4.2

Statistical Indices

Student Text Pages
214–225

Suggested Timing
80 min

Tools
- scientific calculators

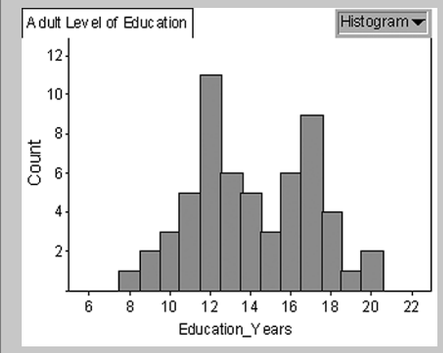
Related Resources
BLM 4-5 Section 4.2 Statistical Indices

Link to Prerequisite Skills

Students should complete Measures of Central Tendency in the Prerequisite Skills before proceeding with this section.

Warm-Up

The graph shows the education levels of 60 randomly selected Canadians.



a) What percent of those surveyed have 12 years of education?
b) What percent of those surveyed have less than 10 years of education?
c) What percent of those surveyed have more than 12 years of education?

Warm-Up Answers

a) 18.3%
b) 5%
c) 60%

Teaching Suggestions

- It might be helpful to have students list the name and corresponding short form of each index in this section. Ensure that students understand what each index represents. Discuss these indices with the class if clarification is needed.
- As an extension, have students find the current level of one of the indices described in this section. Students could compute the percent change from the most recent value given in the textbook to the current value and then write a brief report of their findings.

Warm-Up

- Display the Warm-Up question. Have students complete the question independently. Then, discuss the solutions as a class.

Section Opener

- Read the definition of statistical index and provide examples such as stock market indices, the Consumer Price Index (CPI), or the Air Quality Health Index (AQHI).

Investigate

- This Investigate introduces the CPI, which also appears in the questions for this section.
- It may be helpful to have students work in pairs as they complete the Investigate.
- Discuss Investigate answers as a class.

Investigate Answers (pages 214–215)

1. a) Over the years, the average price of certain goods might increase or decrease. If the cost of footwear and clothing has gone down relative to the average household's income, it would be reasonable to lower the weighting factor for those goods.

b) The weighing factors for goods are not based on their level of importance but on the average household's annual spending on those goods. Since households tend to spend more on transportation than food, it makes sense that transportation would have a higher weighing factor.

c) The CPI would go up if the cost of shelter were to increase by 5%. Since the cost of shelter is only 26.2% of the CPI, the increase in the CPI would be less than 5%.

d) The CPI would go up if the cost of health and personal care were to increase by 2%. Since the cost of health and personal care is only 4.73% of the CPI, the increase in the CPI would be less than 2%.

2. a) It means that the scale is set so that the value of the CPI in 2002 is equal to 100, and all other values are scaled accordingly.

b) The CPI is increasing.

c) In 2005 to 2006, the CPI had the greatest increase.

d) In 2004 to 2005, the CPI had the least increase.

e) approximately 12%

f) approximately 15%

g) approximately 2%

3. An increase in the CPI generally reflects an increase in the cost of living. However, inflation should also be considered.

Examples

- Example 1 follows the fluctuations of the Toronto Stock Exchange (TSX) Composite Index, a weighted average of the most influential stocks on the TSX. This is a good opportunity to consolidate learning of percent and percent change.
- Discuss the meaning of *stock index* in the **Literacy Connect** for Example 1.
- Example 2 focuses on the Farm Product Price Index (FPPI) as a weighted mean, a follow-up to section 4.1.

Key Concepts

- Review the Key Concepts as a class.

Discuss the Concepts

- **Question D1** allows you to assess students' mathematical understanding of an index.
- **Question D2** encourages students to design their own components and weightings for an index.

Discuss the Concepts Suggested Answers (page 218)

D1. The claim means that the TSE index has a greater weighting assigned to resource stocks than to other types of stocks, which makes changes in resource stocks have a greater effect on index value than changes in other types of stocks. The NYSE index has a greater weighting assigned to industrial stocks, and so the NYSE index is more sensitive to changes in the values of industrial stocks.

D2. The components could be quality of doctors, services available, cost of services, success rates in major operations, and wait times. The weighting for these components could be 25, 15, 15, 30, and 15.

Practise (A)

- You may wish to have students work in pairs or small groups to complete the Practise questions.
- Encourage students to refer to the Examples before asking for assistance.
- The **Literacy Connect** for **question 2** provides a link for students interested in learning more about the Air Quality Health Index. Students could write a journal entry or a short presentation.

Apply (B)

- For **question 5**, students who are not familiar with brands of cars may need help identifying new car dealers.
- For **question 7, part b)**, students will first need to multiply the 2002 value of the stock by approximately 114.5%, or 1.145.
- In **question 8**, students may mistakenly assume that a negative slope means a reduction in tuition fees, rather than a smaller percent increase in cost. Remind them that fees were still rising, just not as quickly.
- **Question 9** links to the Chapter Problem. Remind students to keep the solution to this question handy as it may help them with the Chapter Problem Wrap-Up.

Extend (C)

- Assign the Extend question to students who are not being challenged by the Apply questions.
- **Question 13** may make an interesting assignment or group project. Students can make posters to illustrate SPFs.

Literacy Connect

- Have one or two students read the section opener out loud and discuss the meaning of the term *index.* Refer to the Literacy Connect on page 214 and point out that there are two ways to write the plural of index.
- Have one or two students read the introduction to the Investigate and then discuss the meaning of the CPI. Ensure students understand what is expected of them in the Investigate.
- Encourage students to continue adding new terms to their personal math dictionaries.
- Allow students to work in pairs so they can assist each other in completing the questions.

Common Errors

- Some students may have difficulty understanding base index values that are set to 100.

R_x Remind students that a value of 100 is an easy starting point, and allows for an easy conversion to percent change as the index changes. An index reading of 115 means 115% of the reference value, and corresponds to an increase of 15%.

- Some students may have difficulty when calculating percent changes involving indices.

R_x Refer students to section 4.1, **Example 2**.

Accommodations

Language—provide a partner to assist with reading the **Investigate**

Spatial—provide additional scaffolding for the **Examples**

Perceptual—have students use the Internet to research the TSX Index, the Farm Product Price Index, the Air Quality Health Index, the Canadian Customer Commitment Index, or the UV Index. Have them share the information using a Jigsaw format.

ESL—provide a partner to assist students when completing the Investigate, and to help students read and understand the Examples and Practise questions. Have students add new terms to their personal math dictionaries.

Mathematical Process Expectations

Process Expectation	Questions
Problem Solving	11, 13
Reasoning and Proving	1, 2, 4, 8–10
Reflecting	2, 4, 5, 7, 8, 11
Selecting Tools and Computational Strategies	6, 7
Connecting	2, 4, 6–13
Representing	13
Communicating	1, 2, 4, 8, 9, 11–13

Extra Practice

- Use **BLM 4-5 Section 4.2 Statistical Indices** for remediation or extra practice.