

Catholic Identity Standards**8A.0 The student understands and integrates the content of what is learned into their faith and daily life.**

- 8A.0A recognize that every human life is sacred because each person is created and loved by God
- 8A.0B describe ways to take part in/be responsible to the community by discerning and using our God-given gifts
- 8A.0C recognize and oppose unjust social structures and work toward justice for all
- 8A.0D see God at work in all things and as expressed in the sacraments
- 8A.0E connect scripture, tradition, and the models of Mary and the saints to guide, grow, and deepen faith

Mathematical Process Standards**8A.1 The student uses mathematical processes to acquire and demonstrate mathematical understanding.**

- 8A.1A apply mathematics to problems arising in everyday life, society, and the workplace
- 8A.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
- 8A.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
- 8A.1D communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate
- 8A.1E create and use representations to organize, record, and communicate mathematical ideas
- 8A.1F analyze mathematical relationships to connect and communicate mathematical ideas
- 8A.1G display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication
- 8A.GS1* demonstrate the mental habits of precise, determined, careful, and accurate questioning, inquiry, and reasoning in the pursuit of transcendent truths
- 8A.GS2* develop lines of inquiry to understand why things are true and why they are false
- 8A.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
- 8A.GS4* explain how mathematics in its reflection of the good, true, and beautiful reveals qualities of being and the presence of God
- 8A.DS3* advocate for the pursuit of understanding for its own sake and the intrinsic value or discovery of the true and the beautiful often at the requirement of great sacrifice, discipline, and effort
- 8A.DS8* exhibit humility at knowing that as a human being man can only grasp a portion of the truths of the universe
- 8A.DS9* advance an understanding of the ability of the human intellect to know and the desire of the will to want to know more

Linear Functions, Equations, And Inequalities**8A.2 The student applies the mathematical process standards when using properties of linear functions to write and represent in multiple ways, with and without technology, linear equations, inequalities, and systems of equations.**

- 8A.2A determine the domain and range of a linear function in mathematical problems; determine reasonable domain and range values for real-world situations, both continuous and discrete; and represent domain and range using inequalities
- 8A.2B write linear equations in two variables in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$, given one point and the slope and given two points
- 8A.2C write linear equations in two variables given a table of values, a graph, and a verbal description
- 8A.2D write and solve equations involving direct variation
- 8A.2E write the equation of a line that contains a given point and is parallel to a given line
- 8A.2F write the equation of a line that contains a given point and is perpendicular to a given line
- 8A.2G write an equation of a line that is parallel or perpendicular to the x- or y- axis and determine whether the slope of the line is zero or undefined
- 8A.2H write linear inequalities in two variables given a table of values, a graph, and a verbal description
- 8A.2I write systems of two linear equations given a table of values, a graph, and a verbal description

Linear Functions, Equations, And Inequalities**8A.3 The student applies the mathematical process standards when using graphs of linear functions, key features, and related transformations to represent in multiple ways and solve, with and without technology, equations, inequalities, and systems of equations.**

- 8A.3A use similar right triangles to develop an understanding that slope, m , given as the rate comparing the change in y-values to the change in x-values, $(y_2 - y_1) / (x_2 - x_1)$, is the same for any two points (x_1, y_1) and (x_2, y_2) on the same line
- 8A.3B graph proportional relationships, interpreting the unit rate as the slope of the line that models the relationship
- 8A.3C determine the slope of a line given a table of values, a graph, two points on the line, and an equation written in various forms, including $y = mx + b$, $Ax + By = C$, and $y - y_1 = m(x - x_1)$
- 8A.3D calculate the rate of change of a linear function represented tabularly, graphically, or algebraically in context of mathematical and real-world problems
- 8A.3E use data from a table or graph to determine the rate of change or slope and y-intercept in mathematical and real-world problems
- 8A.3F graph linear functions on the coordinate plane and identify key features, including x intercept, y-intercept, zeros, and slope, in mathematical and real-world problems
- 8A.3G graph the solution set of linear inequalities in two variables on the coordinate plane
- 8A.3H determine the effects on the graph of the parent function $f(x) = x$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, and $f(bx)$ for specific values of a , b , c , and d
- 8A.3I graph systems of two linear equations in two variables on the coordinate plane and determine the solutions if they exist
- 8A.3J estimate graphically the solutions to systems of two linear equations with two variables in real-world problems
- 8A.3K graph the solution set of systems of two linear inequalities in two variables on the coordinate plane
- 8A.IS4* explain how it is possible to mentally abstract and construct mathematical objects from direct observations of reality and how one's perception of that

reality is important to what one is doing

Linear Functions, Equations, And Inequalities

8A.4 The student applies the mathematical process standards to formulate statistical relationships and evaluate their reasonableness based on real world data.

- 8A.4A construct a scatterplot and describe the observed data to address questions of association such as linear, non-linear, and no association between bivariate data
- 8A.4B contrast bivariate sets of data that suggest a linear relationship with bivariate sets of data that do not suggest a linear relationship from a graphical representation
- 8A.4C use a trend line that approximates the linear relationship between bivariate sets of data to make predictions
- 8A.4D calculate, using technology, the correlation coefficient between two quantitative variables and interpret this quantity as a measure of the strength of the linear association
- 8A.4E compare and contrast association and causation in real-world problems
- 8A.4F write, with and without technology, linear functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems

Linear Functions, Equations, And Inequalities

8A.5 The student applies the mathematical process standards to solve, with and without technology, linear equations and evaluate the reasonableness of their solutions.

- 8A.5A solve linear equations in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides
- 8A.5B solve linear inequalities in one variable, including those for which the application of the distributive property is necessary and for which variables are included on both sides
- 8A.5C solve systems of two linear equations with two variables for mathematical and real-world problems

Quadratic Functions and Equations

8A.6 The student applies the mathematical process standards when using properties of quadratic functions to write and represent in multiple ways, with and without technology, quadratic equations.

- 8A.6A determine the domain and range of quadratic functions and represent the domain and range using inequalities
- 8A.6B write equations of quadratic functions given the vertex and another point on the graph, write the equation in vertex form ($f(x) = a(x - h)^2 + k$), and rewrite the equation from vertex form to standard form ($f(x) = ax^2 + bx + c$)
- 8A.6C write quadratic functions when given real solutions and graphs of their related equations

Quadratic Functions and Equations

8A.7 The student applies the mathematical process standards when using graphs of quadratic functions and their related transformations to represent in multiple ways and determine, with and without technology, the solutions to equations.

- 8A.7A graph quadratic functions on the coordinate plane and use the graph to identify key attributes, if possible, including x-intercept, y-intercept, zeros, maximum value, minimum values, vertex, and the equation of the axis of symmetry
- 8A.7B describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions
- 8A.7C determine the effects on the graph of the parent function $f(x) = x^2$ when $f(x)$ is replaced by $af(x)$, $f(x) + d$, $f(x - c)$, and $f(bx)$ for specific values of a , b , c , and d

Quadratic Functions and Equations

8A.8 The student applies the mathematical process standards to solve, with and without technology, quadratic equations and evaluate the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data.

- 8A.8A solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula
- 8A.8B write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems

Exponential Functions and Equations

8A.9 The student applies the mathematical process standards when using properties of exponential functions and their related transformations to write, graph, and represent in multiple ways exponential equations and evaluate, with and without technology, the reasonableness of their solutions. The student formulates statistical relationships and evaluates their reasonableness based on real-world data.

- 8A.9A determine the domain and range of exponential functions of the form $f(x) = abx$ and represent the domain and range using inequalities
- 8A.9B interpret the meaning of the values of a and b in exponential functions of the form $f(x) = abx$ in real-world problems
- 8A.9C write exponential functions in the form $f(x) = abx$ (where b is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay
- 8A.9D graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems
- 8A.9E write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems

Number and Algebraic Methods

8A.10 The student applies the mathematical process standards and algebraic methods to rewrite in equivalent forms and perform operations on polynomial expressions.

- 8A.10A add and subtract polynomials of degree one and degree two
- 8A.10B multiply polynomials of degree one and degree two
- 8A.10C determine the quotient of a polynomial of degree one and polynomial of degree two when divided by a polynomial of degree one and polynomial of degree two when the degree of the divisor does not exceed the degree of the dividend
- 8A.10D rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property
- 8A.10E factor, if possible, trinomials with real factors in the form $ax^2 + bx + c$, including perfect square trinomials of degree two
- 8A.10F decide if a binomial can be written as the difference of two squares and, if possible, use the structure of a difference of two squares to rewrite the binomial

Number and Algebraic Methods
8A.11 The student applies the mathematical process standards and algebraic methods to rewrite algebraic expressions into equivalent forms.

- 8A.11A simplify numerical radical expressions involving square roots
- 8A.11B simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents

Number and Algebraic Methods
8A.12 The student applies the mathematical process standards and algebraic methods to write, solve, analyze, and evaluate equations, relations, and functions.

- 8A.12A identify functions using sets of ordered pairs and mappings
- 8A.12B decide whether relations represented verbally, tabularly, graphically, and symbolically define a function
- 8A.12C evaluate functions, expressed in function notation, given one or more elements in their domains
- 8A.12D identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes
- 8A.12E write a formula for the n th term of arithmetic and geometric sequences, given the value of several of their terms
- 8A.12F solve mathematic and scientific formulas, and other literal equations, for a specified variable