

Appendix 14A: TIMSS 2015 Fourth Grade Mathematics Item Descriptions Developed During the TIMSS 2015 Benchmarking

Items at Low International Benchmark (400)

Number

M01_01	Identifies a four-digit number given in words
M04_01	Adds a four-digit, three-digit, and two-digit number
M05_01	Subtracts a three-digit number from another three-digit number
M07_01	Identifies the rectangular representation for a unit fraction
N01_01	Adds three three-digit numbers
N01_04	Divides a two-digit number by a one-digit number
N01_05	Generates the next value in a well-defined number pattern
N01_07	Recognizes a unit fraction represented pictorially
N02_04	Multiplies a three-digit number by a one-digit number
N02_05	Identifies an expression that represents a situation
N03_01	Adds two two-digit numbers
N05_01	Identifies a four-digit number represented in words
N05_02	Solves a two-step word problem involving subtraction of one- and two-digit numbers
N06_02	Solves a word problem involving addition of two two-digit numbers
N06_08	Recognizes a non-unit fraction represented pictorially
N07_01	Solves a word problem involving multiplication of one- and two-digit numbers
N07_03	Solves a word problem involving subtraction of a one-digit number from a three-digit number
N07_07	Finds the missing value in an addition number sentence
N09_02	Solves a word problem involving subtraction of a one-digit number from a two-digit number
N09_05	Multiplies a one-digit number by a two-digit number
N10_01	Orders four three-digit numbers

N10_03A	Identifies the largest of four three-digit numbers in context
N10_06	Recognizes a unit fraction represented pictorially
N10_09	Solves a word problem involving addition of three one-digit numbers

Geometric Shapes and Measures

M13_06B	Identifies a street perpendicular to a given street
N01_09	Reads a ruler to find the length of an object
N01_10	Identifies triangles
N02_11A	Identifies the tallest of four rectangular prisms represented pictorially
N02_11B	Identifies the greatest volume of four rectangular prisms represented pictorially
N03_10	Determines the distance around a triangle given the side lengths
N05_09	Identifies a shape with equal angles
N05_10	Completes a rectangle on a square grid
N06_10	Identifies a cube
N09_08	Identifies a cylinder

Data Display

M01_12	Identifies the largest increase shown in a bar graph
M05_12	Completes a table from given information by counting
M06_11A	Reads data from a bar graph
N03_04A	Reads data from a bar graph
N03_04B	Compares data presented on a bar graph
N05_05A	Reads data from a table
N05_05B	Compares data presented in a table
N07_05	Uses data from a table to complete a bar graph (2 of 2 points)
N09_04A	Reads data from a bar graph

Items at Intermediate International Benchmark (475)

Number

M01_02	Solves a word problem involving multiplication of one-digit numbers
M02_06	Generates the next term in a well-defined number pattern
M04_02	Determines a four-digit number given the place values of the digits
M08_01	Identifies a four-digit number given in expanded form
M08_07	Identifies an expression that represents a situation
M09_01	Adds a four-digit and a three-digit number
M10_02	Divides a three-digit number by a one-digit number
M12_03	Multiplies a one-digit number by a three-digit number
M12_06	Determines the operation to complete a number sentence
M13_02	Identifies the representation of a non-unit fraction
N01_03	Solves a word problem involving multiplication of a one-digit number by 10
N01_06	Solves a two-step word problem involving subtraction and division
N01_12	Solves a word problem involving addition of money
N02_01	Identifies a four-digit number given the digits in two places
N02_02	Solves a word problem involving addition of two- and three-digit numbers
N02_03	Divides a two-digit number by a one-digit number with a remainder
N03_02	Divides a two-digit number by a one-digit number
N03_07	Solves a word problem involving addition of decimals
N03_11	Solves a word problem involving addition of hours and minutes
N05_03	Solves a word problem involving division of a two-digit number by a one-digit number
N05_04	Identifies an expression that represents a situation
N05_12	Solves a word problem involving addition of hours and minutes
N06_01	Subtracts a two-digit number from a three-digit number

N06_03	Solves a word problem involving multiplication of one- and two-digit numbers
N06_06	Determines the missing number in a well-defined number pattern
N07_02	Multiplies a one-digit number by a two-digit number
N07_04	Writes a number between two two-digit numbers
N07_06	Finds the missing term in an addition word problem
N09_01	Subtracts a two-digit number from a three-digit number
N09_03	Writes a four-digit number given the digits in two places
N09_06	Solves a multi-step word problem involving multiplication and division with a remainder
N09_07	Writes a fraction larger than a given unit fraction
N10_02	Solves a word problem involving division of a two-digit number by a one-digit number
N10_03B	Justifies the greatest number if one of four numbers is increased by 100
N10_05	Solves a word problem involving subtraction of one- and two-digit numbers

Geometric Shapes and Measures

M01_06A	Identifies the shape made by connecting specified dots on a circle
M02_09	Identifies a time when the hands of a clock form a right angle
M03_09	Draws the reflection of a simple shape across a line
M04_08	Finds the halfway point between two positions on a number line
M05_07	Identifies a pair of parallel lines
M05_10	Identifies a net of a cube
M09_08	Identifies a shape with a right angle
M13_07	Identifies the number of triangular faces in a given three-dimensional shape
N01_11	Draws a rectangle with given dimensions on a square grid
N02_09	Draws a right angle on a square grid given one side
N05_11	Determines the number of unit cubes to fill a rectangular prism
N06_09	Identifies the appropriate metric unit of measurement for an object

N06_11	Determines the number of faces on a rectangular prism
N07_10	Identifies a common shape inside another common shape
N09_09	Identifies a triangle with given properties
N09_11	Justifies which figure made of unit cubes has the larger volume
N10_08	Writes the names of four common two-dimensional shapes

Data Display

M01_11	Interprets information in a table to solve a problem
M02_10	Reads data from a table
M07_12	Recognizes which set of labels on a bar graph could show given information
M14_10A	Reads data from a graph

Items at High International Benchmark (550)

Number

M01_03	Identifies multiples of a given number
M01_04	Adds two two-place decimals
M01_05	Follows a rule to complete a table
M02_01	Divides a two-digit number by a one-digit number with a remainder
M02_02	Provides numbers that round to specified conditions (2 of 2 points)
M02_03	Analyzes place value conditions to identify a four-digit number
M03_01	Subtracts a three-digit number from a four-digit number
M03_02	Solves a word problem involving division of two-digit numbers with a remainder
M04_05	Solves a word problem involving subtracting one-place decimals
M04_06	Identifies an expression that represents a situation
M05_02	Identifies the whole number closest to a given multiple of a hundred
M06_01	Identifies an expression that represents a situation
M06_05	Solves a multi-step problem involving two-place decimals and whole numbers

M07_02	Uses knowledge of place value to solve a problem involving a five-digit number
M07_04	Writes a fraction that represents a subset of a set of objects
M07_05	Identifies the largest of a set of unit fractions
M08_02	Multiplies a two-digit number by a two-digit number
M08_06	Solves for a repeated missing number in a subtraction sentence
M09_02	Identifies the number closest in size to a given four-digit number
M09_03	Solves a word problem involving division
M09_04	Solves a word problem involving addition of time
M10_01	Classifies two- and three-digit numbers as even or odd
M10_04	Solves a word problem involving non-unit fractions
M10_06	Determines the operation to complete a number sentence with operations on both sides
M10_07	Identifies an expression that represents a situation
M11_03	Solves a word problem involving multiplication of two-digit numbers
M11_04	Identifies a set of objects with a given fraction shaded
M11_05	Solves a number sentence involving multiplication facts
M11_06	Adds a whole number and a two-place decimal
M12_01	Rounds a four-digit number to the thousands place
M12_02	Identifies a number that satisfies two conditions of multiples
M12_04	Solves a problem set in a novel situation involving addition and comparison of whole numbers and justifies the solution
M13_01	Identifies the set of numbers having a given number as a factor
M13_04A	Solves a word problem involving rectangular representations of fractions
M13_04B	Solves a word problem involving rectangular representations of fractions
M13_05	Follows a two-step rule to extend a number pattern
M14_02	Determines whether three pairs of numbers follow a two-step rule
M14_03	Identifies a true statement about two- and three-digit numbers

M14_05 Solves for the missing number in a subtraction sentence

M14_07 Follows a two-step rule to generate the next number in a pattern

Geometric Shapes and Measures

M01_06B Draws a specified geometric shape by connecting dots on a circle

M01_06C Draws a specified geometric shape by connecting dots on a circle

M01_07 Identifies the number of edges of a solid shown in a picture

M01_08 Determines the perimeter of a figure made of squares

M03_07 Identifies a shape that can be made by combining two given shapes

M03_08 Identifies a property common to two triangles

M04_09 Identifies a solid given two faces

M05_08 Uses knowledge about properties of rectangles to classify statements as true or false

M06_07 Identifies a shape that has a line of symmetry

M06_09 Identifies the stack of cubes with the largest volume

M06_10 Given a starting position on a map, follows specified moves and provides final coordinates

M07_07 Identifies a pair of shapes which are not mirror images of each other

M08_09 Finds the distance between two positions on a number line

M08_10 Relates a specified face of a cube to its net

M09_11 Solves a problem by filling a three-dimensional shape with rectangular solids

M10_09 Recognizes acute angles in an irregular quadrilateral

M11_08 Given a line, draws another line to form an angle less than a right angle

M11_09 Identifies the two-dimensional view of a three-dimensional object

M12_08 Classifies angle types in a figure

M14_08 Draws an obtuse angle on a square grid given one side

M14_09 Identifies a two-dimensional view of an irregular three-dimensional figure

Data Display

M03_11	Compares information in a table and a bar graph to solve a problem
M03_12	Interprets data from a pie chart to solve a problem
M05_13	Completes a bar graph from information given in a tally chart (2 of 2 points)
M06_11B	Uses information from a bar graph to solve a problem
M07_11	Interprets a bar graph to solve a problem
M07_13A	Finds totals and decides which one is the least
M09_12	Completes a bar graph using information from a pictograph
M10_11	Identifies a pie chart that represents given data
M11_11	Uses information from a bar graph to solve a problem
M11_12	Identifies a pie chart that has the same information as a bar graph
M12_11A	Uses a key to retrieve data from a pictograph
M13_09A	Identifies the greatest value in a bar graph
M14_10B	Extrapolates from a graph to solve a problem

Items at Advanced International Benchmark (625)

Number

M02_04	Solves a multi-step reasoning problem involving division
M02_05	Identifies the missing number in a number sentence with addition on both sides
M03_03	Solves a word problem involving subtraction of time
M03_05	Solves a multi-step problem involving two-place decimals and whole numbers
M03_06	Identifies a term in a repeating pictorial pattern using division with a remainder
M04_03	Devises two ways to allocate money in a given context (2 of 2 points)
M04_04	Determines the missing digit for a two-digit number that satisfies two conditions
M04_07	Identifies the missing number in a number sentence with operations on both sides
M05_03	Identifies the smallest number from a set of one- and two-place decimals

M05_04A	Identifies the circular representation of a non-unit fraction
M05_04B	Explains why a chosen circular representation shows a given non-unit fraction
M05_05	Identifies the missing first number in a number sentence involving subtraction
M05_06	Identifies the two-step rule that relates the numbers in two columns of a table
M06_02	Identifies the closest estimate to the result of a subtraction involving a five-digit number
M06_03	Given four different digits, writes two two-digit numbers with the largest sum
M06_04	Identifies a two-place decimal on a number line marked with one-place decimals
M06_06	Solves a multi-step reasoning problem involving place value of whole numbers
M07_03	Estimates the quotient of a four-digit number divided by a two-digit number
M07_06	Solves a word problem involving proportional reasoning
M08_03	Solves a multi-step word problem involving addition and subtraction of two- and three-digit numbers
M08_04	Solves a problem to identify a fraction that represents the shaded portion of a figure
M08_05	Solves a word problem involving division with a remainder and justifies the solution (2 of 2 points)
M09_05	Identifies a fraction equivalent to a given fraction
M10_03	Devises two ways of grouping objects that satisfy two conditions (2 of 2 points)
M10_05	Draws a complete shape on a grid given a picture of a fraction of the shape
M11_01	Solves a multi-step word problem involving multiplication and addition of whole numbers
M11_02	Identifies a fraction equivalent to a one place decimal
M12_05	Solves a word problem involving adding fractions with different denominators
M12_07	Identifies a number sentence that represents a situation
M13_03	Solves a multi-step problem involving division and gives a reason for their answer
M14_01	Recognizes equivalent three-digit numbers written in expanded form
M14_04	Identifies a number between a one-place decimal and two-place decimal
M14_06	Identifies an expression that represents a situation

Geometric Shapes and Measures

M01_10	Draws all four lines of symmetry on a non-standard shape (2 of 2 points)
M02_07	Estimates the total length of a curved path given the length of a part of it
M02_08A	Given a description of a movement on a number line, determines another possible ending position
M02_08B	Given a starting point and two movements on a number line, identifies a possible ending position
M03_10	Finds the perimeter of a given figure made of a square and a rectangle
M04_10A	Draws a parallel line on a square grid given conditions
M04_10B	Draws a perpendicular line on a square grid given conditions
M05_09	Solves a multi-step word problem involving perimeter
M05_11	Identifies the area of a right triangle drawn on a grid
M06_08	Selects an appropriate unit of length to use in three different contexts
M07_08	Determines the number of cubes in a given rectangular box
M07_10	Draws a line through a given point perpendicular to a given line
M08_08	Identifies parallel lines on a geometric shape
M09_07	Identifies a rule to sort shapes into two sets
M09_09	Identifies a shape that has both line and rotational symmetry
M09_10	Determines the length of one side of an equilateral triangle and finds its perimeter
M10_08	Reads a ruler to find the length of a line segment beginning and ending at half-units
M10_10	Determines the number of square and triangular faces of three-dimensional shapes (2 of 2 points)
M11_07	Reads a ruler to find the length of an object beginning at a half-unit
M11_10	Finds the area of a rectangle given its dimensions
M12_09	Given two positions on a curved path, follows specified moves and labels another position (2 of 2 points)
M12_10	Identifies a net of a hexagonal prism
M13_06A	Identifies a street parallel to a given street

Data Display

M07_13B	Draws and justifies a conclusion from data given in a table
M08_11	Represents data from a table in a pie chart
M12_11B	Uses information in a pictograph to solve a problem
M13_09B	Interprets a bar graph to solve a two-step problem

Items Above the Advanced International Benchmark (625)

Number

M03_04	Solves a non-routine problem presented pictorially (2 of 2 points)
M09_06	Solves a multi-step problem involving fractions

Geometric Shapes and Measures

M01_09	Estimates the length of a curved line in non-standard units
M07_09	Identifies the area of an isosceles triangle drawn on a grid
M13_08	Identifies a net of a given object