

Mathematics
Grade-Level Expectations: Grade 9

Number and Number Relations

1. Identify and describe differences among natural numbers, whole numbers, integers, rational numbers, and irrational numbers (N-1-H) (N-2-H) (N-3-H)
2. Evaluate and write numerical expressions involving integer exponents (N-2-H)
3. Apply scientific notation to perform computations, solve problems, and write representations of numbers (N-2-H)
4. Distinguish between an exact and an approximate answer, and recognize errors introduced by the use of approximate numbers with technology (N-3-H) (N-4-H) (N-7-H)
5. Demonstrate computational fluency with all rational numbers (e.g., estimation, mental math, technology, paper/pencil) (N-5-H)
6. Simplify and perform basic operations on numerical expressions involving radicals (e.g., $2\sqrt{3} + 5\sqrt{3} = 7\sqrt{3}$) (N-5-H)
7. Use proportional reasoning to model and solve real-life problems involving direct and inverse variation (N-6-H)

Algebra

8. Use order of operations to simplify or rewrite variable expressions (A-1-H) (A-2-H)
9. Model real-life situations using linear expressions, equations, and inequalities (A-1-H) (D-2-H) (P-5-H)
10. Identify independent and dependent variables in real-life relationships (A-1-H)
11. Use equivalent forms of equations and inequalities to solve real-life problems (A-1-H)
12. Evaluate polynomial expressions for given values of the variable (A-2-H)
13. Translate between the characteristics defining a line (i.e., slope, intercepts, points) and both its equation and graph (A-2-H) (G-3-H)
14. Graph and interpret linear inequalities in one or two variables and systems of linear inequalities (A-2-H) (A-4-H)
15. Translate among tabular, graphical, and algebraic representations of functions and real-life situations (A-3-H) (P-1-H) (P-2-H)
16. Interpret and solve systems of linear equations using graphing, substitution, elimination, with and without technology, and matrices using technology (A-4-H)

Measurement

17. Distinguish between precision and accuracy (M-1-H)
18. Demonstrate and explain how the scale of a measuring instrument determines the precision of that instrument (M-1-H)
19. Use significant digits in computational problems (M-1-H) (N-2-H)
20. Demonstrate and explain how relative measurement error is compounded when determining absolute error (M-1-H) (M-2-H) (M-3-H)
21. Determine appropriate units and scales to use when solving measurement problems (M-2-H) (M-3-H) (M-1-H)
22. Solve problems using indirect measurement (M-4-H)

Geometry

23. Use coordinate methods to solve and interpret problems (e.g., slope as rate of change, intercept as initial value, intersection as common solution, midpoint as equidistant) (G-2-H) (G-3-H)
24. Graph a line when the slope and a point or when two points are known (G-3-H)
25. Explain slope as a representation of “rate of change” (G-3-H) (A-1-H)
26. Perform translations and line reflections on the coordinate plane (G-3-H)

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Data Analysis, Probability, and Discrete Math

27. Determine the most appropriate measure of central tendency for a set of data based on its distribution (D-1-H)
28. Identify trends in data and support conclusions by using distribution characteristics such as patterns, clusters, and outliers (D-1-H) (D-6-H) (D-7-H)
29. Create a scatter plot from a set of data and determine if the relationship is linear or nonlinear (D-1-H) (D-6-H) (D-7-H)
30. Use simulations to estimate probabilities (D-3-H) (D-5-H)
31. Define probability in terms of sample spaces, outcomes, and events (D-4-H)
32. Compute probabilities using geometric models and basic counting techniques such as combinations and permutations (D-4-H)
33. Explain the relationship between the probability of an event occurring, and the odds of an event occurring and compute one given the other (D-4-H)
34. Follow and interpret processes expressed in flow charts (D-8-H)

Patterns, Relations, and Functions

35. Determine if a relation is a function and use appropriate function notation (P-1-H)
36. Identify the domain and range of functions (P-1-H)
37. Analyze real-life relationships that can be modeled by linear functions (P-1-H) (P-5-H)
38. Identify and describe the characteristics of families of linear functions, with and without technology (P-3-H)
39. Compare and contrast linear functions algebraically in terms of their rates of change and intercepts (P-4-H)
40. Explain how the graph of a linear function changes as the coefficients or constants are changed in the function's symbolic representation (P-4-H)