Maryland Mathematics

Grade 4

Number and Operation Sense NOS

A GENERALIZE PLACE VALUE UNDERSTANDING FOR MULTI-DIGIT WHOLE NUMBERS. 4.NOS.A

1 Apply and extend place value understanding to multidigit whole numbers within 1,000,000. 4.NOS.A.1

- a Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. 4.NOS.A.1.A
- b Estimate quantities by reasoning about their location on a number line, their relationship to benchmark numbers, and rounding to any place. 4.NOS.A.1.B
- c Compare two multi-digit numbers by reasoning about the values of the digits and the location of the numbers on a number line. Record the results of comparisons with the symbols , =, and . 4.NOS.A.1.D

2 Explain that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right (e.g., recognize that 700 ÷ 70 = 10 by applying concepts of place value and division). 4.NOS.A.2

B USE PLACE VALUE UNDERSTANDING AND PROPERTIES OF OPERATIONS TO PERFORM MULTI-DIGIT ARITHMETIC. 4.NOS.B

3 Fluently add and subtract multi-digit whole numbers within 1,000,000. 4.NOS.B.3

- a Apply estimation strategies to estimate sums and differences. 4.NOS.B.3.A
- b Use computational strategies (e.g., decomposition, partials sums) efficiently. 4.NOS.B.3.B
- c Use a standard algorithm 4.NOS.B.3.C
- d Determine and explain when a strategy or algorithm is most efficient. 4.NOS.B.3.D

4 Extend place value understanding and basic facts to multiply a multi-digit whole number by a multiple of ten. 4.NOS.B.4

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5 Multiply a whole number of up to four digits by a onedigit whole number, and multiply two two-digit numbers. 4.NOS.B.5

a Apply estimation strategies to estimate products. 4.NOS.B.5.A

b Use strategies based on place value (e.g., partial products) to multiply. 4.NOS.B.5.B

c Use properties of operations (e.g., use doubling and halving strategy to think of 12 × 32 as 6 × 64) to multiply. 4.NOS.B.5.C

d Represent and explain the computation by connecting rectangular arrays, area models, and/or equations to the meaning of multiplication. 4.NOS.B.5.D

6 Divide whole numbers with up to four-digit dividends and one-digit divisors with and without remainders. 4.NOS.B.6

a Apply estimation strategies to estimate quotients. 4.NOS.B.6.A

b Use strategies based on place value (e.g., partial quotients) to divide. 4.NOS.B.6.B

c Use properties of operations and/or the inverse relationship between multiplication and division to divide. 4.NOS.B.6.C

d Represent and explain the computation by connecting rectangular arrays, area models, and/or equations to the meaning of division. 4.NOS.B.6.D

C GAIN FAMILIARITY WITH FACTORS AND MULTIPLES. 4.NOS.C

7 Recall or quickly derive multiplication and division facts within 100 (e.g., factors less than or equal to 10 and quotients less than are equal to 10). 4.NOS.C.7

a Skip count (2s, 5s, 10s) and apply properties of operations (0s, 1s) to derive foundational facts. 4.NOS.C.7.A

b Derive unknown facts from known facts using double facts (e.g., to solve 4 × 3, double 3 to get 6 and double 6 to get 12) to multiply and divide. 4.NOS.C.7.B

c Use properties of operations (e.g., to solve 8 × 7, think of (5 × 7 + (3 × 7)) to multiply. 4.NOS.C.7.C

d Use the inverse relationship between multiplication and division (e.g., think of to solve) to multiply and divide. 4.NOS.C.7.D

8 Explain and apply concepts of factors, multiples, and prime and composite numbers for whole numbers in the range of 1-100. 4.NOS.C.8

a Identify factor pairs for a whole number in the range of 1–100. 4.NOS.C.8.A

b Determine whether a given whole number in the range of 1–100 is a multiple of a one-digit number. 4.NOS.C.8.B

c Distinguish between factors and multiples and explain how they relate to a given number. 4.NOS.C.8.C

d Determine whether a given whole number in the range of 1–100 is prime, composite, or neither. 4.NOS.C.8.D

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:XTEND UNDERSTANDING OF FRACTION EQUIVALENCE AND ORDERING. 4.NOS.D

9 Understand and generate equivalent fractions. 4.NOS.D.9

a Identify and generate equivalent fractions using representations and the Identity Property of Multiplication. 4.NOS.D.9.A

b Explain why fractions are equivalent ( ). 4.NOS.D.9.B

10 Compare two fractions with different numerators and different denominators, understanding that comparisons are valid only when the two fractions refer to the same whole. 4.NOS.D.10

a Use benchmark numbers (e.g., , 1), common numerators, and common denominators to compare. 4.NOS.D.10.A

b Record comparisons with symbols , =, . 4.NOS.D.10.B

c Justify comparisons using representations and reasoning. 4.NOS.D.10.C

E BUILD FRACTIONS FROM UNIT FRACTIONS BY APPLYING AND EXTENDING PREVIOUS UNDERSTANDINGS OF OPERATIONS ON WHOLE NUMBERS. 4.NOS.E

11 Apply understanding of a fraction with d >1 as a sum of unit fractions ( ) to decompose a fraction (including fractions greater than 1) into a sum of fractions with the same denominator in more than one way, recording each decomposition as an equation. Justify decompositions using visual fraction models and equations (e.g., or or or). 4.NOS.E.11

12 Apply and extend previous understanding of addition and subtraction of whole numbers to add and subtract fractions with like denominators. 4.NOS.E.12

a Understand addition and subtraction of fractions as joining and separating parts referring to the same whole. 4.NOS.E.12.A

b Estimate sums and differences by reasoning about benchmark numbers and assess reasonableness of answers (e.g., will be greater than 1 because both fractions are greater than). 4.NOS.E.12.B

c Apply and extend whole number addition and subtraction strategies (e.g. counting on, making a whole, partial sums, compensation, properties of operations, the inverse relationship between addition and subtraction) to add and subtract fractions. 4.NOS.E.12.C

d Solve problems in context involving addition and subtraction of fractions using visual fraction models and equations to represent the problem. 4.NOS.E.12.D

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13 Apply and extend previous understandings of multiplication to multiply a fraction by a whole number ( ). 4.NOS.E.13

a Estimate products by reasoning about benchmark numbers and assess reasonableness of answers (e.g., will be less than 4 because I have 4 groups of something less than 1). 4.NOS.E.13.A

b Use understanding of multiplication as equal groups to multiply a unit fraction by whole number (e.g., interpret as b groups of). 4.NOS.E.13.B

c Use understanding of multiplication as equal groups to multiply a fraction by whole number (e.g., interpret as b groups of when is greater than or less than 1). 4.NOS.E.13.C

d Solve problems in context involving multiplication of a fraction by a whole number, using visual fraction models and equations to represent the problem. 4.NOS.E.13.D

F UNDERSTAND DECIMAL NOTATION FOR FRACTIONS AND COMPARE DECIMAL FRACTIONS. 4.NOS.F

14 Express a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100 to add two fractions with respective denominators of 10 and 100. 4.NOS.F.14

15 Use decimal notation for fractions with denominators 10 and 100 (e.g., rewrite 0.62 as or describe a length as 0.62 meters or locate 0.62 on a number line). 4.NOS.F.15

16 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols , =, , and justify the conclusions, (e.g. using a visual model). 4.NOS.F.16

Algebraic Thinking AT

A REPRESENT AND SOLVE PROBLEMS INVOLVING MULTIPLICATION AND DIVISION. 4.AT.A

1 Interpret a multiplication situation as a comparison (e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5). Represent verbal statements of multiplicative comparisons as multiplication equations. 4.AT.A.1

2 Multiply or divide to solve multiplicative comparison problems in context by using drawings and equations with a symbol for the unknown number to represent the problem 4.AT.A.2

3 Distinguish multiplicative comparison from additive comparison. 4.AT.A.3

4 Solve multistep problems in context involving whole numbers and having whole number answers using the four operations, including problems in which remainders must be interpreted. 4.AT.A.4

a Represent these problems using equations with a letter standing for the unknown quantity. 4.AT.A.4.A

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b Assess the reasonableness of answers in terms of context, including interpreting remainders. 4.AT.A.4.B

Geometric Reasoning and Measurement GR

A SOLVE PROBLEMS INVOLVING MEASUREMENT CONVERSION, AREA, AND PERIMETER. 4.GR.A

1. Apply the relationship between measurement units within a given measurement system (customary: in, ft, yd, oz, lb, sec, min, hr; metric: cm, m, km, g, kg, mL, L) to convert measurements from a larger unit to smaller unit. 4.GR.A.1
2. Use the four operations to solve problems in context involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving common fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. 4.GR.A.2
3. Apply the area and perimeter formulas for rectangles in context, including rectangles with missing dimensions. 4.GR.A.3
4. Relate the area of a triangle to the area of a rectangle using decomposition and visual models. Derive and apply the formula to solve problems in contexts involving triangles positioned within or formed from the decomposition of rectangles 4.GR.A.4

B UNDERSTAND CONCEPTS OF ANGLE AND MEASURE ANGLES. 4.GR.B

5. Identify angles as geometric figures formed by two rays that share a common endpoint and describe angle size as the amount of rotation between the two rays measured in degrees with reference to a circle. 4.GR.B.5
6. Measure angles in whole-number degrees using a protractor. Estimate and sketch angles of specified measures. 4.GR.B.6
7. Explain that when an angle is decomposed into nonoverlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in context (e.g., by using an equation with a symbol for the unknown angle measure). 4.GR.B.7

C DRAW AND IDENTIFY LINES AND ANGLES AND CLASSIFY SHAPES BY PROPERTIES OF THEIR LINES AND ANGLES. 4.GR.C

8. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures. 4.GR.C.8
9. Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. 4.GR.C.9

Reasoning with Data and Statistics DS

A REPRESENT AND INTERPRET DATA. 4.DS.A

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1. Ask and answer questions by collecting, organizing and summarizing data, recognizing the importance of context when analyzing data. 4.DS.A.1
    a. Create scaled data visualization (e.g. bar graphs for categorical data; line plots with fraction units of halves, fourths, and eighths for numerical data) to display data to communicate an idea. 4.DS.A.1.A
    b. Summarize data presented in scaled data visualizations (e.g. bar graphs, line plots) and draw conclusions about the data. 4.DS.A.1.B
    c. Compare and contrast different data visualizations of the same data by varying attributes (e.g., reordering bars, changing the scale) and explain how changing the attributes affects the interpretation. 4.DS.A.1.C