

USD 312

Algebra II

Standard 1: Students will use number sense in a variety of situations.

Indicators of Performance:

Students will –

1. state which sets are subsets of others given the following sets: natural numbers, whole numbers, integers, rational numbers, irrational numbers, real numbers, complex numbers
2. define absolute value as 1) the distance from zero; 2) x if $x \geq 0$ and $-x$ if $x < 0$; 3) $\sqrt{x^2}$
3. identify $\sqrt{-1}$ as the imaginary unit
4. use the following properties:
 - a. associative prop of addition and multiplication
 - b. commutative property of addition and multiplication
 - c. identity property of addition and multiplication
 - d. distributive property
 - e. multiplicative property of zero
 - f. addition and multiplication properties of equality and inequality
 - g. addition and multiplication inverse properties
 - h. reflexive, symmetric and transitive properties of equality
 - i. zero product property
 - j. substitution prop of equality

Standard 2: Students will use computation in a variety of situations.

Indicators of Performance:

Students will -

- S
1. generate and/or solve multi-step real-world problems with real numbers and algebraic expressions using computational procedures and mathematical concepts with: applications from business, chemistry, and physics that involve addition, subtraction, multiplication, division, squares, and square roots when the formulae are given as part of the problem and variables are defined; volume and surface area given the measurement formulas; application of percents
 2. add, subtract, multiply, divide, and simplify radicals and complex numbers
 3. simplify real numbers and algebraic expressions raised to powers, including binomials to the third power
 4. simplify complex fractions (with fractions in numerator and denominator)
 5. use synthetic division to divide polynomials by binomials

S preceding an indicator means it is a state assessed item.

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6. evaluate logarithms with natural logs
7. add, subtract and multiply matrices
8. perform scalar multiplication on a matrix

Standard 3: Students will use algebraic concepts in a variety of situations.

Indicators of Performance:

Students will -

- S 1. solve systems of linear equations with two unknowns using integer coefficients and constants
- SN 2. represent and/or solve real-world problems with linear equations and inequalities both analytically and graphically
- S 3. recognize how changes in the constant and/or slope within a linear function changes the appearance of a graph
- S 4. interpret the meaning of the x- and y-intercepts, slope, and/or points on and off the line of a graph in the context of a real-world situation
- S 5. recognize that various mathematical models can be used to represent the same problem situation (models include: scale drawings to model large and small real-world objects; geometric models (spinners, targets, or number cubes), process models (coins, pictures, or diagrams), tree diagrams to model probability; frequency tables, bar graphs, line graphs, circle graphs, Venn diagrams, charts, tables, single and double stem-and-leaf plots, scatter plots, box-and-whisker plots, histograms, and matrices to describe, interpret and analyze data
- 6. recognize the generalization of a pattern and represent the nth term in explicit form. Consider the following patterns:
 - a. algebraic patterns such as consecutive numbers ($n, n+1, n+2\dots$)
 - b. equations such as $f(x) = 2x - 1$
 - c. geometric patterns
 - d. classifying sequences as arithmetic or geometric and finding the nth term
 - e. exponential patterns such as growth and decay
- 7. solve quadratic equations
- 8. solve simple logarithmic equations
- 9. solve simple factorable polynomial equations
- 10. set up and solve radical and rational equations
- 11. evaluate the value of a composition at both a given value and for a given variable (ex. $f(g(2))$ and $f(g(x))$)
- 12. determine the inverse of a linear function given its equation
- 13. identify linear functions from their equations
- 14. expand powers of binomials using Pascal's triangle and find specific terms of the binomial expansion

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15. represent the sum of a sequence in sigma notation; convert sigma notation to the sum of a sequence
16. convert an expression from logarithmic form to exponential form; convert an expression from exponential form to logarithmic form

Standard 4: Students will use geometry in a variety of situations.

Indicators of Performance:

Students will -

- S
1. recognize the equation of a line and transform the equation into slope-intercept form in order to identify the slope and y-intercept and use this information to graph the line
 2. identify ellipses and hyperbolas
 3. find the equation of a line parallel or perpendicular to a given line
 4. solve graphically (for an approximate solution) a system of linear or quadratic equations
 5. graph linear or quadratic systems of inequalities
 6. graph direct variation, constant, identity, and absolute value functions
 7. graph its inverse given a graph of a relation
 8. write the equations of the conic sections given their graphs
 9. graph the conic sections given their equations in standard form
 10. recognize the equations of a line in any form and be able to convert it to slope-intercept form to graph
 11. determine the maximum and minimum values from a graph

Standard 5: Students will use statistics in a variety of situations.

Indicators of Performance:

Students will -

- S
1. explain the relationship between probability and odds and compute one given the other
- S
2. explain the effects of outliers on the measures of central tendency (mean, median, mode) and range and interquartile range of a real number data set
- S
3. approximate a line of best fit given a scatter plot and makes predictions using the equation of that line
 4. find the combined probability of two or more independent or dependent events to determine the odds of success or failure
 5. find probability of mutually exclusive or inclusive events

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6. represent data in bar graphs, circle graphs, line graphs, stem-and-leaf plots, box-and-whisker plots, frequency distributions, histograms, Venn diagrams, scatterplots and charts and tables
7. use theoretical or experimental probability to make predictions
8. use a normal distribution to make predictions about data that fall within 1-2 standard deviations of the mean
9. find the interquartile range of a set of data
10. find the outliers of a set of data

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