Mississippi Mathematics

Foundations of Algebra

Standards for Mathematical Practice (SMP)

Approach Mathematics Confidently and Adaptively, Applying Understanding and Skills Effectively across Diverse Contexts

1 Make sense of problems and persevere in solving them. FA.SMP.1

2 Reason abstractly and quantitatively. FA.SMP.2

3 Construct viable arguments and critique the reasoning of others. FA.SMP.3

4 Model with mathematics. FA.SMP.4

5 Use appropriate tools strategically. FA.SMP.5

6 Attend to precision. FA.SMP.6

7 Look for and make use of structure. FA.SMP.7

8 Look for and express regularity in repeated reasoning. FA.SMP.8

Algebra (A)

Equations and Inequalities

1 Interpret key features of an expression (i.e., terms, factors, and coefficients). (A-SSE.1a) FA.A.1

2 Create expressions that can be modeled by a real-world context. FA.A.2

3 Use the structure of an expression to identify ways to rewrite it. (A-SSE.2) FA.A.3

4 Simplify and evaluate numerical and algebraic expressions. (7.EE.1) FA.A.4

5 Compare and contrast an expression and an equation and give examples of each. FA.A.5

6 Given an equation, solve for a specified variable of degree one (i.e., isolate a variable). (6.EE.7, 7.EE.4) FA.A.6

7 Fluently solve and check multi-step equations and inequalities with an emphasis on the distributive property, variables on both sides, and rational coefficients. Explain each step when solving a multi-step equation and inequality. Justify each step using the properties of real numbers. FA.A.7

8 Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. (7.EE.4a) FA.A.8

9 Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. Solve inequalities of these forms fluently. (7.EE.4b) FA.A.9

Skip to main content

10 Graph the solution point of an equation and the solution set of an inequality in one variable on a horizontal number line. For inequalities, be able to interpret and write the solution set in a variety of ways (e.g., set notation). FA.A.10

11 Justify when linear equations in one variable will yield one solution, infinitely many solutions, or no solution. (8.EE.7a) FA.A.11

Functions (F)

Functions

12 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. Use function notation, where appropriate. (F-IF.1, F-IF.2) FA.F.12

13 Compare and contrast a function and a relation. Use appropriate strategies to assess whether a given situation represents a function or a relation (e.g., the vertical line test). FA.F.13

14 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. (F-IF.7) FA.F.14

15 Determine the rate of change of a linear function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. (8.F.4) Use the rate of change to determine if two lines are parallel, perpendicular, or neither. FA.F.15

16 Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. (8.F.4) FA.F.16

17 Create and graph the equation of a linear function given the rate of change and y-intercept. Compare and contrast up to three linear functions written in various forms (i.e., point-slope, slope-intercept, standard form). FA.F.17

18 Given two points, a graph, a table of values, a mapping diagram, or a real-world context, determine the linear function that models this information. Fluently convert between the point-slope, slope-intercept, and standard form of a line. FA.F.18

19 Create and identify the parent function for linear and quadratic functions in the Coordinate Plane. FA.F.19

20 Compare the properties of two functions, each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. (Limited to linear and quadratic functions only.) (8.F.2) FA.F.20

21 Describe the following characteristics of linear and quadratic parent functions by inspection: domain/range, increasing/decreasing intervals, intercepts, symmetry, and asymptotic behavior. Identify each characteristic in set notation or words, where appropriate. (A3.A.8) FA.F.21

Skip to main content

22 Graph a system of two functions, f(x) and g(x), on the same Coordinate Plane by hand for simple cases, and with technology for complicated cases. Explain the relationship between the point(s) of intersection and the solution to the system. Determine the solution(s) using technology, a table of values, substitution, or successive approximations. (Limited to linear and quadratic functions only.) (8.EE.7b, A-REI.6, A-REI.11) FA.F.22

23 With accuracy, graph the solutions to a linear inequality in two variables as a half-plane, and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes on the same Coordinate Plane. (A-REI.12) Construct graphs of linear inequalities and systems of linear inequalities without technology. Use appropriate strategies to verify points that may or may not belong to the solution set. FA.F.23

24 Identify real-world contexts that can be modeled by a system of inequalities in two variables. (Limited to three inequalities.) FA.F.24

25 Identify when systems of equations and inequalities have constraints. (A-CED.3) FA.F.25

26 Perform simple translations on linear functions given in a variety of forms (e.g., two points, a graph, a table of values, a mapping, slope-intercept form, or standard form). Explain the impact on the parent function when the slope is greater than one or less than one, and the effect of increasing/decreasing the y-intercept. FA.F.26

27 Given the graph of function in the form f(x)+ k, kf(x), f(kx), or f(x + k), where k belongs to the set of integers, identify the domain/range, increasing/decreasing intervals, intercepts, symmetry, and asymptotic behavior, where appropriate. (F-BF.3) Identify each characteristic in set notation or as an inequality, where appropriate. (Limited to linear and quadratic functions only.) FA.F.27

28 Identify and graph real-world contexts that can be modeled by a quadratic equation. FA.F.28

29 Solve quadratic equations in standard form by factoring, graphing, using tables, and the Quadratic Formula. Know when the Quadratic Formula might yield complex solutions and the location of the solutions in relation to the x-axis. Know suitable alternatives for the terminology “solution of a quadratic” and when each is appropriate to use. FA.F.29

30 Understand the relationship between the constants of a quadratic equation and the attributes of the graph. Recognize the relationship between the value of the discriminant and the type and number of solutions (i.e., predict the characteristics of a graph given the equation). FA.F.30

Algebra (A)

Polynomials

31 Describe and identify a polynomial of degree one, two, three, and four by examining a polynomial expression or a graph. FA.A.31

32 Add and subtract polynomials using appropriate strategies (e.g.,by using Algebra Tiles). FA.A.32

Skip to main content

33 Factor polynomials using the greatest common factor and factor quadratics that have only rational zeros. FA.A.33

34 Justify why some polynomials are prime over the rational number system. FA.A.34

35 Use the zeros of a polynomial to construct a rough graph of the function. (A-APR.3) FA.A.35

Geometry (G)

Geometry

36 Explain and apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (8.G.7) FA.G.36

37 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (8.G.8) FA.G.37

38 Fluently use formulas and/or appropriate measuring tools to find length and angle measures, perimeter, area, volume, and surface area of polygons, circles, spheres, cones, cylinders, pyramids, and composite or irregular figures. Use them to solve real-world and mathematical problems. (8.G.9) FA.G.38

39 Solve real-world and mathematical problems involving two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.6) FA.G.39

Statistics and Probability (S)

Statistics

40 Without technology, fluently calculate the measures of central tendency (mean, median, mode), measures of spread (range, interquartile range), and understand the impact of extreme values (outliers) on each of these values. (6.SP.5, 8.SP.1, S-ID.3) Justify which measure is appropriate to use when describing a data set or a real-world context. FA.S.40

41 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (8.SP.1) FA.S.41

42 Know when it is and is not appropriate to use a linear model to make predictions about a data set beyond a given set of values. Explain extrapolation and interpolation and the impact both have on predicted values. FA.S.42

43 For scatter plots that suggest a linear association, informally fit a straight line and predict the equation for the line of best fit. (8.SP.2) FA.S.43

44 Justify the relationship between the correlation coefficient and the rate of change for the line of best fit. FA.S.44

45 Understand the difference between correlation and causation and identify real-world contexts that depict each of them. (S-ID.9) FA.S.45