

# Algebra II

**Course Description:** This course reviews basic algebraic functions and extends student's skills in graphing and in solving equations. Students will be introduced to exponential functions, logarithms, and trigonometry. They will also explore advanced topics such as complex numbers, rational expressions and equations, conic sections, probability, statistics, and matrices.

**Textbook:** *Algebra I for Christian Schools* (BJUP)

**Goal 1: To review procedures with polynomials.**

- \_\_\_\_\_ 1.1 The student will add and subtract two polynomials.
- \_\_\_\_\_ 1.2 The student will multiply two polynomials.
- \_\_\_\_\_ 1.3 The student will divide two polynomials.
- \_\_\_\_\_ 1.4 The student will factor binomials.
- \_\_\_\_\_ 1.5 The student will factor quadratic trinomials.
- \_\_\_\_\_ 1.6 The student will factor by grouping.

**Goal 2: To become proficient with first order equations.**

- \_\_\_\_\_ 2.1 The student will solve linear equations.
- \_\_\_\_\_ 2.2 The student will solve linear inequalities.
- \_\_\_\_\_ 2.3 The student will solve absolute value equations.
- \_\_\_\_\_ 2.4 The student will solve word problems using first order equations.

**Goal 3: To become proficient with linear relations.**

- \_\_\_\_\_ 3.1 The student will classify a relation as a function.
- \_\_\_\_\_ 3.2 The student will graph the line given by an equation.
- \_\_\_\_\_ 3.3 The student will find the equation of a line.
- \_\_\_\_\_ 3.4 The student will graph linear inequalities.

**Goal 4: To become proficient with quadratic equations.**

- \_\_\_\_\_ 4.1 The student will solve quadratic equations by factoring.
- \_\_\_\_\_ 4.2 The student will solve quadratic equations by completing the square.
- \_\_\_\_\_ 4.3 The student will solve quadratic equations using the quadratic formula.
- \_\_\_\_\_ 4.4 The student will solve quadratic inequalities.

**Goal 5: To become proficient with polynomial functions.**

- \_\_\_\_\_ 5.1 The student will graph quadratic functions in standard form.
- \_\_\_\_\_ 5.2 The student will translate basic quadratic functions.
- \_\_\_\_\_ 5.3 The student will graph general quadratic functions.

- \_\_\_\_\_ 5.4 The student will solve word problems involving quadratic functions.
- \_\_\_\_\_ 5.5 The student will graph quadratic inequalities.
- \_\_\_\_\_ 5.6 The student will use the remainder theorem and factor theorem to determine zeros of a polynomial function.
- \_\_\_\_\_ 5.7 The student will graph a polynomial function.

**Goal 6: To become proficient with systems of linear equations.**

- \_\_\_\_\_ 6.1 The student will solve systems of equations by graphing.
- \_\_\_\_\_ 6.2 The student will solve systems of equations by substitution.
- \_\_\_\_\_ 6.3 The student will solve systems of equations by addition.
- \_\_\_\_\_ 6.4 The student will solve word problems using systems of equations.
- \_\_\_\_\_ 6.5 The student will solve quadratic systems of equations.
- \_\_\_\_\_ 6.6 The student will graph systems of inequalities.
- \_\_\_\_\_ 6.7 The student will solve systems of equations in three variables.

**Goal 7: To become proficient with radicals.**

- \_\_\_\_\_ 7.1 The student will simplify radical expressions.
- \_\_\_\_\_ 7.2 The student will add and subtract radicals.
- \_\_\_\_\_ 7.3 The student will multiply radicals.
- \_\_\_\_\_ 7.4 The student will divide radicals.
- \_\_\_\_\_ 7.5 The student will solve equations with radicals.
- \_\_\_\_\_ 7.6 The student will graph radical and exponential functions.
- \_\_\_\_\_ 7.7 The student will solve radical equations.

**Goal 8: To understand complex numbers.**

- \_\_\_\_\_ 8.1 The student will classify as pure imaginary or complex numbers.
- \_\_\_\_\_ 8.2 The student will add complex numbers.
- \_\_\_\_\_ 8.3 The student will subtract complex numbers.
- \_\_\_\_\_ 8.4 The student will multiply complex numbers.
- \_\_\_\_\_ 8.5 The student will divide complex numbers.
- \_\_\_\_\_ 8.6 The student will solve quadratic equations whose solution is complex.

**Goal 9: To become proficient with rational expressions.**

- \_\_\_\_\_ 9.1 The student will simplify rational expressions.
- \_\_\_\_\_ 9.2 The student will multiply rational expressions.
- \_\_\_\_\_ 9.3 The student will divide rational expressions.
- \_\_\_\_\_ 9.4 The student will add and subtract rational expressions.
- \_\_\_\_\_ 9.5 The student will graph rational functions.
- \_\_\_\_\_ 9.6 The student will solve rational equations.

**Goal 10: To become familiar with right triangle trigonometry and the unit circle.**

- \_\_\_\_\_ 10.1 The student will give the six trigonometric ratios of a given acute angle of a right triangle.
- \_\_\_\_\_ 10.2 The student will solve application problems involving right triangle trigonometry.
- \_\_\_\_\_ 10.3 The student will use special triangles to calculate the six trigonometric ratios of certain angles.
- \_\_\_\_\_ 10.4 The student will use the unit circle to give the six trigonometric ratios of angles greater than ninety degrees.
- \_\_\_\_\_ 10.5 The student will convert between degrees and radians.
- \_\_\_\_\_ 10.6 The student will graph the trigonometric functions.
- \_\_\_\_\_ 10.7 The student will give the amplitude and period of a trigonometric function.

**Goal 11: To become familiar with trigonometric identities.**

- \_\_\_\_\_ 11.1 The student will solve triangle problems using the law of sines.
- \_\_\_\_\_ 11.2 The student will solve triangle problems using the law of cosines.
- \_\_\_\_\_ 11.3 The student will prove basic trigonometric identities.
- \_\_\_\_\_ 11.4 The student will solve trigonometric equations.

**Goal 12: To understand special relations.**

- \_\_\_\_\_ 12.1 The student will determine whether a relation has an inverse.
- \_\_\_\_\_ 12.2 The student will find the inverse of an invertible relation.
- \_\_\_\_\_ 12.3 The student will graph the logarithm function.
- \_\_\_\_\_ 12.4 The student will use the laws of logs to simplify expressions involving logarithms.
- \_\_\_\_\_ 12.5 The student will use natural and common logarithms.

**Goal 13: To become familiar with probability and statistics.**

- \_\_\_\_\_ 13.1 The student will calculate number of permutations.
- \_\_\_\_\_ 13.2 The student will calculate number of combinations.
- \_\_\_\_\_ 13.3 The student will calculate probability of an event.
- \_\_\_\_\_ 13.4 The student will identify specified measures of central tendency.
- \_\_\_\_\_ 13.5 The student will calculate standard deviation.

**Goal 14: To become familiar with quadratic functions.**

- \_\_\_\_\_ 14.1 The student will graph the equation of a circle.
- \_\_\_\_\_ 14.2 The student will graph the equation of a parabola.
- \_\_\_\_\_ 14.3 The student will graph the equation of an ellipse.
- \_\_\_\_\_ 14.4 The student will graph the equation of a hyperbola.