U4D3_T Understanding Indices

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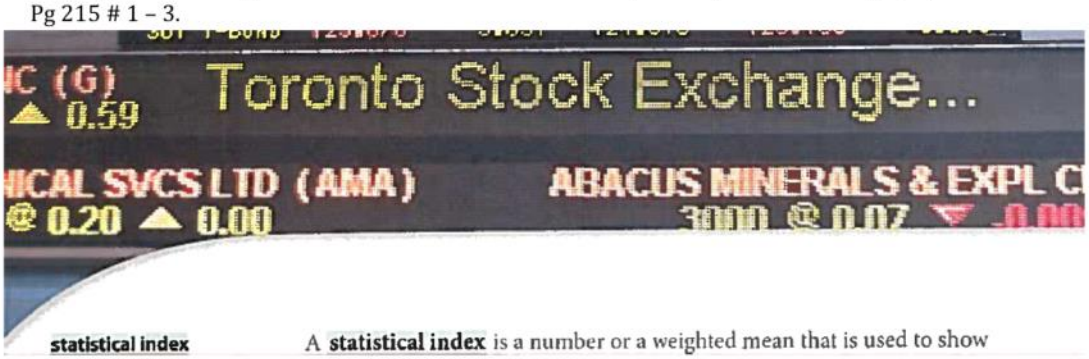
U4D3 Understanding Indices Page 1

Statistical Index (plural "Indices"): is a number or weighted mean that is used to show how something has changed over time compared to a base value. (Without the need of the percent change formula)

1. Read Pg 214 Investigate...The Consumer Price Index. Then, on a separate sheet of paper, answer Pg 215 # 1 – 3.



statistical index
- a weighted mean used to show change over time
- change is measured with respect to a base period

A **statistical index** is a number or a weighted mean that is used to show how the individual statistics or components of an index have changed as a whole. Indices are used to quantify trends. Most indices use a base value of 100 to make the figures easier to work with. Indices are used to report on numerous variables, including consumer prices, stock prices, customer satisfaction, and human development.

Investigate

Literacy Connect

Historically, the plural of index is *indices*. Modern usage allows the plural of index to be *indexes*, except in mathematics.

The Consumer Price Index

The Consumer Price Index (CPI) is a measure of the changes in price of a group of consumer goods and services used by Canadians, such as milk, telephone services, and transportation. It is a widely used indicator of inflation, which is the overall increase in prices over a period of time. The CPI was established in the early 1900s using the prices of 29 food items in major cities. Now, there are more than 600 items in the index.

Each item is given a weighting factor based on the average annual spending per household on the item. Prices of most items are adjusted monthly, while others are adjusted quarterly (such as hair styling) or annually (such as property taxes) based on the general frequency of price changes of the items. These adjustments are based on over 60 000 monthly price quotes from across the country.

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1. The graph shows the CPI and the weighting factors for 2002.

Source: Statistics Canada, CANSIM tables 326-0009, 326-0012, 326-0015, 326-0020 to 326-0022

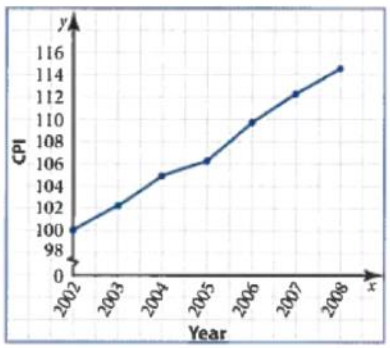
a) In 1992, clothing and footwear had a weighting factor of 6.60%. Why would the factor be changed in 2002?

b) Food is more necessary than transportation. Why might it have a lower weighting factor than transportation?

c) If there were a 5% increase in the cost of shelter, how would it affect the CPI?

d) If there were a 2% increase in the cost of health and personal care, how would it affect the CPI?

2. The graph shows the value of the CPI since 2002 for the month of May.



Source: Bank of Canada

a) Explain what is meant by 2002 = 100.

b) Describe the general trend in the CPI.

c) Which one-year span had the greatest increase in the CPI?

d) Which one-year span had the least increase in the CPI?

e) By what percent have prices increased between 2002 and 2007?

f) By what percent have prices increased between 2002 and 2008?

g) By what percent have prices increased between 2007 and 2008?

3. **Reflect** How can you use CPI data to describe the change in the cost of living?

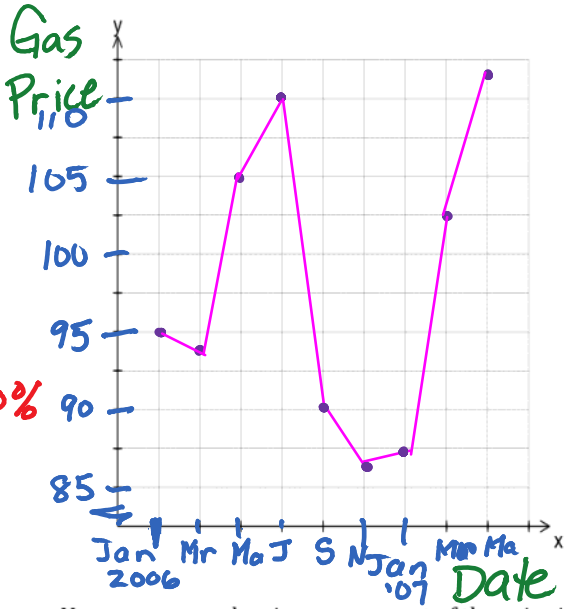
2. Graph the data in this table:

Date	Gas Price (¢/litre)	% of Jan 2006
Jan 2006	95.0	100
Mar 2006	93.3	98.2
May 2006	104.6	110.1
July 2006	109.7	115
Sept 2006	89.7	94
Nov 2006	86.5	91
Jan 2007	87.1	92
Mar 2007	102.4	108
May 2007	111.5	117

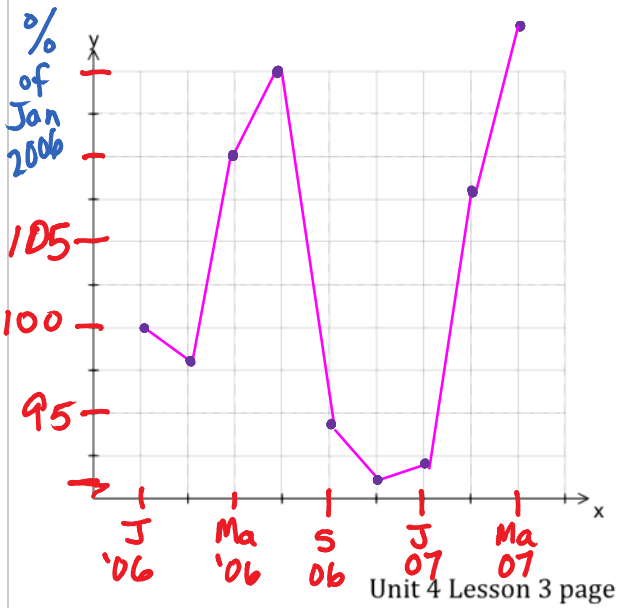
Base

$\frac{93.3}{95} \times 100\% = 98.2\%$

$\frac{104.6}{95.0} \times 100\% = 110.1\%$



Now express each price as a percent of the price in January 2006 and graph the new data on the graph to the left.



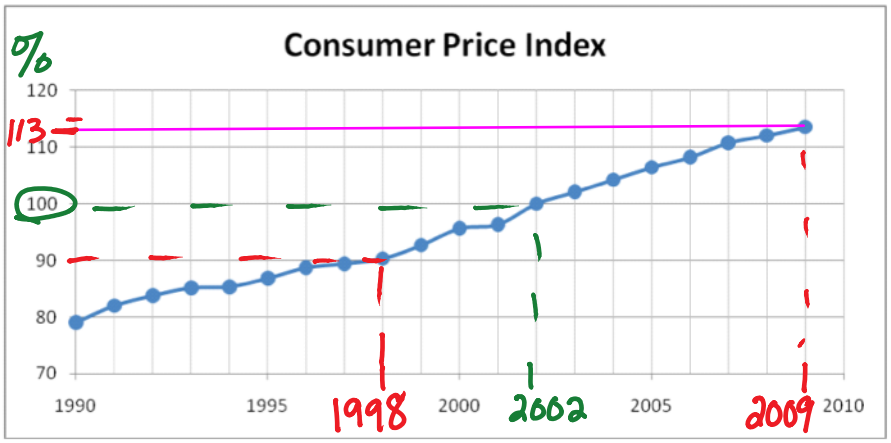
- What is similar between the two graphs?
  - shape
  - max/mins, slopes are similar
- What does the second graph show that the first one does not?
  → we see % change from Jan 2006 without using the percent Change Formula.

Indices: JAN '06 is the base month because it is at 100%.

An index describes the value of a certain variable **compared** to a **base value** measured at a particular time or location.

Examples:

One of the most widely used indices is the Consumer Price Index (CPI). The CPI is calculated by taking thousands of price quotations from across the country for a "basket" of about 600 popular goods and services. The total price of these items at any point in time is **compared** to the price of the same items in the **base year**.



Questions:

1. What is the base year for the CPI? 2002 because it is at 100%.
2. In what year was the cost of the basket of goods approximately 90% of the price of the base cost? 1998
3. What was the CPI in 2009? What does this number represent?
   113 Goods cost 13% more in 2009 than in 2002
   (OR) In 2009 goods cost 113% of what they were in 2002.
4. If your household spent $2000 on goods and services in 2002, what would you expect to pay for the same goods and services in 2009?
   $2000 \times 113\%$
   $= 2000 \times 1.13$
   $= 2260$
   ∴ you would expect to pay $2260 in 2009.
5. If your household spent $2000 on goods and services in 1990, what would you expect to pay for the same goods and services in 2009? Neither is base year.
   * have to use % change formula.
   1990 → 80%
   2009 → 113%

   $\text{Percent change} = \frac{\text{New} - \text{Old}}{\text{old}} \times 100\%$
   $= \frac{113 - 80}{80} \times 100\%$
   $= \frac{33}{80} \times 100\%$
   $= 41.25\%$

   $2000 \times 141.25\%$
   $= 2000 \times 1.4125$
   $= \$2825$

Other Indices

There are other indices that are often used in finance and other applications.

Examples include:

TSX (Toronto Stock Exchange)
UVI (Ultra-Violet Index)
FPPI (Farm Product Price Index)
AQHI (Air Quality Health Index)

Practice pg 218 #1,2,3,5,8,9 Answers Page 549