Pennsylvania Mathematics

Assessment Anchors & Eligible Content: Sixth Grade

The Number System M06.A-N

1 **Apply and extend previous understandings of multiplication and division to divide fractions by fractions.** M06.A-N.1

1 Solve real-world and mathematical problems involving division of fractions. M06.A-N.1.1

1 Interpret and compute quotients of fractions (including mixed numbers), and solve word problems involving division of fractions by fractions. Example 1: Given a story context for (2/3) ÷ (3/4), explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = (a/b) × (d/c) = ad/bc.) Example 2: How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi? Example 3: How many 2 1/4-foot pieces can be cut from a 15 1/2-foot board? M06.A-N.1.1.1

2 **Compute with multi-digit numbers and find common factors and multiples** M06.A-N.2

1 Compute with multi-digit numbers using the four arithmetic operations with or without a calculator. M06.A-N.2.1

1 Solve problems involving operations (+, –, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems. M06.A-N.2.1.1

2 Apply number theory concepts (specifically, factors and multiples). M06.A-N.2.2

1 Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. M06.2.2.1

2 Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor. Example: Express 36 + 8 as 4(9 + 2). M06.A-N.2.2.2

3 **Apply and extend previous understandings of numbers to the system of rational numbers** M06.A-N.3

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1 Understand that positive and negative numbers are used together to describe quantities having opposite directions or values and locations on the number line and coordinate plane. M06.3.1

1 Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge). M06.A-N.3.1.1

2 Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., – (– 3) = 3; 0 is its own opposite). M06.A-N.3.1.2

3 Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane. M06.A-N.3.1.3

2 Understand ordering and absolute value of rational numbers. M06.A-N.3.2

1 Write, interpret, and explain statements of order for rational numbers in real-world contexts. Example: Write – 3°C > – 7°C to express the fact that – 3°C is warmer than – 7°C. M06.A-N.3.2.1

2 Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. Example: For an account balance of – 30 dollars, write |– 30| = 30 to describe the size of the debt in dollars, and recognize that an account balance less than – 30 dollars represents a debt greater than 30 dollars. M06.A-N.3.2.2

3 Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. M06.A-N.3.2.3

Ratios and Proportional Relationships M06.A-R

1 **Understand ratio concepts and use ratio reasoning to solve problems** M06.A-R.1

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1 Represent and/or solve real world and mathematical problems using rates, ratios, and/or percents. M06.A-R.1.1

1 Use ratio language and notation (such as 3 to 4, 3:4, 3/4) to describe a ratio relationship between two quantities. Example 1: “The ratio of girls to boys in a math class is 2:3 because for every 2 girls there are 3 boys.” Example 2: “For every five votes candidate A received, candidate B received four votes.” M06.A-R.1.1.1

2 Find the unit rate a/b associated with a ratio a:b (with b ≠ 0) and use rate language in the context of a ratio relationship. Example 1: “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” Example 2: “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.” M06A-R.1.1.2

3 Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios. M06.A-R.1.1.3

4 Solve unit rate problems including those involving unit pricing and constant speed. Example: If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? M06.A-R.1.1.4

5 Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percentage. M06.A-R.1.1.5

Expressions and Equations M06.B-E

1 **Apply and extend previous understandings of arithmetic to numerical and algebraic expressions.** M06.B-E.1

1 Identify, write, and evaluate numerical and algebraic expressions. M06.B-E.1.1

1 Write and evaluate numerical expressions involving whole-number exponents. M06.B-E.1.1.1

2 Write algebraic expressions from verbal descriptions. Example: Express the description “five less than twice a number” as 2y – 5. M06B-E.1.1.2

3 Identify parts of an expression using mathematical terms (e.g., sum, term, product, factor, quotient, coefficient, quantity). Example: Describe the expression 2(8 + 7) as a product of two factors. M06.B-E.1.1.3

4 Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems. Example: Evaluate the expression b2 – 5 when b = 4. M06.B-E.1.1.4

5 Apply the properties of operations to generate equivalent expressions. Example 1: Apply the distributive property to the expression 3 (2 + x) to produce the equivalent expression 6 + 3x. Example 2: Apply the distributive property to the expression 24x + 18y to produce the equivalent expression 6(4x + 3y). Example 3: Apply properties of operations to y + y + y to produce the equivalent expression 3y. M06.B-E.1.1.5

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nterpret and solve one-variable equations and inequalities. M06.B-E.2

1 Create, solve, and interpret one variable equations or inequalities in real-world and mathematical problems. M06.B-E.2.1

1 Use substitution to determine whether a given number in a specified set makes an equation or inequality true. M06.B-E.2.1.1

2 Write algebraic expressions to represent real-world or mathematical problems. M06.B-E.2.1.2

3 Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q, and x are all non-negative rational numbers. M06.B-E.2.1.3

4 Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines. M06.B-E.2.1.4

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3 **Represent and analyze quantitative relationships between dependent and independent variables.** M06.B-E.3

1 Use variables to represent two quantities in a real-world problem that change in relationship to one another. M06.B-E.3.1

1 Write an equation to express the relationship between the dependent and independent variables. Example: In a problem involving motion at a constant speed of 65 units, write the equation d = 65t to represent the relationship between distance and time. M06.B-E.3.1.1

2 Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation. M06.B-E.3.1.2

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Geometry M06.C-G

1 **Solve real-world and mathematical problems involving area, surface area, and volume.** M06.C-G.1

1 Find area, surface area, and volume by applying formulas and using various strategies. M06.C-G.1.1

1 Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided. M06.C-G.1.1.1

2 Determine the area of irregular or compound polygons. Example: Find the area of a room in the shape of an irregular polygon by composing and/or decomposing. M06.C-G.1.1.2

3 Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided. M06.C-G.1.1.3

4 Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided. M06.C-G.1.1.4

5 Represent three-dimensional figures using nets made of rectangles and triangles. M06.C-G.1.1.5

6 Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided. M06.C-G.1.1.6

Statistics and Probability M06.D-S

1 **Demonstrate understanding of statistical variability by summarizing and describing distributions** M06.D-S.1

1 Display, analyze, and summarize numerical data sets in relation to their context. M06.D-S.1.1

1 Display numerical data in plots on a number line, including line plots, histograms, and box-and whisker plots. M06.D-S.1.1.1

2 Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation). M06.D-S.1.1.2

3 Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered. M06.D-S.1.1.3

4 Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. M06.D-S.1.1.4