Task Analysis Report

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Task Analysis

Among the students I tutor, several concepts in mathematics repeatedly emerge as

problem areas: integer operations, order of operations, converting between fractions, decimals

and percents, and word problems. The task analysis, along with the defined objectives, will

focus on the foundational concepts related to those problem areas. Word problems will not be a

topic of its own, but will be incorporated into the objectives for each of the other three areas.

I. Integer Operations
    A. Integer Addition (concept)
        1. Adding integers with the same signs (procedure)
            a) Add the absolute values of the integers (procedure)
                (1) Absolute value = the distance a number is from zero on the
                    number line (fact)
                (2) Absolute value = "the magnitude of a number without a sign"
                    (fact) (Kaplan, 2015, p. 126)
                (3) The absolute value of any number is always positive (fact)
            b) Keep the common sign for the sum (procedure)
        2. Adding integers with different signs (procedure)
            a) Determine the absolute values of the two integers (procedure)
                (1) Absolute value = the distance a number is from zero on the
                    number line (fact)
                (2) Absolute value = "the magnitude of a number without a sign"
                    (fact) (Kaplan, 2015, p. 126)
                (3) The absolute value of any number is always positive (fact)
            b) Subtract the smaller absolute value from the larger absolute value
              (procedure)
            c) Use the sign of the number with the greater absolute value for the
              difference (procedure)
    B. Integer Subtraction (concept)
        1. Adding the opposite (concept)
            a) Keep the first number; do not change it in any way (procedure)
            b) Change the subtraction sign to an addition sign (procedure)
            c) Change the sign of the second number (procedure)
            d) Follow the procedures for integer addition (procedure)
    C. Integer Multiplication (concept)
        1. Multiplying integers with the same signs (procedure)
            a) Multiply the values of the integers (procedure)
            b) Make the product a positive number (procedure)
                 (1) Product = The result of multiplying two numbers (fact)
        2. Multiplying integers with different signs (procedure)
            a) Multiply the values of the integers (procedure)

     b) Make the product a negative number (procedure)
       (1) Product = The result of multiplying two numbers (fact)
  D. Integer Division (concept)
    1. Dividing integers with the same signs (procedure)
     a) Divide the dividend by the divisor (procedure)
     b) The divisor cannot be 0 (rule)
       (1) Dividend = the number before the division symbol (fact)
       (2) Divisor = the number after the division symbol (fact)
       (3) Quotient = the result obtained by doing division (fact)
     c) Make the quotient a positive number (procedure)
    2. Dividing integers with different signs (procedure)
     a) Divide the dividend by the divisor (procedure)
     b) The divisor cannot be 0 (rule)
       (1) Dividend = the number before the division symbol (fact)
       (2) Divisor = the number after the division symbol (fact)
       (3) Quotient = the result obtained by doing division (fact)
     c) Make the quotient a negative number (procedure)

II. Order of Operations
  A. Perform the operations in parentheses (procedure)
  B. Evaluate the numbers with exponents (procedure)
  C. Perform multiplication and division operations (procedure)
    1. Work from left to right (rule)
  D. Perform addition and subtraction operations (procedure)
    1. Work from left to right (rule)
  E. PEMDAS (concept)
    1. P = Parenthesis (fact)
    2. E = Exponents (fact)
    3. MD = Multiplication and Division (fact)
    4. AS = Addition and Subtraction (fact)

III. Converting Between Fractions, Terminating Decimals, and Percents
  A. Converting between Fractions and Terminating Decimals (procedure)
    1. Changing a fraction to a decimal (procedure)
     a) Divide the numerator by the denominator (procedure)
       (1) Numerator = top number of a fraction (fact)
       (2) Denominator = bottom number of a fraction (fact)
    2. Changing a decimal to a fraction (procedure)
     a) Write the decimal number without the decimal point as the numerator
       (1) Numerator = top number of a fraction (fact)
     b) Determine the place value name of the last decimal digit on the right
      (procedure)
     c) Write the number associated with that place value as the denominator
      (procedure)
       (1) Denominator = bottom number of a fraction (fact)
     d) Reduce to lowest terms (procedure)

      (1) "A fraction is reduced to lowest terms when the two terms do not have any common factor except 1." (fact) (Kaplan, 2015, p. 49)

      (2) Divide both the numerator and denominator by the same number, also known as the common factor, until it is reduced to lowest terms. (procedure)

B. Converting between Decimals and Percents (procedure)

  1. Changing a decimal to a percent (procedure)

    a) Move the decimal point two places to the right and add the percent symbol to the right of the last digit.

  2. Changing a percent to a decimal (procedure)

    a) Remove the percent symbol and move the decimal point two places to the left. (procedure)

C. Converting between Fractions and Percents (procedure)

  1. Changing a fraction to a percent (procedure)

    a) Divide the numerator by the denominator (procedure)

      (1) Numerator = top number of a fraction (fact)

      (2) Denominator = bottom number of a fraction (fact)

    b) Move the decimal point two places to the right and add the percent symbol to the right of the last digit. (procedure)

  2. Changing a percent to a fraction (procedure)

    a) Remove the percent symbol and write the numerical value of the percent as the numerator (procedure)

      (1) Numerator = top number of a fraction (fact)

    b) Write 100 as the value of the denominator (procedure)

      (1) Denominator = bottom number of a fraction (fact)

    c) Reduce to lowest terms (procedure)

      (1) "A fraction is reduced to lowest terms when the two terms do not have any common factor except 1." (fact) (Kaplan, 2015, p. 49)

      (2) Divide both the numerator and denominator by the same number, also known as the common factor, until it is reduced to lowest terms. (procedure)

Objectives	Domain	Level	Content Structure	Performance
	Psychomotor Affective Cognitive	(Imitation, Manipulation, Precision, and Articulation) (Receiving, Responding, Valuing, Organizing, and Characterizing) (Remembering, Understanding, Applying, Analyzing, Evaluating, and Creating)	Fact Concept Rules/Principles Procedures Attitudes Interpersonal	Recall Application
Topic/Task 1: Integer Operations				
1.0 Given any combination of integers and operations, the learner will accurately evaluate the expressions.	Cognitive	Evaluating	Rules / Procedures	Application
1.1 The learner will display a willingness to learn the procedures associated with integer operations.	Affective	Receiving / Responding	Attitude	Application

1.2	The learner will define key vocabulary terms: *integer, absolute value, sum, difference, product, dividend, divisor, quotient.*	Cognitive	Remembering	Fact	Recall
1.3	The learner will demonstrate how to solve integer addition problems.	Cognitive	Understanding / Applying	Procedures	Application
1.4	The learner will explain how to change integer subtraction problems into integer addition problems.	Cognitive	Understanding	Procedures	Recall
1.5	The learner will demonstrate how to solve integer multiplication problems.	Cognitive	Understanding / Applying	Procedures	Application
1.6	The learner will demonstrate how to solve integer division problems.	Cognitive	Understanding / Applying	Procedures	Application
1.7	The learner will examine eight word problems involving integer operations and will determine the appropriate procedures to use to solve them.	Cognitive	Analyzing / Evaluating	Procedures	Application
1.8	The learner will model integer addition and subtraction using counters.	Cognitive	Applying	Procedures	Application
1.9	The learner will model integer addition using a number line.	Cognitive	Applying	Procedures	Application
1.10	The learner will create four original word problems and accurately solve them using integer operations.	Cognitive	Creating	Procedures	Application
Topic/Task 2: Order of Operations					

2.0 Given any combination of numbers and operations, the learner will accurately apply the order of operations to evaluate expressions.	Cognitive	Evaluating	Rules / Procedures	Application
2.1 The learner will display a willingness to learn the procedures associated with the order of operations.	Affective	Receiving / Responding	Attitude	Application
2.2 The learner will accurately explain PEMDAS.	Cognitive	Understanding	Fact	Recall
2.3 The learner will examine ten word problems involving order of operations and will apply the appropriate procedures to solve them.	Cognitive	Analyzing	Procedures	Application
2.4 The learner will compare three solutions and determine which one is correct following the order of operations.	Cognitive	Analyzing / Evaluating	Procedures	Application
2.5 The learner will create three original word problems and accurately solve them using the order of operations.	Cognitive	Creating	Procedures	Application
Topic/Task 3: Converting between Fractions, Decimals, and Percents				
3.0 Given any fraction, terminating decimal, or percent, the learner will accurately determine its equivalent value in the remaining two formats.	Cognitive	Evaluating	Rules / Procedures	Application
3.1 The learner will display a willingness to learn the procedures associated with converting between equivalent fractions, decimals, and percents.	Affective	Receiving / Responding	Attitude	Application

3.2	The learner will define key vocabulary terms: *numerator, denominator, reduce to lowest terms, place value, percent, terminating decimal.*	Cognitive	Remembering	Fact	Recall
3.3	The learner will explain how to convert a decimal to a percent, and a percent to a decimal.	Cognitive	Understanding	Procedure	Recall
3.4	The learner will explain how to convert a fraction to a decimal, and a decimal to a fraction.	Cognitive	Understanding	Procedure	Recall
3.5	The learner will solve for the missing values in a table of fifteen equivalent fractions, decimals and percents.	Cognitive	Applying	Procedure	Application
3.6	The learner will examine word problems involving the conversion between fractions, decimals and percents, and will apply the appropriate procedures to solve them.	Cognitive	Analyzing	Procedures	Application
3.7	The learner will create a table of ten equivalent fractions, decimals and percents.	Cognitive	Creating	Procedure	Application

References

Kaplan GED test mathematical reasoning prep 2015. (2015). New York, NY: Kaplan

   Publishing.