

Grades 6–8

Amplify Desmos Math

Indiana Academic Standards for Mathematics for Amplify Desmos Math, **Grade 6**.

Source: <https://www.in.gov/doi/students/indiana-academic-standards/mathematics/>

Number Sense	
Learning Outcome: Students begin to apply negative integers within real-world contexts and use number lines to model opposite signed numbers as located on opposite sides of zero.	
6.NS.1 Use positive and negative numbers to represent and compare quantities in real-world contexts, explaining the meaning of 0 in each situation. (E)	Unit 7
6.NS.2 Explain how opposite signs of numbers indicate locations on opposite sides of 0 on the number line; identify the opposite of the opposite of a number.	Unit 7
6.NS.3 Compare and order rational numbers and plot them on a number line. Write, interpret, and explain statements of order for rational numbers in real-world contexts.	Unit 7
6.NS.4 Solve real-world problems with positive fractions and decimals by using one or two operations. (E)	Unit 4, Unit 5
6.NS.5 Apply the order of operations and properties of operations (i.e., identity, inverse, commutative properties of addition and multiplication, associative properties of addition and multiplication, and distributive property) to evaluate numerical expressions with nonnegative rational numbers, including those using grouping symbols, such as parentheses, and involving whole number exponents. (E)	Unit 6 Commutative and associative properties are addressed but are not required vocabulary in Amplify Desmos Math, Grade 6. Inverse and identity properties are not addressed in Amplify Desmos Math, Grade 6.
6.NS.6 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. Use the distributive property to express a sum of two whole numbers from 1 to 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.	Unit 5

<p>6.NS.7 Apply the properties of operations (i.e., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions and to justify whether two linear expressions are equivalent when the two expressions name the same number regardless of which value is substituted into them. (E)</p>	<p>Unit 6</p> <p>Commutative and associative properties are addressed but are not required vocabulary in Amplify Desmos Math, Grade 6.</p> <p>Inverse and identity properties are not addressed in Amplify Desmos Math, Grade 6.</p>
<p>6.NS.8 Evaluate positive rational numbers with whole number exponents.</p>	<p>Unit 6</p>

<h2 style="text-align: center;">Ratios and Proportional Reasoning</h2>	
<p>Learning Outcome: : Students use ratios and reasoning to compare two quantities and understand unit rate. Students use ratios and unit rates to model and solve real-world problems.</p>	
<p>6.RP.1 Convert between any two representations (fractions, decimals, percents) of positive rational numbers without the use of a calculator. (E)</p>	<p>Unit 5</p> <p>Amplify Desmos Math, Grade 6 is limited to non-repeating decimals.</p> <p>Converting rational numbers to any decimal is addressed in Amplify Desmos Math, Grade 7, Unit 4.</p> <p>Converting repeating decimals to fractions is addressed in Amplify Desmos Math, Grade 8, Unit 8.</p>
<p>6.RP.2 Understand the concept of a unit rate and use terms related to rate in the context of a ratio relationship.</p>	<p>Unit 2, Unit 3, Unit 6</p>
<p>6.RP.3 Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane.</p>	<p>Unit 2, Unit 7</p>
<p>6.RP.4 Solve real-world and other mathematical problems involving rates and ratios using models and strategies such as reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. (E)</p>	<p>Unit 2, Unit 3, Unit 5, Unit 6</p>
<p>6.RP.5 Use variables to represent two quantities in a proportional relationship in a real-world problem; write an equation to express one quantity, the dependent variable, in terms of the other quantity, the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation. (E)</p>	<p>Unit 6</p>

Algebra and Functions

Learning Outcome: Students evaluate algebraic expressions, write algebraic expressions to represent quantities in context, and create equivalent algebraic expressions.

6.AF.1 Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values. (E)	Unit 6
6.AF.2 Demonstrate which values from a specified set, if any, make the equation or inequality true. Use substitution to determine whether a given number in a specified set makes an equation or inequality true. (E)	Unit 6, Unit 7
6.AF.3 Solve equations of the form $x + p = q$, $x - p = q$, $px = q$, and $x/p = q$ fluently for cases in which p , q and x are all nonnegative rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)	Unit 6 Solving equations of the form $x/p = q$ is not addressed in Amplify Desmos Math, Grade 6.
6.AF.4 Write an inequality of the form $x > c$, $x \geq c$, $x < c$, or $x \leq c$, where c is a rational number, to represent a constraint or condition in a real-world or other mathematical problem. Explain that inequalities have infinitely many solutions and how to represent solutions on a number line diagram.	Unit 7 Inequalities using \geq and \leq are addressed Amplify Desmos Math, Grade 7, Unit 6.
6.AF.5 Solve real-world and other mathematical problems by graphing points with rational number coordinates on a coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (E)	Unit 7

Geometry and Measurement

Learning Outcome: Students find areas of complex shapes and find volumes of rectangular prisms.s.

6.GM.1 Convert between measurement systems (Customary to metric and metric to Customary) given the conversion factors, and use these conversions in solving real-world problems.	Unit 3
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<p>6.GM.2 Apply the sums of interior angles of triangles and quadrilaterals to solve real-world and mathematical problems.</p>	<p>Students establish the sum of interior angles of a triangle and apply it to solve mathematical problems in Grade 8, U1.</p> <p>Real-world problems and the sum of interior angles of quadrilaterals are not addressed.</p>
<p>6.GM.3 Find the area of complex shapes composed of polygons by composing or decomposing into simple shapes; apply this technique to solve real-world and other mathematical problems.</p>	<p>Unit 1</p>
<p>6.GM.4 Find the volume of a right rectangular prism with fractional edge lengths using unit cubes of the appropriate unit fraction edge lengths (e.g., using technology or concrete materials) and show that the volume is the same as would be found by multiplying the edge lengths of the prism. Apply the formulas $V = lwh$ and $V = Bh$ to find volumes of right rectangular prisms with fractional edge lengths to solve real-world and other mathematical problems. (E)</p>	<p>Unit 1</p>

Data Analysis and Statistics	
Learning Outcome: Students represent data using line plots, histograms, and box plots.	
<p>6.DS.1 Select, create, and interpret graphical representations of numerical data, including line plots, histograms, and box plots.</p>	<p>Unit 8</p>
<p>6.DS.2 Formulate statistical questions; collect and organize the data (e.g., using technology), and display and interpret the data with graphical representations (e.g., using technology). (E)</p>	<p>Unit 8</p> <p>Formulating statistical questions is not addressed in Amplify Desmos Math, Grade 6.</p>
<p>6.DS.3 Summarize numerical data sets in relation to their context in multiple ways, such as:</p> <ol style="list-style-type: none"> a. Report the number of observations; b. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement; c. Determine quantitative measures of center (mean and/or median) and spread (range and interquartile range); d. Describe any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered; and e. Relate the choice of measures of center and spread to the shape of the data distribution and the context in which the data were gathered. (E) 	<p>Unit 8</p>

Amplify Desmos Math

Indiana Academic Standards for Mathematics for Amplify Desmos Math, **Grade 7**.

Source: <https://www.in.gov/doe/students/indiana-academic-standards/mathematics/>

Number Sense	
Learning Outcome: Students connect earlier learning to express the prime factorization of whole numbers using exponents, understand the inverse relationship between perfect squares and square roots, and use number lines to compare and order rational and irrational numbers.	
7.NS.1 Show on a number line that a number and its opposite have a sum of 0 (are additive inverses). Find and interpret sums of rational numbers in real-world contexts.	Unit 5
7.NS.2 Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.	This standard is not addressed in Amplify Desmos Math, Grade 7.
7.NS.3 Use the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. (E)	Unit 5
7.NS.4 Explain that if p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$ for all nonzero integers. (E)	Unit 5
7.NS.5 Find the prime factorization of whole numbers and write the results using exponents.	This standard is addressed in Amplify Desmos Math, Grade 5, Unit 4.
7.NS.6 Apply the inverse relationship between squaring and finding the square root of a perfect square whole number. Find square roots of perfect square whole numbers.	This standard is addressed in Amplify Desmos Math, Grade 8, Unit 8.
7.NS.7 Compute fluently with rational numbers using an algorithmic approach. (E)	Unit 5

Ratios and Proportional Reasoning

Learning Outcome: Students continue to use ratio and rate language, compute using unit rates, and use proportional relationships to solve real-world problems involving ratios and percents.

<p>7.RP.1 Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships.</p>	<p>Unit 1, Unit 2, Unit 3, Unit 4, Unit 5, Unit 8</p>
<p>7.RP.2 Use proportional relationships to solve ratio and percent problems with multiple operations (e.g., simple interest, tax, markups, markdowns, gratuities, conversions within and across measurement systems, and percent increase and decrease). (E)</p>	<p>Unit 1, Unit 4</p>
<p>7.RP.3 Represent real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent these proportional relationships. Apply the definition of unit rate to $y = mx$. (E)</p>	<p>Unit 2, Unit 4</p>

Algebra and Functions

Learning Outcome: Students use two variable equations, as well as graphs and tables, to model real-world proportional relationships and connect the constant of proportionality to the idea of slope.

<p>7.AF.1 Apply the properties of operations (e.g., identity, inverse, commutative, associative, distributive properties) to create equivalent linear expressions, including situations that involve factoring out a common number (e.g., given $2x - 10$, create an equivalent expression $2(x - 5)$). Justify each step in the process. (E)</p>	<p>Unit 6</p> <p>Commutative and associative properties are used but are not required vocabulary in Amplify Desmos Math, Grade 7.</p> <p>Inverse and identity properties are not addressed in Amplify Desmos Math, Grade 7.</p>
<p>7.AF.2 Solve real-world problems with rational numbers by using one or two operations. (E)</p>	<p>Unit 5, Unit 6</p>
<p>7.AF.3 Solve equations of the form $px + q = r$ and $p(x + q) = r$ fluently, where p, q, and r are specific rational numbers. Represent real-world problems using equations of these forms and solve such problems. (E)</p>	<p>Unit 6</p>
<p>7.AF.4 Solve inequalities of the form $px + q (> \text{ or } \geq) r$ or $px + q (< \text{ or } \leq) r$, where p, q, and r are specific rational numbers. Represent real-world problems using inequalities of these forms and solve such problems. Graph the solution set of the inequality and interpret it in the context of the problem.</p>	<p>Unit 6</p>

<p>7.AF.5 Define slope as vertical change for each unit of horizontal change, and apply that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change.</p>	<p>This standard is addressed in Amplify Desmos Math, Grade 8, Units 2–4.</p>
<p>7.AF.6 Graph a line given its slope and a point on the line. Find the slope of a line given its graph. (E)</p>	<p>Finding the slope of a line given its graph is addressed in Amplify Desmos Math, Grade 8, Units 2 and 3.</p> <p>Graphing a line given its slope and y-intercept is addressed in Amplify Desmos Math, Grade 8, Unit 3.</p>

Geometry and Measurement	
<p>Learning Outcome: Students use scale drawings, the area and circumference of circles, and the volume of cylinders and other three-dimensional solids to solve real-world problems.</p>	
<p>7.GM.1 Solve real-world and other mathematical problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing. Create a scale drawing by using proportional reasoning.</p>	<p>Unit 1</p>
<p>7.GM.2 Understand the formulas for area and circumference of a circle and use them to solve real-world and other mathematical problems; give an informal derivation of the relationship between circumference and area of a circle.</p>	<p>Unit 3</p>
<p>7.GM.3 Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms. (E).</p>	<p>Unit 7</p> <p>Amplify Desmos Math, Grade 7 addresses the surface area and volume of three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</p> <p>Volume of cylinders is addressed in Amplify Desmos Math, Grade 8, Unit 5.</p>

Data Analysis, Statistics, and Probability

Learning Outcome: Students make inferences about populations through sampling and learn about the importance of representative samples.

<p>7.DSP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population. Understand that conclusions and generalizations about a population from a sample are valid only if the sample is representative of that population and that random sampling tends to produce representative samples and support valid inferences. (E)</p>	Unit 8
<p>7.DSP.2 Find, use, and interpret measures of central tendency (mean and median) and measures of spread (range, interquartile range, and mean absolute deviation) for numerical data from random samples to draw comparative inferences about two populations. (E)</p>	Unit 8 Range is not addressed in Amplify Desmos Math, Grade 7.
<p>7.DSP.3 Make observations about the degree of visual overlap of two numerical data distributions represented in line plots or box plots. Describe how data, particularly outliers, added to a data set may affect the mean and/or median.</p>	Unit 8 Describing how added data affects the mean and/or median is addressed in Amplify Desmos Math, Grade 6, Unit 8.
<p>7.DSP.4 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Understand that a probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event. Understand that a probability of 1 indicates an event certain to occur and a probability of 0 indicates an event impossible to occur. Identify probabilities of events as impossible, unlikely, equally likely, likely, or certain. (E)</p>	Unit 8
<p>7.DSP.5 Develop probability models that include the sample space and probabilities of outcomes to represent simple events with equally likely outcomes. Predict the approximate relative frequency of the event based on the model. Compare probabilities from the model to observed frequencies, evaluate the level of agreement, and explain possible sources of discrepancy. (E)</p>	Unit 8

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Number Sense	
Learning Outcome: Students continue to deepen their understanding of rational and irrational numbers by explaining the differences between them and solving real-world problems.	
8.NS.1 Give examples of rational and irrational numbers, and explain the difference between them. State decimal equivalents for any number. For rational numbers, show that the decimal equivalent terminates or repeats, and convert a repeating decimal into a rational number.	Unit 8
8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, plot them approximately on a number line, and estimate the value of expressions involving irrational numbers.	Unit 8
8.NS.3 Given a numeric expression with common rational number bases and integer exponents, apply the properties of exponents to generate equivalent expressions. (E)	Unit 7
8.NS.4 Solve real-world problems with rational numbers by using multiple operations. (E)	This standard is addressed in Amplify Desmos Math, Grade 7, Unit 5.

Algebra and Functions	
Learning Outcome: Students understand the formal definition of a function, analyze linear functions in multiple representations, and differentiate between linear and nonlinear functions. Students also solve a system of linear equations in two unknowns.	
8.AF.1 Solve linear equations and inequalities with rational number coefficients fluently, including those whose solutions require expanding expressions using the distributive property and collecting like terms. Represent real-world problems using linear equations and inequalities in one variable and solve such problems. (E)	Unit 4
8.AF.2 Generate linear equations in one variable with one solution, infinitely many solutions, or no solutions. Justify the classification given.	Unit 4

<p>8.AF.3 Understand that a function assigns to each x-value (independent variable) exactly one y-value (dependent variable), and that the graph of a function is the set of ordered pairs (x,y)</p>	Unit 5
<p>8.AF.4 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear, has a maximum or minimum value). Sketch a graph that exhibits the qualitative features of a function that has been verbally described. (E)</p>	Unit 5
<p>8.AF.5 Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. Describe similarities and differences between linear and nonlinear functions from tables, graphs, verbal descriptions, and equations.</p>	Unit 5
<p>8.AF.6 Construct a function to model a linear relationship between two quantities given a verbal description, table of values, or graph. Within the context of a problem, describe the meaning of m (rate of change) and b (y-intercept) in $y = mx + b$. (E)</p>	Unit 3, Unit 5
<p>8.AF.7 Compare properties of two linear functions given in different forms, such as a table of values, equation, verbal description, and graph (e.g., compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed).</p>	Unit 5
<p>8.AF.8 Approximate the solution of a system of equations by graphing and interpreting the reasonableness of the approximation. (E)</p>	Unit 4 Amplify Desmos Math, Grade 8 is limited to solving systems of linear equations.

<h2>Geometry and Measurement</h2>	
<p>Learning Outcome: Students explore transformations in the coordinate plane and are also expected to understand and explain the Pythagorean Theorem, its converse, and to use this relationship to solve problems and find distance on the coordinate plane.</p>	
<p>8.GM.1 Explore dilations, translations, rotations, and reflections on two-dimensional figures in the coordinate plane. (E)</p>	Unit 1, Unit 2

<p>8.GM.2 Solve real-world and other mathematical problems involving volume of cones, spheres, and pyramids and surface area of spheres. (E)</p>	<p>Unit 5 Amplify Desmos Math, Grade 8 is limited to the volume of cones and spheres.</p>
<p>8.GM.3 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and other mathematical problems in two dimensions. (E)</p>	<p>Unit 8</p>

Data Analysis, Statistics, and Probability	
<p>Learning Outcome: Students begin to investigate and represent bivariate data using scatter plots. They build on their experience with univariate data. Students also build on the probability work in grade seven to examine and represent the probability and compound events.</p>	
<p>8.DSP.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantitative variables. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</p>	<p>Unit 6</p>
<p>8.DSP.2 Write and use equations that model linear relationships to make predictions, including interpolation and extrapolation, in real-world situations involving bivariate measurement data. Interpret the slope and y-intercept in context. (E)</p>	<p>Unit 9 Extrapolation is not addressed in Amplify Desmos Math, Grade 8.</p>
<p>8.DSP.3 Represent sample spaces and find probabilities of compound events (independent and dependent) using organized lists, tables, and tree diagrams.(E)</p>	<p>This standard is addressed in Amplify Desmos Math, Grade 7 but is limited to independent compound events.</p>
<p>8.DSP.4 Define the probability of a compound event, just as with simple events, as the fraction of outcomes in the sample space for which the compound event occurs. Use appropriate terminology to describe independent, dependent, complementary, and mutually exclusive events. (E)</p>	<p>This standard is addressed in Amplify Desmos Math, Grade 7 but is limited to independent compound events. Terminology to describe independent, dependent, complementary, and mutually exclusive events is not addressed.</p>
<p>8.DSP.5 For events with a large number of outcomes, understand the use of the multiplication counting principle. Develop the multiplication counting principle, and apply it to situations with a large number of outcomes.</p>	<p>This standard is not addressed in Amplify Desmos Math, Grade 8.</p>