Big Question: How is inflation calculated?

Syllabus ref: 2.3 HL Syllabus Item 97 Calculation of Inflation

What is inflation?

Inflation is a consistent rise in the average price level (basket in Germany = 700 goods and services) and the increases in prices are sustained over time. It measures average changes in price level:

Visit www.destatis.de to learn about how the Bundesamt for Statistics measures inflation in Germany.

Problems measuring inflation rate in an economy:
1. basket measures 'average household'
2. 'errors' in data collection e.g. use of samples (cannot measure all products on the market)
3. 'quality' changes may not be taken into account
4. 'volatility' in some sectors eg oil – prices change twice daily + spikes
5. cpi is one view of inflation but there are other indices e.g. ppi

see Blink pp 213-214

Example:
If basket price increases from 70 (base year price) to 77 use the formula opposite to calculate the % change. In this case it is 77/70*100 = 110. The index then increases from 100 to 110. Inflation has increased by 10%. See IBO examples below.
You are asked to use weights but these will be given to you

How to calculate inflation rate?

1. Find the base period. This is =100 i.e. the index for the basket in the base year
2. Find the value of the basket. If given weights (composite price index) then multiply each good by the weight and add up the cost of the basket
3. You have just calculated a composite/weighted price index
4. Income is weighted according to how much of the good is bought or % of income spend on the good = composite price index
5. Be careful to answer the question. Are you asked to calculate the new index or find the inflation rate durin the period. Study examples below from 2015 November and 2016November to understand this.

Box 1: Price Level: how is inflation measured?

⊙ **To express any number as an index or a % of another number do the following:**

$$\frac{1) \quad \text{new price (basket)}}{2 \;) \text{ base year (original/price basket)}} \times 100$$

Note:

You will be asked to calculate the weighted or composite price index so you have to multiply the prices given by the weight. Two IBO examples below will help you to understand how the weighting influences how a basket of goods is calculated.

Inflation Calculation November 2015

3. In Aceland, the "typical basket of goods" purchased by the average consumer consists of 48 pizzas, 120 litres of chocolate milk and 18 jazz concerts. The following table shows the prices for these products in 2013 and 2014.

Table 1

	Price per unit in dollars ($)	
	2013	2014
Pizza	12.50	12.90
Chocolate milk (litres)	1.15	1.25
Jazz concert	45.00	46.00
Total cost of the typical basket		

(a) (i) Calculate the cost of this basket in 2013 and 2014. Enter your answers in Table 1. [2]

(ii) Using your results from part (a)(i), calculate a consumer price index (CPI) with 2013 as the base year. [1]

3.   (a)   (i)   Calculate the cost of this basket in 2013 **and** 2014. Enter your answers in
Table 1.   **[2]**

	Price per unit in Aceland dollars ($)	
	2013	2014
Pizza	12.50	12.90
Chocolate milk (litres)	1.15	1.25
Jazz concert	45.00	46.00
Total cost of the typical basket	1548.00	1597.20

$(12.50 \times 48) + (1.15 \times 120) + (45 \times 18) = 1548.00$ **[1]**
$(12.90 \times 48) + (1.25 \times 120) + (46 \times 18) = 1597.20$ **[1]**

Dollar sign is not required
Workings are not required

   (ii)   Using your results from part (a)(i), calculate a consumer price index (CPI)
with 2013 as the base year.   **[1]**

$\dfrac{1597.2}{1548} \times 100 = 103.18$ **[1]**

OFR applies
Workings are not necessary.

Inflation Calculation November 2016

3. The following information provides a simplified version of the calculation of a consumer price index (CPI).

In Country A, the rate of inflation is measured by the calculation of a CPI. The index is calculated using the five products which are purchased by citizens of Country A as representative of a "typical basket of goods".

The weighting given to each product is based on the quantities of each product purchased by the average household in Country A per week.

Table 1

Product	Average price per unit in dollars ($)		Quantity of each product purchased by the average household per week
	2015	2016	
A	5.60	6.30	25
B	3.45	3.50	18
C	1.20	1.05	40
D	8.40	9.20	5
E	2.55	2.35	12

Assume that 2015 is the base year for the purpose of calculating the CPI.

(a) Calculate the consumer price index (CPI) for Country A in 2016. [3]

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Answer Inflation Calculation November 2016

3. (a) Calculate the consumer price index (CPI) for Country A in 2016. **[3]**

In 2015, the typical basket costs
$$5.6 \times 25 + 3.45 \times 18 + 1.2 \times 40 + 8.40 \times 5 + 2.55 \times 12 = 322.70$$
[1]

In 2016, the typical basket costs
$$6.3 \times 25 + 3.5 \times 18 + 1.05 \times 40 + 9.20 \times 5 + 2.35 \times 12 = 336.70$$
[1]

Any valid working is sufficient for [1].

The CPI in $2016 = \dfrac{336.70}{322.70} \times 100$

$= 104.34$
[1]

An answer of 104.34 without workings is sufficient for [1].
OFR applies, assuming that the correct method of calculating the cost of the baskets is applied.

See HL 3 2016 Q3 for example. See sample answer below. In this case you are multiplying the price by the weight to get the price index. Then divide the new by the old and multiply by 100 to get the index i.e. 104.34

See German inflation indices below: Index numbers are calculated for each of the categories of good in the basket of goods used to calculate the inflation index.

Verbraucherpreisindex für Deutschland August 2017

Gesamtindex / Teilindex	Gewichtung	Index 2010 = 100	Veränderung gegenüber Vorjahreszeitraum	Veränderung gegenüber Vormonat
	in ‰		in %	
Gesamtindex	1 000,00	109,5	1,8	0,1
Nahrungsmittel und alkoholfreie Getränke	102,71	115,7	2,8	− 0,2
Nahrungsmittel	90,52	115,9	3,0	− 0,2
Fleisch und Fleischwaren	20,76	115,9	2,6	0,2
Obst	8,76	128,1	0,5	0,1
Gemüse	11,26	102,5	− 4,5	− 2,2
Alkoholische Getränke und Tabakwaren	37,59	119,8	2,8	0,1
Bekleidung und Schuhe	44,93	105,9	2,7	2,5
Wohnung, Wasser, Strom, Gas und andere Brennstoffe	317,29	109,6	1,6	0,1
Nettokaltmiete	209,93	109,9	1,7	0,1
Haushaltsenergie	68,19	108,8	1,4	0,2
Strom	26,21	128,1	2,0	0,1
Gas	14,46	103,3	− 2,9	0,1
Leichtes Heizöl	11,11	81,9	10,4	1,9
Möbel, Leuchten, Geräte und anderes Haushaltszubehör	49,78	104,0	0,5	− 0,2
Gesundheitspflege	44,44	107,3	1,8	0,1
Verkehr	134,73	107,5	2,7	0,4
Kraftstoffe	38,37	94,0	3,9	0,9
Superbenzin	28,38	94,8	3,6	0,7
Dieselkraftstoff	9,19	92,1	4,8	1,3
Nachrichtenübermittlung	30,10	89,6	− 0,6	0,1
Freizeit, Unterhaltung und Kultur	114,92	111,1	1,6	− 0,4