

Name

Tonya [REDACTED]

Date:

Fall 2023 Semester

Instructor:

Samuel Chukwuemeka

Project:

Number Theory Application: Check Digits for International Standard Book Numbers (ISBNs)

Book Title:

Introduction to Contemporary Education: New Horizons

Copyright Year, Edition, and ISBNs:

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2nd Edition

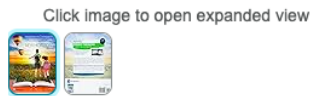
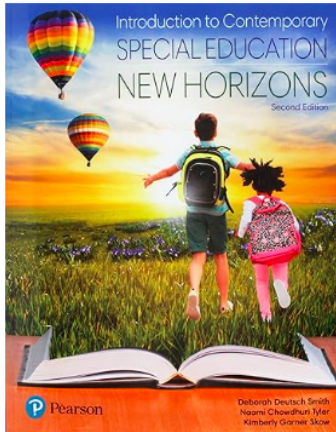
ISBN-10: 0134895088

ISBN-13: 978-0134895086

Objectives:

- (1.) Verify the check digit for ISBN-10
- (2.) Verify the check digit for ISBN-13
- (3.) Convert ISBN-10 to ISBN-13
- (4.) Convert ISBN-13 to ISBN-10

Calculations:



Introduction to Contemporary Special Education: New Horizons 2nd Edition

by Deborah Smith (Author), Naomi Tyler (Author), Kimberly Skow (Author)

4.6 ★★★★★ 243 ratings

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ISBN-10	ISBN-13	Edition	Publisher	Publication date
0134895088	978-0134895086	# 2nd	Pearson	March 1, 2018

Objective 1: Verify the check digit for ISBN-10

Given: 0134895088

Approach: Multiplication-Modulo-Subtraction Approach

$$0 \times 10 = 0$$

$$1 \times 9 = 9$$

$$3 \times 8 = 24$$

$$4 \times 7 = 28$$

$$8 \times 6 = 48$$

$$9 \times 5 = 45$$

$$5 \times 4 = 20$$

$$0 \times 3 = 0$$

$$8 \times 2 = 16$$

Sum of the Products

$$0 + 9 + 24 + 28 + 48 + 45 + 20 + 0 + 16 = 190$$

Sum divided by Modulo

$$190 \div 11 = 17 \text{ Remainder } 3$$

Modulo – Remainder

$$11 - 3 = 8$$

This is the correct check digit.

Objective 2: Verify the check digit for ISBN-13

Given: 978-0134895086

Approach: Multiplication-Modulo-Subtraction Approach

$$9 \times 1 = 9$$

$$7 \times 3 = 21$$

$$8 \times 1 = 8$$

$$0 \times 3 = 0$$

$$1 \times 1 = 1$$

$$3 \times 3 = 9$$

$$4 \times 1 = 4$$

$$8 \times 3 = 24$$

$$9 \times 1 = 9$$

$$5 \times 3 = 15$$

$$0 \times 1 = 0$$

$$8 \times 3 = 24$$

Sum of the Products

$$9 + 21 + 8 + 0 + 1 + 9 + 4 + 24 + 9 + 15 + 0 + 24 = 124$$

Sum Divided by 10

$$124 \div 10 = 12 \text{ Remainder } 4$$

Modulo – Remainder

$$10 - 4 = 6$$

This is the correct check digit.

Objective 3: Convert ISBN-10 to ISBN-13

Given: 0134895088

Step 1: Remove check digit: 013489508

Step 2: Append 978: 978013489508

Step 3: Calculated check digit in 2nd objective. The check digit is 6.

ISBN-13: 9780134895086

Objective 4: Covert ISBN-13 to ISBN-10

Given: 9780134895086

Step 1: Remove the check digit: 978013489508

Step 2: Remove the 978: 013489508

Step 3: Calculated check digit in 1st objective. The check digit is 8.

ISBN-10: 0134895088

References (MLA9):

Chukwuemeka, Samuel. "Number Theory Application: Check Digits for ISBN." *Mathematics Education Courses*, 2023, mathematicseducation.appspot.com/.

Smith, Deborah Deutsch, et al. *Introduction to Contemporary Special Education: New Horizons*. 2nd ed., Pearson, 2018.