

Catholic Identity Standards

7A.0 The student understands and integrates the content of what is learned into their faith and daily life.

- 7A.0A recognize that every human life is sacred because each person is created and loved by God
- 7A.0B describe ways to take part in/be responsible to the community by discerning and using our God-given gifts
- 7A.0C recognize and oppose unjust social structures and work toward justice for all
- 7A.0D see God at work in all things and as expressed in the sacraments
- 7A.0E connect scripture, tradition, and the models of Mary and the saints to guide, grow, and deepen faith

Mathematical Process Standards

7A.1 The student uses mathematical processes to acquire and demonstrate mathematical understanding.

- 7A.1A apply mathematics to problems arising in everyday life, society, and the workplace
- 7A.1B use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution
- 7A.1C select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems
- 7A.1D communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate
- 7A.1E create and use representations to organize, record, and communicate mathematical ideas
- 7A.1F analyze mathematical relationships to connect and communicate mathematical ideas
- 7A.1G display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication
- 7A.GS1* demonstrate the mental habits of precise, determined, careful, and accurate questioning, inquiry, and reasoning in the pursuit of transcendent truths
- 7A.GS2* develop lines of inquiry to understand why things are true and why they are false
- 7A.GS3* have faith in the glory and dignity of human reason as both a gift from God and a reflection of Him in whose image and likeness we are made
- 7A.GS4* explain how mathematics in its reflection of the good, true, and beautiful reveals qualities of being and the presence of God
- 7A.DS8* exhibit humility at knowing that as a human being man can only grasp a portion of the truths of the universe
- 7A.DS9* advance an understanding of the ability of the human intellect to know and the desire of the will to want to know more

Numeracy--Foundations of Real Numbers

7A.2 The student applies mathematical process standards to represent and use real numbers in a variety of forms.

- 7A.2A extend previous knowledge of sets and subsets using a visual representation to describe relationships between sets of real numbers
- 7A.2B approximate the value of an irrational number, including π and square roots of numbers less than 225, and locate that rational number approximation on a number line
- 7A.2C convert between standard decimal notation and scientific notation
- 7A.2D order a set of real numbers arising from mathematical and real-world contexts
- 7A.IS6* evaluate the ongoing nature of mathematical inquiry, its inexhaustibility, and its openness to the infinite

Numeracy--Operations with Rational Numbers

7A.3 The student applies mathematical process standards to add, subtract, multiply, and divide while solving problems and justifying solutions.

7A.DS5* Exhibit habits of thinking quantitatively and in an orderly manner, especially through immersion in mathematical observations found within creation

- 7A.3A add, subtract, multiply, and divide rational numbers fluently
- 7A.3B apply and extend previous understandings of operations to solve problems using addition, subtraction, multiplication, and division of rational numbers

Numeracy--Applications of Percents

7A.4 The student applies mathematical process standards to represent and solve problems involving percents as proportional relationships.

- 7A.4A solve problems involving ratios, rates, and percents, including multi-step problems involving percent increase and percent decrease, and financial literacy problems
- 7A.4B calculate and compare simple interest and compound interest earnings
- 7A.4C analyze and compare monetary incentives, including sales, rebates, and coupons
- 7A.4D solve real-world problems comparing how interest rate and loan length affect the cost of credit
- 7A.4E calculate the total cost of repaying a loan, including credit cards and easy access loans, under various rates of interest and over different periods using an online calculator
- 7A.4F explain how small amounts of money invested regularly, including money saved for college and retirement, grow over time
- 7A.4G estimate the cost of a two-year and four-year college education, including family contribution, and devise a periodic savings plan for accumulating the money needed to contribute to the total cost of attendance for at least the first year of college

Proportionality--Geometric Ratios

7A.5 The student applies mathematical process standards to use geometry to describe or solve problems involving proportional relationships such as dilations.

- 7A.5A describe π as the ratio of the circumference of a circle to its diameter
- 7A.5B generalize the critical attributes of similarity, including ratios within and between similar shapes
- 7A.5C solve mathematical and real-world problems involving similar shape and scale drawings

7A.5D	compare and contrast the attributes of a shape and its dilation(s) on a coordinate plane
7A.5E	use an algebraic representation to explain the effect of a given positive rational scale factor applied to two-dimensional figures on a coordinate plane with the origin as the center of dilation
7A.IS7*	explain man's limitations of understanding and uncovering all mathematical knowledge

Proportionality--Probability

7A.6	The student applies mathematical process standards to use probability and statistics to describe or solve problems involving proportional relationships.
7A.IS2*	Demonstrate how sound logical arguments and other processes of mathematics are foundational to its discipline
7A.IS3*	Recognize how mathematical arguments and processes can be extrapolated to other areas of study, including theology and philosophy
7A.IS5*	Recognize personal bias in inquiry and articulate why inquiry should be undertaken in a fair and independent manner
7A.6A	represent sample spaces for simple and compound events using lists and tree diagrams
7A.6B	select and use different simulations to represent simple and compound events with and without technology
7A.6C	make predictions and determine solutions using experimental data for simple and compound events
7A.6D	make predictions and determine solutions using theoretical probability for simple and compound events
7A.6E	find the probabilities of a simple event and its complement and describe the relationship between the two
7A.6F	solve problems using qualitative and quantitative predictions and comparisons from simple experiments
7A.6G	determine experimental and theoretical probabilities related to simple and compound events using data and sample spaces

One-Variable Expressions, Equations, and Relationships--Applications of One-Variable Relationships

7A.7	The student applies mathematical process standards to use one-variable equations or inequalities in problem situations.
7A.7A	represent solutions for one-variable, two-step inequalities on number lines
7A.7B	model and solve one-variable, two-step inequalities
7A.7C	write one-variable equations or inequalities with variables on both sides that represent problems using rational number coefficients and constants
7A.7D	write a corresponding real-world problem when given a one-variable equation or inequality with variables on both sides of the equal sign using rational number coefficients and constants
7A.7E	model and solve one-variable equations with variables on both sides of the equal sign that represent mathematical and real-world problems using rational number coefficients and constants

Two-Variable Equations and Relationships--Foundations of Linear Relationships

7A.8	The student applies mathematical process standards to use proportional and non-proportional relationships to develop foundational concepts of functions.
7A.8A	determine the constant of proportionality ($k = y/x$) within mathematical and real-world problems
7A.8B	distinguish between proportional and non-proportional situations using tables, graphs, and equations in the form $y = kx$ or $y = mx + b$, where $b \neq 0$
7A.8C	identify examples of proportional and non-proportional relationships that arise from mathematical and real-world problems

Two-Variable Equations and Relationships--Applications of Linear Relationships

7A.9	The student applies mathematical process standards to represent linear relationships using multiple representations.
7A.9A	represent linear proportional and non-proportional relationships using verbal descriptions, tables, graphs, and equations that simplify to the form $y = mx + b$

Geometric Expressions, Equations, and Relationships--Foundations of Geometric Concepts

7A.10	The student applies mathematical process standards to develop geometric relationships and solve problems.
7A.10A	use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas
7A.10B	solve problems involving the lateral and total surface area of a rectangular prism, rectangular pyramid, triangular prism, and triangular pyramid by determining the area of the shape's net
7A.10C	describe the volume formula $V = Bh$ of a cylinder in terms of its base area and its height
7A.10D	model the relationship between the volume of a rectangular prism and a rectangular pyramid having both congruent bases and heights and connect that relationship to the formulas
7A.10E	explain verbally and symbolically the relationship between the volume of a triangular prism and a triangular pyramid having both congruent bases and heights and connect that relationship to the formulas
7A.10F	model the relationship between the volume of a cylinder and a cone having both congruent bases and heights and connect that relationship to the formulas
7A.10G	use models and diagrams to explain the Pythagorean theorem
7A.10H	use informal arguments to establish facts about the angle sum and exterior angle of triangles, the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles
7A.IS1*	explain the nature of rational discourse and argument and the desirability of precision and deductive certainty which mathematics makes possible and is not possible to the same degree in other disciplines
7A.DS6*	Propose how mathematical objects or proofs (such as the golden mean, the Fibonacci numbers, the musical scale, and geometric proofs) suggest divine origin

Geometric Expressions, Equations, and Relationships--Applications of Geometric Concepts

7A.11 The student applies mathematical process standards to solve geometric problems.

- 7A.11A determine the circumference and area of circles
- 7A.11B determine the area of composite figures containing combinations of rectangles, squares, parallelograms, trapezoids, triangles, semicircles, and quarter circles
- 7A.11C use previous knowledge of surface area to make connections to the formulas for lateral and total surface area and determine solutions for problems involving rectangular prisms, triangular prisms, and cylinders
- 7A.11D solve problems involving the volume of rectangular pyramids and triangular pyramids
- 7A.11E solve problems involving the volume of cylinders, cones, and spheres
- 7A.11F use the Pythagorean theorem and its converse to solve problems
- 7A.11G determine the distance between two points on a coordinate plane using the Pythagorean theorem

Geometric Expressions, Equations, and Relationships--Transformations

7A.12 The student applies mathematical process standards to develop transformational geometry concepts.

- 7A.12A generalize the properties of orientation and congruence of rotations, reflections, translations, and dilations of two-dimensional shapes on a coordinate plane
- 7A.12B differentiate between transformations that preserve congruence and those that do not
- 7A.12C explain the effect of translations, reflections over the x- or y-axis, and rotations limited to 90°, 180°, 270°, and 360° as applied to two-dimensional shapes on a coordinate plane using an algebraic representation
- 7A.12D model the effect on linear and area measurements of dilated two-dimensional shapes
- 7A.IS1* explain the nature of rational discourse and argument and the desirability of precision and deductive certainty which mathematics makes possible and is not possible to the same degree in other disciplines

Data Science--Applications of Measurement and Data

7A.13 The student applies mathematical process standards to use statistical representations and procedures to analyze and describe data.

- 7A.13A use data from a random sample to make inferences about a population
- 7A.13B compare two populations based on data in random samples from these populations, including informal comparative inferences about differences between the two populations
- 7A.13C simulate generating random samples of the same size from a population with known characteristics to develop the notion of a random sample being representative of the population from which it was selected
- 7A.13D determine the mean absolute deviation and use this quantity as a measure of the average distance data are from the mean using a data set of no more than 10 data points

Personal Financial Literacy--Money Management

7A.14 The student applies mathematical process standards to develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer and investor.

- 7A.14A identify the components of a personal budget, including income; planned savings for college, retirement, and emergencies; taxes; and fixed and variable expenses, and calculate what percentage each category comprises of the total budget
- 7A.14B use a family budget estimator to determine the minimum household budget and average hourly wage needed for a family to meet its basic needs in the student's city or another large city nearby
- 7A.14C analyze situations to determine if they represent financially responsible decisions and identify the benefits of financial responsibility and the costs of financial irresponsibility