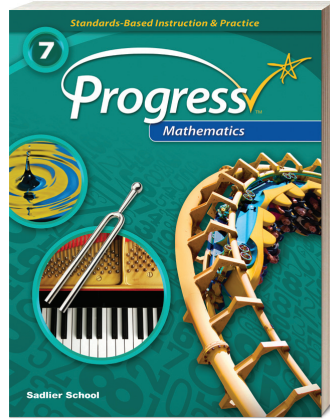


SADLIER

Progress Mathematics



Aligned to the

College and Career Ready Indiana Academic Standards Mathematics: Grade 7

Contents

- 2 Number Sense
- 2 Computation
- 4 Algebra and Functions
- 6 Geometry and Measurement
- 7 Data Analysis, Statistics, and Probability

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Number Sense

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.NS.1: Find the prime factorization of whole numbers and write the results using exponents.

7.NS.2: Understand the inverse relationship between squaring and finding the square root of a perfect square integer. Find square roots of perfect square integers.

7.NS.3: Know there are rational and irrational numbers. Identify, compare, and order rational and common irrational numbers ($\sqrt{2}$, $\sqrt{3}$, $\sqrt{5}$, π) and plot them on a number line.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Not addressed at this level.

Not addressed at this level.

Lesson 27 Use Formulas for Area and Circumference of Circles—pp. 236–243
Understand: Relating the diameter of a circle to its circumference (explaining pi as an irrational number)
Understand: Using the formula for the circumference of a circle
Understand: Using the formula for the area of a circle

Computation

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.C.1: Understand $p + q$ as the number located a distance $|q|$ from p , in the positive or negative direction, depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

7.C.2: Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. 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.

7.C.3: Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers.

7.C.4: Understand that integers can be divided, provided that the divisor is not zero, and that every quotient of integers (with non-zero divisor) is a rational number. Understand that if p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$.

7.C.5: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 8 Understand Addition of Integers—pp. 72–79
Understand: Using a number line to add integers
Understand: Using absolute values to add two integers

Foundational Skills Handbook—p. 371
F. Positive and negative numbers, opposites, and absolute value

Lesson 9 Understand Subtraction of Integers—pp. 80–87
Understand: Subtracting integers

Foundational Skills Handbook—p. 371
F. Positive and negative numbers, opposites, and absolute value

Lesson 11 Understand Multiplication of Integers—pp. 96–103
Understand: Using properties of rational numbers to multiply two integers
Understand: Using rules to multiply two integers

Lesson 12 Understand Division of Integers—pp. 104–111
Understand: Using a rule to divide integers
Understand: Dividing two integers when the quotient is not an integer

Lesson 1 Compute Unit Rates—pp. 10–17
Understand: Unit rates for ratios of fractional quantities with like units
Understand: Unit rates with money

Foundational Skills Handbook—p. 369
A. Understand: What a unit rate is

Computation

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.C.6: Use proportional relationships to solve ratio and percent problems with multiple operations, such as the following: simple interest, tax, markups, markdowns, gratuities, commissions, fees, conversions within and across measurement systems, percent increase and decrease, and percent error.

7.C.7: Compute with rational numbers fluently using a standard algorithmic approach.

7.C.8: Solve real-world problems with rational numbers by using one or two operations.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 6 Problem Solving: Multi-step Ratio Problems—pp. 50–57
Understand: Using equations to solve multi-step ratio problems

Lesson 7 Problem Solving: Multi-step Percent Problems—pp. 58–65
Understand: Solving percent decrease problems
Understand: Solving percent increase problems
Understand: Solving percent error problems

Foundational Skills Handbook—p. 370
C. Understand: Finding a percent of a quantity

Lesson 8 Understand Addition of Integers—pp. 72–79
Understand: Using a number line to add integers
Understand: Using absolute values to add two integers

Lesson 9 Understand Subtraction of Integers—pp. 80–87
Understand: Subtracting integers

Lesson 10 Add and Subtract Rational Numbers—pp. 88–95
Understand: Adding rational numbers that are not integers
Understand: Subtracting rational numbers that are not integers

Lesson 11 Understand Multiplication of Integers—pp. 96–103
Understand: Using properties of rational numbers to multiply two integers
Understand: Using rules to multiply two integers

Lesson 12 Understand Division of Integers—pp. 104–111
Understand: Using a rule to divide integers
Understand: Dividing two integers when the quotient is not an integer

Lesson 13 Multiply and Divide Rational Numbers—pp. 112–119
Understand: Multiplying and dividing rational numbers that are not integers

Lesson 8 Understand Addition of Integers—pp. 72–79
Understand: Using a number line to add integers
Understand: Using absolute values to add two integers

Lesson 9 Understand Subtraction of Integers—pp. 80–87
Understand: Subtracting integers

Lesson 10 Add and Subtract Rational Numbers—pp. 88–95
Understand: Adding rational numbers that are not integers
Understand: Subtracting rational numbers that are not integers

Computation

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

SADLIER PROGRESS MATHEMATICS, GRADE 7

- Lesson 11 Understand Multiplication of Integers**—pp. 96–103
Understand: Using properties of rational numbers to multiply two integers
Understand: Using rules to multiply two integers
- Lesson 12 Understand Division of Integers**—pp. 104–111
Understand: Using a rule to divide integers
Understand: Dividing two integers when the quotient is not an integer
- Lesson 13 Multiply and Divide Rational Numbers**—pp. 112–119
Understand: Multiplying and dividing rational numbers that are not integers
- Lesson 15 Apply Rational-Number Operations**—pp. 128–135
Understand: Evaluate mathematical expressions using the order of operations
- Lesson 18 Problem Solving: Multi-step Problems with Rational Numbers**—pp. 158–165
Understand: Estimating with rational numbers

Algebra and Functions

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

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 (e.g., given $2x - 10$, create an equivalent expression $2(x - 5)$). Justify each step in the process.

7.AF.2: 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.

SADLIER PROGRESS MATHEMATICS, GRADE 7

- Lesson 8 Understand Addition of Integers**—pp. 72–79
Understand: Using absolute values to add two integers (additive inverse)
- Lesson 11 Understand Multiplication of Integers**—pp. 96–103
Understand: Using properties of rational numbers to multiply two integers (commutative, distributive properties)
- Lesson 16 Combine Like Terms to Simplify Linear Expressions**—pp. 142–149
Understand: Combining like terms to simplify expressions (associative property)
- Lesson 17 Expand and Factor Linear Expressions**—pp. 150–157
Understand: Factoring an expression
- Properties of Addition and Multiplication**—p. 380
- Lesson 19 Solve Linear Equations**—pp. 166–173
Understand: Solving equations of the form $x + \neg p = q$
Understand: Solving equations of the form $px \neg = q$
- Lesson 20 Problem Solving: Linear Equations**—pp. 174–181
Understand: Using equations to solve real-world problems
Understand: Using equations to solve mathematical problems

Algebra and Functions

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.AF.3: Define and use multiple variables when writing expressions to represent real-world and other mathematical problems, and evaluate them for given values.

7.AF.4: Define slope as vertical change for each unit of horizontal change and recognize that a constant rate of change or constant slope describes a linear function. Identify and describe situations with constant or varying rates of change.

7.AF.5: Graph a line given its slope and a point on the line. Find the slope of a line given its graph.

7.AF.6: Decide whether two quantities are in a proportional relationship (e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin).

7.AF.7: Identify the unit rate or constant of proportionality in tables, graphs, equations, and verbal descriptions of proportional relationships.

7.AF.8: Explain what the coordinates of a point on the graph of a proportional relationship mean in terms of the situation, with special attention to the points (0, 0) and (1, r), where r is the unit rate.

7.AF.9: Identify real-world and other mathematical situations that involve proportional relationships. Write equations and draw graphs to represent proportional relationships and recognize that these situations are described by a linear function in the form $y = mx$, where the unit rate, m , is the slope of the line.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Foundational Skills Handbook—p. 373

I. Understand: Solving equations of the forms $x + p = q$ and $px = q$

Lesson 5 Interpret Graphs of Proportional Relationships—pp. 42–49

Understand: The meaning of the points on the graph of a proportional relationship (two variables)

Lesson 27 Use Formulas for Area and Circumference of Circles—pp. 236–243

Understand: Using the formula for the circumference of a circle

Understand: Using the formula for the area of a circle

Lesson 29 Problem Solving: Area, Volume, and Surface Area—pp. 252–259

Understand: Finding area of a two-dimensional shape

Understand: Finding the surface area of a three-dimensional object

Understand: Finding the volume of a three-dimensional object

Foundational Skills Handbook—p. 372

G. Understand: Evaluating algebraic expressions

H. Understand: Using expressions to write an equation

Not addressed at this level (see Gr. 8).

Not addressed at this level (see Gr. 8).

Lesson 2 Identify Proportional Relationships—pp. 18–25

Understand: Using a table to test for a proportional relationship

Understand: Using a graph to test for a proportional relationship

Lesson 3 Identify the Constant of Proportionality—pp. 26–33

Understand: Identifying the unit rate from a graph or from an equation

Understand: Identifying a unit rate from a double number line diagram

Lesson 5 Interpret Graphs of Proportional Relationships—pp. 42–49

Understand: The meaning of the points on the graph of a proportional relationship

Lesson 2 Identify Proportional Relationships—pp. 18–25

Understand: Using a table to test for a proportional relationship

Understand: Using a graph to test for a proportional relationship

Algebra and Functions

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 3 Identify the Constant of Proportionality—pp. 26–33

Understand: Identifying the unit rate from a graph or from an equation

Understand: Identifying a unit rate from a double number line diagram

Lesson 4 Represent Proportional Relationships with Equations—pp. 34–41

Understand: Representing a proportional relationship with an equation

*Linear functions formally introduced in Gr. 8.

Lesson 5 Interpret Graphs of Proportional Relationships—pp. 42–49

Understand: The meaning of the points on the graph of a proportional relationship (two variables)

*Slope formally introduced in Gr. 8.

Lesson 6 Problem Solving: Multi-step Ratio Problems—pp. 50–57

Understand: Using equations to solve multi-step ratio problems

Lesson 7 Problem Solving: Multi-step Percent Problems—pp. 58–65

Understand: Solving percent decrease problems

Understand: Solving percent increase problems

Understand: Solving percent error problems

Foundational Skills Handbook—p. 372

G. Understand: Evaluating algebraic expressions

H. Understand: Using expressions to write an equation

Geometry and Measurement

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.GM.1: Draw triangles (freehand, with ruler and protractor, and using technology) with given conditions from three measures of angles or sides, and notice when the conditions determine a unique triangle, more than one triangle, or no triangle.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 24 Draw Shapes that Meet Given Conditions—pp. 212–219

Understand: Drawing a geometric shape to meet given conditions

Understand: Drawing a triangle when given three side lengths

Understand: Drawing a triangle when given three angle measures

Lesson 25 Construct Triangles Using Both Side Lengths and Angle Measures—pp. 220–227

Understand: Drawing a triangle when given two side lengths and the measure of the angle between them

Understand: Drawing a triangle when given two side lengths and the measure of an angle not between them

Understand: Drawing a triangle when given two angle measures and the length of one side

Geometry and Measurement

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.GM.2: Identify and describe similarity relationships of polygons including the angle-angle criterion for similar triangles, and solve problems involving similarity.

7.GM.3: 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.

7.GM.4: Solve real-world and other mathematical problems that involve vertical, adjacent, complementary, and supplementary angles.

7.GM.5: 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.

7.GM.6: Solve real-world and other mathematical problems involving volume of cylinders and three-dimensional objects composed of right rectangular prisms.

7.GM.7: Construct nets for right rectangular prisms and cylinders and use the nets to compute the surface area; apply this technique to solve real-world and other mathematical problems.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Not addressed at this level (see Gr. 8).

Lesson 23 Use Scale Drawings to Solve Problems—pp. 204–211
Understand: Solving problems about scale drawings
Understand: Reproducing a scale drawing at a different scale

Lesson 28 Use Equations to Find Unknown Angle Measures—pp. 244–251
Understand: Identifying pairs of adjacent angles
Understand: Identifying pairs of vertical angles
Understand: Using facts about complementary angles to write equations to find the unknown angle measure in a figure
Understand: Using facts about supplementary angles to write equations to find the unknown angle measure in a figure

Lesson 27 Use Formulas for Area and Circumference of Circles—pp. 236–243
Understand: Relating the diameter of a circle to its circumference
Understand: Using the formula for the circumference of a circle
Understand: Relating the circumference of a circle to the area of a circle
Understand: Using the formula for the area of a circle

Lesson 29 Problem Solving: Area, Volume, and Surface Area—pp. 252–259
Understand: Finding area of a two-dimensional shape
Understand: Finding the surface area of a three-dimensional object
Understand: Finding the volume of a three-dimensional object

Not addressed at this level (see Gr. 6).

Data Analysis, Statistics, and Probability

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.DSP.1: Understand that statistics can be used to gain information about a population by examining a sample of the population and generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 30 Understand Sampling—pp. 266–273
Understand: Judging if a sample is representative of a population
Understand: Choosing a sampling method

Data Analysis, Statistics, and Probability

MATHEMATICS STANDARDS & DESCRIPTION, GRADE 7

7.DSP.2: Use data from a random sample to draw inferences about a population. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.DSP.3: Find, use, and interpret measures of center (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.

7.DSP.4: 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.

7.DSP.5: 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.

7.DSP.6: Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its relative frequency from a large sample.

7.DSP.7: 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.

SADLIER PROGRESS MATHEMATICS, GRADE 7

Lesson 31 Use Sampling to Draw Inferences—pp. 274–281

Understand: Drawing Inferences about a population from a random sample

Understand: Using multiple samples to make inferences about a population

Lesson 33 Use Sample Statistics to Compare Populations—pp. 290–297

Understand: Selecting a measure of center to compare random samples

Understand: Using random samples to compare populations

Lesson 32 Use Visual Overlap to Compare Distributions—pp. 282–289

Understand: Comparing displays of data sets visually

Understand: Comparing data sets using their measures of center and variability

Understand: Expressing a difference in means as a multiple of MAD

Lesson 34 Understand Probability of a Chance Event—pp. 298–305

Understand: The probability of an event

Understand: Find the probability of a certain event

Understand: Find the probability of an impossible event

Lesson 35 Relate Relative Frequency and Probability—pp. 306–313

Understand: Finding approximate probability using relative frequency

Understand: Using a known probability to predict the frequency of a given outcome

Lesson 36 Develop a Uniform Probability Model—pp. 314–321

Understand: Calculate theoretical probability

Understand: Random drawing

Lesson 37 Use a Chance Process to Develop a Probability Model—pp. 322–329

Understand: Experimental probability

Understand: Finding experimental probability