]
 (d) If the cost of each component rises by 23% from the year 2004 to 2006, find the

composite index representing the cost of the mechanical product in the year 2006 based on the year 2002.

[2 marks]

17.

Item	Consumer Price index in 2003 based on 1997	Average monthly expenditure in 1997 (RM)
Clothing	120	300
Transport	110	120
Food	105	450
Education	115	990

The table above shows the consumer price indices of four major items that constituted basic household expenditure in the year 2003 based on the year 1997 and their corresponding average monthly expenditure in the year 1997.

(a) Determine the composite index for the basic household expenditure in the year 2003 based on the year 1997.

[3 marks]

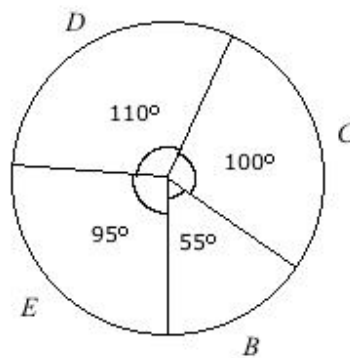
(b) Calculate the total monthly basic household expenditure in the year 2003.

[3 marks]

(c) Given that the consumer price index of transport in the year 1997 based on the year 1992 was 180, calculate the consumer price index of transport in the year 2003 based on the year 1992.

[4 marks]

18.



The pie chart above shows the percentage of usage of four major ingredients used to produce a certain kind of food. The table below shows the price indices of these ingredients.

Ingredient	Price index for the year 2005 based on the year 2002
<i>B</i>	146
<i>C</i>	148
<i>D</i>	108

E	x
-----	-----

- (a) Calculate
- (i) the price of ingredient B in the year 2002 if the price in the year 2005 is RM59,
 - (ii) the price index of ingredient D in the year 2005 based on the year 2000 if the price index in the year 2002 based on the year 2000 is 122.
- [4 marks]
- (b) The composite index representing the cost of production of the food in the year 2005 based on the year 2002 is 136. Calculate
- (i) the value of x ,
 - (ii) the cost of one unit of the food in the year 2002 if one unit of the food costs RM27.20 in the year 2005.
- [6 marks]

19.

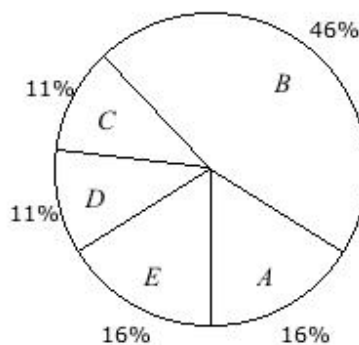
Item	Price index in the year 2004 based on the year 2001	Price index in the year 2005 based on the year 2001	Price index in the year 2005 based on the year 2004	Weightage
Banana	90	q	150	4
Orange	p	154	110	1
Papaya	120	162	r	8

The table above shows the prices indices and the corresponding weightages of three types of fruits.

- (a) Find the values of p , q and r .
- (b) Hence, find the composite index representing the price indices of these fruits in the year 2005 based on the year 2004.

[4 marks]

20.



A mechanical product consists of five raw materials, A , B , C , D and E . The diagram above is a pie chart showing the percentages of the raw materials used to produce the mechanical product. The following table shows the prices and the price indices of the

raw materials.

Raw materials	Price in the year 2002 (RM)	Price in the year 2003 (RM)	Price index in 2003 based on 2002
<i>A</i>	2.50	3.10	124
<i>B</i>	<i>z</i>	23.85	150
<i>C</i>	12.00	18.00	150
<i>D</i>	17.50	21.35	<i>y</i>
<i>E</i>	2.50	<i>x</i>	108

- (a) Find the values of x , y and z . [3 marks]
 (b) Calculate the composite index representing the cost of the mechanical product in the year 2003 using the year 2002 as the base year. [3 marks]
 (c) If the total monthly cost of the raw materials in the year 2002 is RM1.3 million, find the total monthly cost of the raw materials in the year 2003. [2 marks]
 (d) If the cost of each raw materials rises by 40% from the year 2003 to 2005, find the composite index representing the cost of the mechanical product in the year 2005 based on the year 2002. [2 marks]

Answers:

1.

- (a) For orange,

$$\frac{P_{2005}}{P_{2000}} = 1 \quad \text{and} \quad \frac{P_{2005}}{P_{2003}} = 0.8$$

$$\begin{aligned} \text{Hence,} \quad p &= \frac{P_{2003}}{P_{2000}} \times 100 \\ &= \frac{P_{2003}}{P_{2005}} \times \frac{P_{2005}}{P_{2000}} \times 100 \\ &= \frac{1}{\frac{P_{2005}}{P_{2003}}} \times \frac{P_{2005}}{P_{2000}} \times 100 \\ &= \frac{1}{0.8} \times 1 \times 100 \\ &= 125 \end{aligned}$$

For pineapple,

$$\frac{P_{2003}}{P_{2000}} = 1.1 \quad \text{and} \quad \frac{P_{2005}}{P_{2003}} = 1.1$$

$$\begin{aligned} \text{Hence,} \quad q &= \frac{P_{2005}}{P_{2000}} \times 100 \\ &= \frac{P_{2005}}{P_{2003}} \times \frac{P_{2003}}{P_{2000}} \times 100 \\ &= 1.1 \times 1.1 \times 100 \\ &= 121 \end{aligned}$$

For durian,

$$I_{\frac{2003}{2000}} = 115 \Rightarrow \frac{P_{2003}}{P_{2000}} \times 100 = 115$$
$$\frac{P_{2003}}{P_{2000}} = 1.15$$

$$I_{\frac{2005}{2000}} = 92 \Rightarrow \frac{P_{2005}}{P_{2000}} \times 100 = 92$$
$$\frac{P_{2005}}{P_{2000}} = 0.92$$

$$\begin{aligned} \text{Hence, } r &= I_{\frac{2005}{2003}} = \frac{P_{2005}}{P_{2003}} \times 100 \\ &= \frac{P_{2005}}{P_{2000}} \times \frac{P_{2000}}{P_{2003}} \times 100 \\ &= \frac{P_{2005}}{P_{2000}} \times \frac{1}{\frac{P_{2003}}{P_{2000}}} \times 100 \\ &= 0.92 \times \frac{1}{1.15} \times 100 \\ &= 80 \end{aligned}$$

$$\begin{aligned} \text{(b) } \bar{I} &= \frac{80 \times 1 + 80 \times 2 + 110 \times 5}{1 + 2 + 5} \\ &= \frac{790}{8} \\ &= 98.8 \end{aligned}$$

2.

$$\begin{aligned} \text{(a) For component } M, \quad \frac{88}{x} \times 100 &= 110 \\ x &= \frac{88 \times 100}{110} \\ &= 80 \end{aligned}$$

$$\begin{aligned} \text{For component } N, \quad \frac{y}{100} \times 100 &= 135 \\ y &= \frac{135 \times 100}{100} \\ &= 135 \end{aligned}$$

$$\begin{aligned} \text{For component } L, \quad z &= \frac{88}{80} \times 100 \\ &= 110 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } h &= 100 - 25 - 35 - 10 \\
 &= 30 \\
 30 : 25 : 35 : 10 &= 6 : 5 : 7 : 2
 \end{aligned}$$

I_i	w_i	$I_i w_i$
135	6	810
110	5	550
110	7	770
135	2	270
	$\sum w_i = 20$	$\sum I_i w_i = 2400$

$$\begin{aligned}
 \bar{I} &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{2400}{20} \\
 &= 120
 \end{aligned}$$

(c) Let the cost of one unit of product T in 2001 = m

$$\begin{aligned}
 \frac{m}{1000} \times 100 &= 120 \\
 &= \frac{120 \times 1000}{100} \\
 &= 1200
 \end{aligned}$$

$$\begin{aligned}
 \text{(d) } \bar{I} \frac{2005}{2001} &= 120 \times \frac{126}{100} \\
 &= 151.2
 \end{aligned}$$

3.

$$\begin{aligned}
 \text{(a) For component } M, \quad \frac{200}{x} \times 100 &= 200 \\
 x &= \frac{200 \times 100}{200} \\
 &= 100
 \end{aligned}$$

$$\begin{aligned}
 \text{For component } L, \quad \frac{y}{116} \times 100 &= 175 \\
 y &= \frac{175 \times 116}{100} \\
 &= 203
 \end{aligned}$$

$$\begin{aligned}
 \text{For component } N, \quad z &= \frac{120}{60} \times 100 \\
 &= 200
 \end{aligned}$$

$$\text{(b) } h = 100 - 10 - 20 - 50$$

$$= 20$$

$$20 : 10 : 20 : 50 = 2 : 1 : 2 : 5$$

I_i	w_i	$I_i w_i$
170	2	340
175	1	175
200	2	400
200	5	1000
	$\sum w_i = 10$	$\sum I_i w_i = 1915$

$$\bar{I} = \frac{\sum I_i w_i}{\sum w_i}$$

$$= \frac{1915}{10}$$

$$= 191.5$$

(c) Let the cost of one unit of product T in 1999 = m

$$\frac{m}{800} \times 100 = 191.5$$

$$= \frac{191.5 \times 800}{100}$$

$$= 1532$$

(d) $\bar{I} \frac{2003}{1999} = 191.5 \times \frac{114}{100}$

$$= 218.31$$

4.

(a)

I_i	w_i	$I_i w_i$
140	21	2940
125	54	6750
120	65	7800
115	64	7360
	$\sum w_i = 204$	$\sum I_i w_i = 24850$

$$\text{Composite index, } \bar{I} = \frac{\sum I_i w_i}{\sum w_i}$$

$$= \frac{24850}{204}$$

$$= 121.8$$

(b) Let P_{2000} = total monthly basic household expenditure in the year 2000
 P_{2005} = total monthly basic household expenditure in the year 2005

$$\frac{P_{2005}}{P_{2000}} \times 100 = 121.8$$

$$P_{2005} = \frac{P_{2000} \times 121.8}{100} \times \frac{100}{(315 + 810 + 975 + 960) \times 121.8}$$

$$= \text{RM}3727.08$$

Therefore, the total monthly basic household expenditure in the year 2005 was RM3727.08.

- (c) Let Q_{1995} = monthly expenditure on clothing in the year 1995
 Q_{2000} = monthly expenditure on clothing in the year 2000
 Q_{2005} = monthly expenditure on clothing in the year 2005

$$\frac{Q_{2005}}{Q_{2000}} \times 100 = 120$$

$$\frac{Q_{2005}}{Q_{2000}} = \frac{120}{100}$$

$$= 1.2$$

$$\frac{Q_{2000}}{Q_{1995}} \times 100 = 145$$

$$\frac{Q_{2000}}{Q_{1995}} = \frac{145}{100}$$

$$= 1.45$$

Consumer price index of food in the year 2005 based on the year 1995

$$= \frac{Q_{2005}}{Q_{1995}} \times 100$$

$$= \frac{Q_{2005}}{Q_{2000}} \times \frac{Q_{2000}}{Q_{1995}} \times 100$$

$$= 1.2 \times 1.45 \times 100$$

$$= 174$$

5.

- (a) For pineapple,

$$\frac{P_{2006}}{P_{2001}} = 0.95 \quad \text{and} \quad \frac{P_{2006}}{P_{2004}} = 1$$

Hence,

$$p = \frac{P_{2004}}{P_{2001}} \times 100$$

$$= \frac{P_{2004}}{P_{2006}} \times \frac{P_{2006}}{P_{2001}} \times 100$$

$$= \frac{1}{\frac{P_{2006}}{P_{2004}}} \times \frac{P_{2006}}{P_{2001}} \times 100$$

$$= \frac{1}{1} \times 0.95 \times 100$$

$$= 95$$

For apple,

$$\frac{P_{2004}}{P_{2001}} = 1.4 \quad \text{and} \quad \frac{P_{2006}}{P_{2004}} = 1.4$$

$$\begin{aligned} \text{Hence,} \quad q &= \frac{P_{2006}}{P_{2001}} \times 100 \\ &= \frac{P_{2006}}{P_{2004}} \times \frac{P_{2004}}{P_{2001}} \times 100 \\ &= 1.4 \times 1.4 \times 100 \\ &= 196 \end{aligned}$$

For coconut,

$$I_{\frac{2004}{2001}} = 120 \quad \Rightarrow \quad \frac{P_{2004}}{P_{2001}} \times 100 = 120$$

$$\frac{P_{2004}}{P_{2001}} = 1.2$$

$$I_{\frac{2006}{2001}} = 168 \quad \Rightarrow \quad \frac{P_{2006}}{P_{2001}} \times 100 = 168$$

$$\frac{P_{2006}}{P_{2001}} = 1.68$$

$$\begin{aligned} \text{Hence, } r = I_{\frac{2006}{2004}} &= \frac{P_{2006}}{P_{2004}} \times 100 \\ &= \frac{P_{2006}}{P_{2001}} \times \frac{P_{2001}}{P_{2004}} \times 100 \\ &= \frac{P_{2006}}{P_{2001}} \times \frac{1}{\frac{P_{2004}}{P_{2001}}} \times 100 \\ &= 1.68 \times \frac{1}{1.2} \times 100 \\ &= 140 \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad \bar{I} &= \frac{140 \times 6 + 100 \times 2 + 140 \times 8}{6 + 2 + 8} \\ &= \frac{2160}{16} \\ &= 135 \end{aligned}$$

6.

(a) (i) Let the price of ingredient S in the year 2003 = s

$$\frac{83}{s} \times 100 = 107$$

$$s = \frac{83 \times 100}{107}$$

$$= \text{RM}77.6$$

(ii) Given $I_{\frac{2004}{2003}} = 118$ and $I_{\frac{2003}{2000}} = 131$

$$\frac{P_{2004}}{P_{2003}} = 1.18 \text{ and } \frac{P_{2003}}{P_{2000}} = 1.3$$

$$\begin{aligned} \text{Hence, } I_{\frac{2004}{2000}} &= \frac{P_{2004}}{P_{2000}} \times 100 \\ &= \frac{P_{2004}}{P_{2003}} \times \frac{P_{2003}}{P_{2000}} \times 100 \\ &= 1.2 \times 1.3 \times 100 \\ &= 154.6 \end{aligned}$$

(b) (i) $\frac{107 \times 19 + 118 \times 10 + 14x + 149 \times 57}{19 + 10 + 14 + 57} = 134$

$$\frac{11706 + 14x}{100} = 134$$

$$11706 + 14x = 13400$$

$$14x = 1694$$

$$x = 121$$

(ii) Let the cost of one unit of the food in the year 2003 = RM y

$$\frac{67.00}{y} \times 100 = 134$$

$$y = \frac{67.00 \times 100}{134}$$

$$= \text{RM}50.00$$

7.

(a)

I_i	w_i	$I_i w_i$
115	38	4370
120	34	4080
125	35	4375
110	8	880
	$\sum w_i = 115$	$\sum I_i w_i = 13705$

$$\begin{aligned} \text{Composite index, } \bar{I} &= \frac{\sum I_i w_i}{\sum w_i} \\ &= \frac{13705}{115} \\ &= 119.2 \end{aligned}$$

(b) Let P_{2000} = total monthly basic household expenditure in the year 2000

P_{2004} = total monthly basic household expenditure in the year 2004

$$\frac{P_{2004}}{P_{2000}} \times 100 = 119.2$$

$$\frac{P_{2000}}{P_{2004}} = \frac{P_{2000} \times 119.2}{100} \div \frac{(570 + 510 + 525 + 120) \times 119.2}{100}$$

$$= \text{RM}2056.2$$

Therefore, the total monthly basic household expenditure in the year 2004 was RM2056.2.

- (c) Let Q_{1996} = monthly expenditure on transport in the year 1996
 Q_{2000} = monthly expenditure on transport in the year 2000
 Q_{2004} = monthly expenditure on transport in the year 2004

$$\frac{Q_{2004}}{Q_{2000}} \times 100 = 125$$

$$\frac{Q_{2004}}{Q_{2000}} = \frac{125}{100}$$

$$= 1.25$$

$$\frac{Q_{2000}}{Q_{1996}} \times 100 = 105$$

$$\frac{Q_{2000}}{Q_{1996}} = \frac{105}{100}$$

$$= 1.05$$

Consumer price index of food in the year 2004 based on the year 1996

$$= \frac{Q_{2004}}{Q_{1996}} \times 100$$

$$= \frac{Q_{2004}}{Q_{2000}} \times \frac{Q_{2000}}{Q_{1996}} \times 100$$

$$= 1.25 \times 1.05 \times 100$$

$$= 131.25$$

8.

(a)

Raw material	Weightage, w_i	Price Index in 1999 based on 1997, I_i
<i>A</i>	8	$\frac{42.98}{57.30} \times 100 = 75$
<i>B</i>	8	$\frac{36.05}{72.10} \times 100 = 50$
<i>C</i>	2	$\frac{117.88}{84.20} \times 100 = 140$
<i>D</i>	5	$166.69 \times 100 = 185$

		90.10
--	--	-------

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(75 \times 8) + (50 \times 8) + (140 \times 2) + (185 \times 5)}{8 + 8 + 2 + 5} \\
 &= \frac{2205}{23} \\
 &= 95.9
 \end{aligned}$$

(b)

Raw material	Weightage, w_i	Price change in 2003 based on 1999 (%)	Price index in 2003, based on 1999, I_i
<i>A</i>	8	+14	100 + 14 = 114
<i>B</i>	8	+12	100 + 12 = 112
<i>C</i>	2	+54	100 + 54 = 154
<i>D</i>	5	+75	100 + 75 = 175

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(114 \times 8) + (112 \times 8) + (154 \times 2) + (175 \times 5)}{8 + 8 + 2 + 5} \\
 &= \frac{2991}{23} \\
 &= 130
 \end{aligned}$$

9.

(a) For raw material *X*, $\frac{x}{7.50} \times 100 = 130$

$$\begin{aligned}
 x &= \frac{7.50 \times 130}{100} \\
 &= 9.75
 \end{aligned}$$

For raw material *Z*, $\frac{13.80}{10.00} \times 100 = y$

$$y = 138$$

For raw material *W*, $\frac{14.00}{z} \times 100 = 112$

$$z = \frac{14.00 \times 100}{112}$$

$$= 12.50$$

$$\begin{aligned} \text{(b)} \quad \bar{I} &= \frac{150 \times 18 + 112 \times 42 + 130 \times 19 + 150 \times 16 + 138 \times 5}{18 + 42 + 19 + 16 + 5} \\ &= \frac{12964}{100} \\ &= 129.6 \end{aligned}$$

(c) Let the total monthly cost in the year 2005 = p

$$\begin{aligned} \frac{p}{1.8} \times 100 &= 129.6 \\ p &= \frac{129.6 \times 1.8}{100} \\ &= \text{RM}2.33 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad \bar{I}_{\frac{2008}{2002}} &= 129.6 \times \frac{112}{100} \\ &= 145.2 \end{aligned}$$

10.

(a)

Raw material	Weightage, w_i	Price Index in 2002 based on 1998, I_i
C	20	$\frac{16.52}{23.60} \times 100 = 70$
D	53	$\frac{65.63}{62.50} \times 100 = 105$
E	15	$\frac{70.89}{83.40} \times 100 = 85$
F	12	$\frac{20.61}{21.70} \times 100 = 95$

Composite index, \bar{I}

$$\begin{aligned} &= \frac{(70 \times 20) + (105 \times 53) + (85 \times 15) + (95 \times 12)}{20 + 53 + 15 + 12} \\ &= \frac{9380}{100} \\ &= 93.8 \end{aligned}$$

(b)

Raw material	Weightage, w_i	Price change in 2003 based on 2002 (%)	Price index in 2003, based on 2002, I_i
C	20	-11	$100 - 11 = 89$
D	53	-29	$100 - 29 = 71$

<i>E</i>	15	+87	100 + 87 = 187
<i>F</i>	12	+36	100 + 36 = 136

Composite index, \bar{I}

$$= \frac{(89 \times 20) + (71 \times 53) + (187 \times 15) + (136 \times 12)}{20 + 53 + 15 + 12}$$

$$= \frac{9980}{100}$$

$$= 99.8$$

11.

(a) For component *M*, $\frac{140}{x} \times 100 = 140$

$$x = \frac{140 \times 100}{140}$$

$$= 100$$

For component *N*, $\frac{y}{75} \times 100 = 200$

$$y = \frac{200 \times 75}{100}$$

$$= 150$$

For component *K*, $z = \frac{124}{80} \times 100$

$$= 155$$

(b) $h = 100 - 30 - 30 - 15$
 $= 25$

$$30 : 25 : 30 : 15 = 6 : 5 : 6 : 3$$

I_i	w_i	$I_i w_i$
155	6	930
175	5	875
140	6	840
200	3	600
	$\sum w_i = 20$	$\sum I_i w_i = 3245$

$$\bar{I} = \frac{\sum I_i w_i}{\sum w_i}$$

$$= \frac{3245}{20}$$

$$= 162.3$$

(c) Let the cost of one unit of product *T* in 2002 = *m*

$$\begin{aligned}\frac{m}{950} \times 100 &= 162.3 \\ &= \frac{162.3 \times 950}{100} \\ &= 1541.85\end{aligned}$$

$$\begin{aligned}\text{(d) } \bar{I} \frac{2004}{2002} &= 162.3 \times \frac{127}{100} \\ &= 206.12\end{aligned}$$

12.

(a) (i) Let the price of ingredient Y in the year 2003 = y

$$\begin{aligned}\frac{99}{y} \times 100 &= 139 \\ y &= \frac{99 \times 100}{139} \\ &= \text{RM}71.2\end{aligned}$$

(ii) Given $I_{\frac{2004}{2003}} = 113$ and $I_{\frac{2003}{2001}} = 140$

$$\frac{P_{2004}}{P_{2003}} = 1.13 \text{ and } \frac{P_{2003}}{P_{2001}} = 1.4$$

$$\begin{aligned}\text{Hence, } I_{\frac{2004}{2001}} &= \frac{P_{2004}}{P_{2001}} \times 100 \\ &= \frac{P_{2004}}{P_{2003}} \times \frac{P_{2003}}{P_{2001}} \times 100 \\ &= 1.1 \times 1.4 \times 100 \\ &= 158.2\end{aligned}$$

$$\text{(b) (i) } \frac{121 \times 11 + 21x + 139 \times 13 + 113 \times 55}{11 + 21 + 13 + 55} = 116$$

$$\frac{9353 + 21x}{100} = 116$$

$$9353 + 21x = 11600$$

$$21x = 2247$$

$$x = 107$$

(ii) Let the cost of one unit of the food in the year 2003 = RM y

$$\frac{14.50}{y} \times 100 = 116$$

$$\begin{aligned}y &= \frac{14.50 \times 100}{116} \\ &= \text{RM}12.50\end{aligned}$$

13.

(a)

Raw material	Weightage, w_i	Price Index in 1999 based on 1998, I_i
<i>A</i>	7	$\frac{109.59}{84.30} \times 100 = 130$
<i>B</i>	7	$\frac{33.49}{20.30} \times 100 = 165$
<i>C</i>	3	$\frac{105.85}{73.00} \times 100 = 145$
<i>D</i>	6	$\frac{42.49}{60.70} \times 100 = 70$

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(130 \times 7) + (165 \times 7) + (145 \times 3) + (70 \times 6)}{7 + 7 + 3 + 6} \\
 &= \frac{2920}{23} \\
 &= 127
 \end{aligned}$$

(b)

Raw material	Weightage, w_i	Price change in 2001 based on 1999 (%)	Price index in 2001, based on 1999, I_i
<i>A</i>	7	-36	$100 - 36 = 64$
<i>B</i>	7	-7	$100 - 7 = 93$
<i>C</i>	3	+5	$100 + 5 = 105$
<i>D</i>	6	+71	$100 + 71 = 171$

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(64 \times 7) + (93 \times 7) + (105 \times 3) + (171 \times 6)}{7 + 7 + 3 + 6} \\
 &= \frac{2440}{23} \\
 &= 106.1
 \end{aligned}$$

14.

(a)

Raw material	Weightage, w_i	Price Index in 2001 based on 1998, I_i
<i>A</i>	3	$\frac{116.76}{97.30} \times 100 = 120$

<i>B</i>	4	$\frac{122.67}{84.60} \times 100 = 145$
<i>C</i>	5	$\frac{68.72}{50.90} \times 100 = 135$
<i>D</i>	4	$\frac{17.05}{31.00} \times 100 = 55$

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(120 \times 3) + (145 \times 4) + (135 \times 5) + (55 \times 4)}{3 + 4 + 5 + 4} \\
 &= \frac{1835}{16} \\
 &= 114.7
 \end{aligned}$$

(b)

Raw material	Weightage, w_i	Price change in 2004 based on 2001 (%)	Price index in 2004, based on 2001, I_i
<i>A</i>	3	+43	$100 + 43 = 143$
<i>B</i>	4	+82	$100 + 82 = 182$
<i>C</i>	5	+65	$100 + 65 = 165$
<i>D</i>	4	+2	$100 + 2 = 102$

Composite index, \bar{I}

$$\begin{aligned}
 &= \frac{\sum I_i w_i}{\sum w_i} \\
 &= \frac{(143 \times 3) + (182 \times 4) + (165 \times 5) + (102 \times 4)}{3 + 4 + 5 + 4} \\
 &= \frac{2390}{16} \\
 &= 149.4
 \end{aligned}$$

15.

(a) For papaya,

$$\frac{P_{2004}}{P_{2000}} = 1.26 \quad \text{and} \quad \frac{P_{2004}}{P_{2003}} = 1.05$$

$$\begin{aligned}
 \text{Hence,} \quad p &= \frac{P_{2003}}{P_{2000}} \times 100 \\
 &= \frac{P_{2003}}{P_{2004}} \times \frac{P_{2004}}{P_{2000}} \times 100 \\
 &= \frac{1}{P_{2004}} \times \frac{P_{2004}}{P_{2000}} \times 100
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{P_{2003}}{1.05} \times 1.26 \times 100 \\
 &= 120
 \end{aligned}$$

For rambutan,

$$\frac{P_{2003}}{P_{2000}} = 1.2 \quad \text{and} \quad \frac{P_{2004}}{P_{2003}} = 1$$

$$\begin{aligned}
 \text{Hence, } q &= \frac{P_{2004}}{P_{2000}} \times 100 \\
 &= \frac{P_{2004}}{P_{2003}} \times \frac{P_{2003}}{P_{2000}} \times 100 \\
 &= 1 \times 1.2 \times 100 \\
 &= 120
 \end{aligned}$$

For coconut,

$$\begin{aligned}
 I_{\frac{2003}{2000}} = 135 &\Rightarrow \frac{P_{2003}}{P_{2000}} \times 100 = 135 \\
 &\frac{P_{2003}}{P_{2000}} = 1.35
 \end{aligned}$$

$$\begin{aligned}
 I_{\frac{2004}{2000}} = 108 &\Rightarrow \frac{P_{2004}}{P_{2000}} \times 100 = 108 \\
 &\frac{P_{2004}}{P_{2000}} = 1.08
 \end{aligned}$$

$$\begin{aligned}
 \text{Hence, } r = I_{\frac{2004}{2003}} &= \frac{P_{2004}}{P_{2003}} \times 100 \\
 &= \frac{P_{2004}}{P_{2000}} \times \frac{P_{2000}}{P_{2003}} \times 100 \\
 &= \frac{P_{2004}}{P_{2000}} \times \frac{1}{\frac{P_{2003}}{P_{2000}}} \times 100 \\
 &= 1.08 \times \frac{1}{1.35} \times 100 \\
 &= 80
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \bar{I} &= \frac{105 \times 4 + 80 \times 4 + 100 \times 6}{4 + 4 + 6} \\
 &= \frac{1340}{14} \\
 &= 95.7
 \end{aligned}$$

16.

$$\begin{aligned}
 \text{(a) For component } W, \quad \frac{x}{5.00} \times 100 &= 149 \\
 x &= \underline{\underline{5.00 \times 149}}
 \end{aligned}$$

$$= \frac{100}{7.45}$$

For component S , $\frac{11.70}{9.00} \times 100 = y$
 $y = 130$

For component V , $\frac{2.20}{z} \times 100 = 110$
 $z = \frac{2.20 \times 100}{110}$
 $= 2.00$

(b)
$$\bar{I} = \frac{130 \times 38 + 140 \times 24 + 135 \times 12 + 110 \times 42 + 149 \times 7}{38 + 24 + 12 + 42 + 7}$$

$$= \frac{15583}{123}$$

$$= 126.7$$

(c) Let the total monthly cost in the year 2004 = p

$$\frac{p}{1.1} \times 100 = 126.7$$

$$p = \frac{126.7 \times 1.1}{100}$$

$$= \text{RM1.39 million}$$

(d)
$$\bar{I}_{\frac{2006}{2002}} = 126.7 \times \frac{123}{100}$$

$$= 155.8$$

17.

(a)

I_i	w_i	$I_i w_i$
120	10	1200
110	4	440
105	15	1575
115	33	3795
	$\sum w_i = 62$	$\sum I_i w_i = 7010$

$$\text{Composite index, } \bar{I} = \frac{\sum I_i w_i}{\sum w_i}$$

$$= \frac{7010}{62}$$

$$= 113.1$$

(b) Let P_{1997} = total monthly basic household expenditure in the year 1997

P_{2003} = total monthly basic household expenditure in the year 2003

$$\begin{aligned} \frac{P_{2003}}{P_{1997}} \times 100 &= 113.1 \\ P_{2003} &= \frac{P_{1997} \times 113.1}{100} \\ &= \frac{(300 + 120 + 450 + 990) \times 113.1}{100} \\ &= \text{RM}2103.66 \end{aligned}$$

Therefore, the total monthly basic household expenditure in the year 2003 was RM2103.66.

- (c) Let Q_{1992} = monthly expenditure on transport in the year 1992
 Q_{1997} = monthly expenditure on transport in the year 1997
 Q_{2003} = monthly expenditure on transport in the year 2003

$$\begin{aligned} \frac{Q_{2003}}{Q_{1997}} \times 100 &= 110 \\ \frac{Q_{2003}}{Q_{1997}} &= \frac{110}{100} \\ &= 1.1 \end{aligned}$$

$$\begin{aligned} \frac{Q_{1997}}{Q_{1992}} \times 100 &= 180 \\ \frac{Q_{1997}}{Q_{1992}} &= \frac{180}{100} \\ &= 1.8 \end{aligned}$$

Consumer price index of food in the year 2003 based on the year 1992

$$\begin{aligned} &= \frac{Q_{2003}}{Q_{1992}} \times 100 \\ &= \frac{Q_{2003}}{Q_{1997}} \times \frac{Q_{1997}}{Q_{1992}} \times 100 \\ &= 1.1 \times 1.8 \times 100 \\ &= 198 \end{aligned}$$

18.

- (a) (i) Let the price of ingredient B in the year 2002 = b

$$\begin{aligned} \frac{59}{b} \times 100 &= 146 \\ b &= \frac{59 \times 100}{146} \\ &= \text{RM}40.41 \end{aligned}$$

(ii) Given $I_{\frac{2005}{2002}} = 108$ and $I_{\frac{2002}{2000}} = 122$

$$\frac{P_{2005}}{P_{2002}} = 1.08 \text{ and } \frac{P_{2002}}{P_{2000}} = 1.22$$

$$\begin{aligned} \text{Hence, } I_{\frac{2005}{2000}} &= \frac{P_{2005}}{P_{2000}} \times 100 \\ &= \frac{P_{2005}}{P_{2002}} \times \frac{P_{2002}}{P_{2000}} \times 100 \\ &= 1.08 \times 1.22 \times 100 \\ &= 131.8 \end{aligned}$$

(b) (i) $\frac{146 \times 55 + 148 \times 100 + 108 \times 110 + 95x}{55 + 100 + 110 + 95} = 136$

$$\frac{34710 + 95x}{360} = 136$$

$$34710 + 95x = 48960$$

$$95x = 14250$$

$$x = 150$$

(ii) Let the cost of one unit of the food in the year 2002 = RM y

$$\frac{27.20}{y} \times 100 = 136$$

$$\begin{aligned} y &= \frac{27.20 \times 100}{136} \\ &= \text{RM}20.00 \end{aligned}$$

19.

(a) For orange,

$$\frac{P_{2005}}{P_{2001}} = 1.54 \text{ and } \frac{P_{2005}}{P_{2004}} = 1.1$$

$$\begin{aligned} \text{Hence, } p &= \frac{P_{2004}}{P_{2001}} \times 100 \\ &= \frac{P_{2004}}{P_{2005}} \times \frac{P_{2005}}{P_{2001}} \times 100 \\ &= \frac{1}{\frac{P_{2005}}{P_{2004}}} \times \frac{P_{2005}}{P_{2001}} \times 100 \\ &= \frac{1}{1.1} \times 1.54 \times 100 \\ &= 140 \end{aligned}$$

For banana,

$$\frac{P_{2004}}{P_{2001}} = 0.9 \text{ and } \frac{P_{2005}}{P_{2004}} = 1.5$$

$$\begin{aligned} \text{Hence, } q &= \frac{P_{2005}}{P_{2001}} \times 100 \\ &= \frac{P_{2005}}{P_{2004}} \times \frac{P_{2004}}{P_{2001}} \times 100 \end{aligned}$$

$$= 1.5 \times 0.9 \times 100$$

$$= 135$$

For papaya,

$$I \frac{2004}{2001} = 120 \Rightarrow \frac{P_{2004}}{P_{2001}} \times 100 = 120$$

$$\frac{P_{2004}}{P_{2001}} = 1.2$$

$$I \frac{2005}{2001} = 162 \Rightarrow \frac{P_{2005}}{P_{2001}} \times 100 = 162$$

$$\frac{P_{2005}}{P_{2001}} = 1.62$$

$$\text{Hence, } r = I \frac{2005}{2004} = \frac{P_{2005}}{P_{2004}} \times 100$$

$$= \frac{P_{2005}}{P_{2001}} \times \frac{P_{2001}}{P_{2004}} \times 100$$

$$= \frac{P_{2005}}{P_{2001}} \times \frac{1}{\frac{P_{2004}}{P_{2001}}} \times 100$$

$$= 1.62 \times \frac{1}{1.2} \times 100$$

$$= 135$$

$$(b) \bar{I} = \frac{150 \times 4 + 110 \times 1 + 135 \times 8}{4 + 1 + 8}$$

$$= \frac{1790}{13}$$

$$= 137.7$$

20.

$$(a) \text{ For raw material } E, \frac{x}{2.50} \times 100 = 108$$

$$x = \frac{2.50 \times 108}{100}$$

$$= 2.70$$

$$\text{For raw material } D, \frac{21.35}{17.50} \times 100 = y$$

$$y = 122$$

$$\text{For raw material } B, \frac{23.85}{z} \times 100 = 150$$

$$z = \frac{23.85 \times 100}{150}$$

$$= 15.90$$

$$\begin{aligned} \text{(b)} \quad \bar{I} &= \frac{124 \times 16 + 150 \times 46 + 150 \times 11 + 122 \times 11 + 108 \times 16}{16 + 46 + 11 + 11 + 16} \\ &= \frac{13604}{100} \\ &= 136 \end{aligned}$$

(c) Let the total monthly cost in the year 2003 = p

$$\begin{aligned} \frac{p}{1.3} \times 100 &= 136 \\ p &= \frac{136 \times 1.3}{100} \\ &= \text{RM}1.77 \text{ million} \end{aligned}$$

$$\begin{aligned} \text{(d)} \quad \bar{I}_{\frac{2005}{2002}} &= 136 \times \frac{140}{100} \\ &= 190.4 \end{aligned}$$