

Chapter 1 – Performing Operations and Evaluating Expressions
Section 5 – Change in a Quantity and Subtracting Real Numbers

Objectives

1. Find the change in a quantity.
2. Subtract real numbers.
3. Find a change in elevation.
4. Determine the sign of the change for an increasing or decreasing quantity.

Vocabulary

1. change in quantity

Opening/PurposeLesson/Activity

OBJECTIVE 1 – Find the change in a quantity.

1. a. If the price of a basket of strawberries increases from \$2 to \$5, find the change in the price.
b. Write a difference that is related to the computation in Part (a).

Change in a Quantity

The **change in a quantity** is the ending amount minus the beginning amount:

$$\text{Change in the quantity} = \text{Ending amount} - \text{Beginning amount}$$

2. The revenues of Facebook are shown in the following table for various years.
a. For the period 2009 – 2013, find the changes in annual revenue from one year to the next.

Facebook Revenue	
Year	(billions of dollars)
2009	0.78
2010	1.97
2011	3.71
2012	5.09
2013	7.87

Source: Facebook

- b. From which year to the next did the annual revenue increase the most?

OBJECTIVE 2– Subtract real numbers.

3. The volume of gasoline in a car's gasoline tank decreases from 6 gallons to 2 gallons.
a. What is the change in the volume of gasoline in the tank?
b. Write a difference that is related to the computation in Part (a).
c. From Part (b), we found that $2 - 6 = -4$. Find $2 + (-6)$.
d. Explain why we can conclude that $2 - 6 = 2 + (-6)$.

Subtracting a Real Number

$$a - b = a + (-b)$$

4. $3 - 7$

5. $-2 - 8$

6. $\frac{2}{9} - \frac{8}{9}$

7. The temperature increases from -3°F to 2°F .
- Find the change in temperature.
 - Write a difference that is related to the work in Part (a).
 - Find the difference obtained in Part (b) by using the rule $a - b = a + (-b)$.
8. $5 - (-2)$ 9. $-6 - (-1)$ 10. $\frac{2}{7} - \left(-\frac{3}{7}\right)$
11. Translate the sentence "Subtract the number from 5." into a mathematical expression. Then evaluate the expression for $x = -3$. Evaluate.
12. $-5 + (-4)$ 13. $4 - 11$ 14. $-9 - 7$ 15. $-\frac{2}{5} - \frac{7}{10}$
16. $2.5 + (-7.1)$ 17. $62 - (-95)$ 18. $\frac{7}{12} - \frac{11}{15}$ 19. $46 + (-11)$

OBJECTIVE 3 – Find a change in elevation.

20. The lowest elevation in Louisiana is in Eastern New Orleans (-8 ft.), and the highest elevation is at the top of Driskill Mountain (535 ft.). Find the change in elevation from Eastern New Orleans to Driskill Mountain.

OBJECTIVE 4 – Determine the sign of the change for an increasing or decreasing quantity.

Changes of Increasing and Decreasing Quantities

An increasing quantity has a positive change.

A decreasing quantity has a negative change.

21. The number of movies shot in Georgia are shown in the following table for various years.

Year	Number of Movies Shot in Georgia
2004	10
2005	9
2006	12
2007	9
2008	11
2009	17
2010	17
2011	23
2012	24
2013	22

Source: Georgia Film, Music, and Digital Entertainment Office

- Find the change in the number of movies shot in Georgia from 2006 to 2007.
- In 2008, Georgia increased the tax incentives to shoot movies in the state. Find the change in the number of movies shot in Georgia from 2008 to 2013.

Homework/Assessment

HW 1, 3, 5, 15, 19, 33, 47, 53, 57, 61, 65, 73, 79, 81, 85