Grade 6 Extended Math Pacing Guide 2024-2025

First Nine Weeks

Standard

Exponents & Perfect Squares

6.NS.3 The student will recognize and represent patterns with whole number exponents and perfect squares.

a) Recognize and represent patterns with bases and exponents that are whole numbers.
b) Recognize and represent patterns of perfect squares not to exceed 20^2, by using concrete and pictorial models.
c) Justify if a number between 0 and 400 is a perfect square through modeling or mathematical reasoning.
d) Recognize and represent powers of 10 with whole number exponents by examining patterns in place value.

7.NS.1 The student will investigate and describe the concept of exponents for powers of ten and compare and order numbers greater than zero written in scientific notation.

a) Investigate and describe powers of 10 with negative exponents by examining patterns.
b) Represent a power of 10 with a negative exponent in fraction and decimal form.

7.NS.3 The student will recognize and describe the relationship between square roots and perfect squares.

a) Determine the positive square root of a perfect square from 0 to 400.*
b) Describe the relationship between square roots and perfect squares.*

Integers

6.NS.2 The student will reason and use multiple strategies to represent, compare, and order integers.

a) Represent integers (e.g., number lines, concrete materials, pictorial models), including models derived from contextual situations, and identify an integer represented by a point on a number line.
b) Compare and order integers using a number line.
c) Compare integers, using mathematical symbols (<, >, =).
d) Identify and describe the absolute value of an integer as the distance from zero on the number line.

7.PFA.2 The student will identify and describe absolute value of rational numbers

Computing Integers

6.CE.2 The student will estimate, demonstrate, solve, and justify solutions to problems using operations with integers, including those in context.

a) Demonstrate/model addition, subtraction, multiplication, and division of integers using pictorial representations or concrete manipulatives.*
b) Add, subtract, multiply, and divide two integers.*
c) Simplify an expression that contains absolute value bars | | and an operation with two integers (e.g., –|5 – 8| or $\frac{|-12|}{8}$) and represent the result on a number line.
d) Estimate, determine, and justify the solution to one and two-step contextual problems, involving addition, subtraction, multiplication, and division with integers.

7.CE.1 The student will estimate, solve, and justify solutions to multistep contextual problems involving operations with rational numbers.

a) Estimate, solve, and justify solutions to contextual problems involving addition, subtraction, multiplication, and division with rational numbers expressed as integers, fractions (proper or improper), mixed numbers, and decimals. Fractions may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place.

Coordinate Plane

6.MG.3 The student will describe the characteristics of the coordinate plane and graph ordered pairs.

a) Identify and label the axes, origin, and quadrants of a coordinate plane.
b) Identify and describe the location (quadrant or the axis) of a point given as an ordered pair. Ordered pairs will be limited to coordinates expressed as integers.

c) Graph ordered pairs in the four quadrants and on the axes of a coordinate plane. Ordered pairs will be limited to coordinates expressed as integers.
d) Identify ordered pairs represented by points in the four quadrants and on the axes of the coordinate plane. Ordered pairs will be limited to coordinates expressed as integers.
e) Relate the coordinates of a point to the distance from each axis and relate the coordinates of a single point to another point on the same horizontal or vertical line. Ordered pairs will be limited to coordinates expressed as integers.
f) Draw polygons in the coordinate plane given coordinates for the vertices; use coordinates to determine the length of a side joining points with the same first coordinate or the same second coordinate. Ordered pairs will be limited to coordinates expressed as integers. Apply these techniques in the context of solving contextual and mathematical problems.

Ratios

6.PFA.1 The student will use ratios to represent relationships between quantities, including those in context.

a) Represent a relationship between two quantities using ratios.
b) Represent a relationship in context that makes a comparison by using the notations $\frac{a}{b}$, *a:b*, and *a* to *b*.
c) Represent different comparisons within the same quantity or between different quantities (e.g., part to part, part to whole, whole to whole).
d) Create a relationship in words for a given ratio expressed symbolically.
e) Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a ratio.
f) Create a table of equivalent ratios to represent a proportional relationship between two quantities, when given a contextual situation.

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Second Nine Weeks

Standard

Fractions, Mixed Numbers, Decimals, Percents

6.NS.1 The student will reason and use multiple strategies to express equivalency, compare, and order numbers written as fractions, mixed numbers, decimals, and percents.

a) Estimate and determine the percent represented by a given model (e.g., number line, picture, verbal description), including percents greater than 100% and less than 1%.*

b) Represent and determine equivalencies among decimals (through the thousandths place) and percents incorporating the use of number lines, and concrete and pictorial models.*

c) Represent and determine equivalencies among fractions (proper or improper) and mixed numbers that have denominators that are 12 or less or factors of 100 and percents incorporating the use of number lines, and concrete and pictorial models.*

d) Represent and determine equivalencies among decimals, percents, fractions (proper or improper), and mixed numbers that have denominators that are 12 or less or factors of 100 incorporating the use of number lines, and concrete and pictorial models.*

e) Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare and order no more than four positive rational numbers expressed as fractions (proper or improper), mixed numbers, decimals, and percents (decimals through thousandths, fractions with denominators of 12 or less or factors of 100) with and without models. Justify solutions orally, in writing or with a model. Ordering may be in ascending or descending order.*

7.NS.1 The student will investigate and describe the concept of exponents for powers of ten and compare and order numbers greater than zero written in scientific notation.

d) Compare and order no more than four numbers greater than 0 written in scientific notation. Ordering may be in ascending or descending order.*

7.NS.2 The student will reason and use multiple strategies to compare and order rational numbers.

a) Use multiple strategies (e.g., benchmarks, number line, equivalency) to compare (using symbols <, >, =) and order (a set of no more than four) rational numbers expressed as integers, fractions (proper or improper), mixed numbers, decimals, and percents. Fractions and mixed numbers may be positive or negative. Decimals may be positive or negative and are limited to the thousandths place. Ordering may be in ascending or descending order. Justify solutions orally, in writing or with a model.*

Computing Fractions & Mixed Numbers

6.CE.1 The student will estimate, demonstrate, solve, and justify solutions to problems using operations with fractions and mixed numbers, including those in context.

a) Demonstrate/model multiplication and division of fractions (proper or improper) and mixed numbers using multiple representations.*

b) Multiply and divide fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form.*

c) Investigate and explain the effect of multiplying or dividing a fraction, whole number, or mixed number by a number between zero and one.*

d) Estimate, determine, and justify the solution to single-step and multistep problems in context that involve addition and subtraction with fractions (proper or improper) and mixed numbers, with and without regrouping, that include like and unlike denominators of 12 or less. Answers are expressed in simplest form.

e) Estimate, determine, and justify the solution to single-step and multistep problems in context that involve multiplication and division with fractions (proper or improper) and mixed numbers that include denominators of 12 or less. Answers are expressed in simplest form.

Proportional Relationships

6.PFA.2 The student will identify and represent proportional relationships between two quantities, including those in context (unit rates are limited to positive values).

a) Identify the unit rate of a proportional relationship represented by a table of values, a contextual situation, or a graph.
b) Determine a missing value in a ratio table that represents a proportional relationship between two quantities using a unit rate.
c) Determine whether a proportional relationship exists between two quantities, when given a table of values, context, or graph.
d) When given a contextual situation representing a proportional relationship, find the unit rate and create a table of values or a graph.
e) Make connections between and among multiple representations of the same proportional relationship using verbal descriptions, ratio tables, and graphs.

7.PFA.1 The student will investigate and analyze proportional relationships between two quantities using verbal descriptions, tables, equations in $y = mx$ form, and graphs, including problems in context.

a) Determine the slope, *m*, as the rate of change in a proportional relationship between two quantities given a table of values, graph, or contextual situation and write an equation in the form $y = mx$ to represent the direct variation relationship. Slope may include positive or negative values (slope will be limited to positive values in a contextual situation).
c) Graph a line representing a proportional relationship, between two quantities given an ordered pair on the line and the slope, *m*, as rate of change. Slope may include positive or negative values.
d) Graph a line representing a proportional relationship between two quantities given the equation of the line in the form $y = mx$, where *m* represents the slope as rate of change. Slope may include positive or negative values.

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Third Nine Weeks

Standard

Linear Equations

6.PFA.3 The student will write and solve one-step linear equations in one variable, including contextual problems that require the solution of a one-step linear equation in one variable.

a) Identify and develop examples of the following algebraic vocabulary: equation, variable, expression, term, and coefficient.
b) Represent and solve one-step linear equations in one variable, using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale).
c) Apply properties of real numbers and properties of equality to solve a one-step equation in one variable. Coefficients are limited to integers and unit fractions. Numeric terms are limited to integers.
d) Confirm solutions to one-step linear equations in one variable using a variety of concrete manipulatives and pictorial representations (e.g., colored chips, algebra tiles, weights on a balance scale).
e) Write a one-step linear equation in one variable to represent a verbal situation, including those in context.
f) Create a verbal situation in context given a one-step linear equation in one variable.

7.PFA.3 The student will write and solve two-step linear equations in one variable, including problems in context, that require the solution of a two-step linear equation in one variable.

a) Represent and solve two-step linear equations in one variable using a variety of concrete materials and pictorial representations.
b) Apply properties of real numbers and properties of equality to solve two-step linear equations in one variable. Coefficients and numeric terms will be rational.
c) Confirm algebraic solutions to linear equations in one variable.
d) Write a two-step linear equation in one variable to represent a verbal situation, including those in context.
e) Create a verbal situation in context given a two-step linear equation in one variable.
f) Solve problems in context that require the solution of a two-step linear equation.

Linear Inequalities

6.PFA.4 The student will represent a contextual situation using a linear inequality in one variable with symbols and graphs on a number line.

a) Given the graph of a linear inequality in one variable on a number line, represent the inequality in two equivalent ways (e.g., $x < -5$ or $-5 > x$) using symbols. Symbols include $<$, $>$, $\leq$, $\geq$.
b) Write a linear inequality in one variable to represent a given constraint or condition in context or given a graph on a number line.
c) Given a linear inequality in one variable, create a corresponding contextual situation or create a number line graph.
d) Use substitution or a number line graph to justify whether a given number in a specified set makes a linear inequality in one variable true.
e) Identify a numerical value(s) that is part of the solution set of a given inequality in one variable.

7.PFA.4 The student will write and solve one- and two-step linear inequalities in one variable, including problems in context, that require the solution of a one- and two-step linear inequality in one variable.

a) Apply properties of real numbers and the addition, subtraction, multiplication, and division properties of inequality to solve one- and two-step inequalities in one variable. Coefficients and numeric terms will be rational.
b) Investigate and explain how the solution set of a linear inequality is affected by multiplying or dividing both sides of the inequality statement by a rational number less than zero.
c) Represent solutions to one- or two-step linear inequalities in one variable algebraically and graphically using a number line.
d) Write one- or two-step linear inequalities in one variable to represent a verbal situation, including those in context.
e) Create a verbal situation in context given a one or two-step linear inequality in one variable.

f) Solve problems in context that require the solution of a one- or two-step inequality.
g) Identify a numerical value(s) that is part of the solution set of as given one- or two-step linear inequality in one variable.
h) Describe the differences and similarities between solving linear inequalities in one variable and linear equations in one variable.

The Data Cycle

6.PS.1 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on circle graphs.

a) Formulate questions that require the collection or acquisition of data with a focus on circle graphs.
b) Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments).
c) Determine the factors that will ensure that the data collected is a sample that is representative of a larger population.
d) Organize and represent data using circle graphs, with and without the use of technology tools. The number of data values should be limited to allow for comparisons that have denominators of 12 or less or those that are factors of 100
e) Analyze data represented in a circle graph by making observations and drawing conclusions.
f) Compare data represented in a circle graph with the same data represented in other graphs, including but not limited to bar graphs, pictographs, and line plots (dot plots), and justify which graphical representation best represents the data.

7.PS.2 The student will apply the data cycle (formulate questions; collect or acquire data; organize and represent data; and analyze data and communicate results) with a focus on histograms.

a) Formulate questions that require the collection or acquisition of data with a focus on histograms.
b) Determine the data needed to answer a formulated question and collect the data (or acquire existing data) using various methods (e.g., observations, measurement, surveys, experiments).
c) Determine how sample size and randomness will ensure that the data collected is a sample that is representative of a larger population.
d) Organize and represent numerical data using histograms with and without the use of technology
e) Investigate and explain how using different intervals could impact the representation of the data in a histogram.
f) Compare data represented in histograms with the same data represented in other graphs, including but not limited to line plots (dot plots), circle graphs, and stem-and-leaf plots, and justify which graphical representation best represents the data.
g) Analyze data represented in histograms by making observations and drawing conclusions. Determine how histograms reveal patterns in data that cannot be easily seen by looking at the corresponding given data set.

6.PS.2 The student will represent the mean as a balance point and determine the effect on statistical measures when a data point is added, removed, or changed.

a) Represent the mean of a set of data graphically as the balance point represented in a line plot (dot plot).
b) Determine the effect on measures of center when a single value of a data set is added, removed, or changed.
c) Observe patterns in data to identify outliers and determine their effect on mean, median, mode, or range.

Circles

6.MG.1 The student will identify the characteristics of circles and solve problems, including those in context, involving circumference and area.

a) Identify and describe chord, diameter, radius, circumference, and area of a circle.
b) Investigate and describe the relationship between:
   i) diameter and radius; ii) radius and circumference; and iii) diameter and circumference.
c) Develop an approximation for pi (3.14) by gathering data and comparing the circumference to the diameter of various circles, using concrete manipulatives or technological models.
d) Develop the formula for circumference using the relationship between diameter, radius, and pi.
e) Solve problems, including those in context, involving circumference and area of a circle when given the length of the diameter or radius.

Grade 6 Extended Math Pacing Guide 2024-2025
Fourth Nine Weeks
Standard
Area & Perimeter **6.MG.2 The student will reason mathematically to solve problems, including those in context, that involve the area and perimeter of triangles and parallelograms.** a) Develop the formula for determining the area of parallelograms and triangles using pictorial representations and concrete manipulatives (e.g., two-dimensional diagrams, grid paper). b) Solve problems, including those in context, involving the perimeter and area of triangles and parallelograms. **Congruency** **6.MG.4 The student will determine congruence of segments, angles, and polygons.** a) Identify regular polygons. b) Draw lines of symmetry to divide regular polygons into two congruent parts. c) Determine the congruence of segments, angles, and polygons given their properties. d) Determine whether polygons are congruent or noncongruent according to the measures of their sides and angles. **SOL Review**