



## Algebra (ALG) 1B Syllabus

### Course Name

ALG 1B

Algebra I – Semester B

### Course Information

ALG 1B is the second semester of this two-semester course.

Welcome to Algebra 1B! You may not believe this, but algebraic thinking has been a part of your life for a long time. Did you know that in kindergarten when you learned clapping patterns and how to count, you were learning about algebra? Algebra is the study of patterns and relationships. The ability to recognize patterns is the key to mathematical thinking. The study of patterns allows us to make generalizations, explore relationships, and make logical decisions in mathematics. For things to make sense, we must be able to see patterns.

Because of currently available and emerging technology, the content of algebra is no longer just symbolic manipulation or the acquisition of a predefined set of procedures for solving a fixed set of problems. The emphasis of algebra today is on mathematical modeling and functions. Hopefully, after you have completed this course, you will have developed a sense of how algebra can be used to explain the world around us. You will learn by doing. You will learn to interpret graphs, to work with formulas, to use spreadsheets, to organize a set of data, and to make decisions based on that data.

This course has a total of five lessons. At the end of each chapter, you will find *Chapter Review*, *Chapter Test*, and *Standards Assessment* sections for that chapter in the textbook. These sections at the end of each chapter will serve as a great review for the final.

You need to keep a positive attitude, study hard, read all assignments in your textbook and course guide, and never be afraid to ask for help or clarification. Your textbook and this course are meant to be used together. Do not attempt to work the assignment problems without reading the assigned section(s) in the textbook and corresponding discussion in the course.

## Course Delivery Method

Online

## Contacting Your Instructor

You may contact your instructor through the Blackboard messaging system. Technical support is available 24/7 at [www.k12.ttu.edu](http://www.k12.ttu.edu).

## Course Objectives

After completing this course, you should be able to:

1. apply mathematics to problems arising in everyday life, society, and the workplace;
2. use a problem-solving model that incorporates analyzing given information, formulating a solving process and the reasonableness of the solution plan or strategy, determining a solution, justifying the solution, and evaluating the problem;
3. 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;
4. communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;
5. create and use representations to organize, record, and communicate mathematical ideas;
6. analyze mathematical relationships to connect and communicate mathematical ideas;
7. display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication;
8. write linear equations in two variables given a table of values, a graph, and a verbal description;
9. determine the domain and range of quadratic functions and represent the domain and range using inequalities;
10. 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  $(f(x) = ax^2 + bx + c)$ ;
11. write quadratic functions when given real solutions and graphs of their related equations;
12. 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;

13. describe the relationship between the linear factors of quadratic expressions and the zeros of their associated quadratic functions;
14. determine the effects on the graph of the parent function  $f(x) = x^2$  when  $f(x)$  is replaced by  $af(x)$ ,  $f(x) + d$ ,  $f(x - c)$ ,  $f(bx)$  for specific values of  $a$ ,  $b$ ,  $c$ , and  $d$ ;
15. solve quadratic equations having real solutions by factoring, taking square roots, completing the square, and applying the quadratic formula;
16. write, using technology, quadratic functions that provide a reasonable fit to data to estimate solutions and make predictions for real-world problems;
17. determine the domain and range of exponential functions of the form  $f(x) = ab^x$  and represent the domain and range using inequalities;
18. interpret the meaning of the values of  $a$  and  $b$  in exponential functions of the form  $f(x) = ab^x$  in real-world problems;
19. write exponential functions in the form  $f(x) = ab^x$  (where  $b$  is a rational number) to describe problems arising from mathematical and real-world situations, including growth and decay;
20. graph exponential functions that model growth and decay and identify key features, including y-intercept and asymptote, in mathematical and real-world problems;
21. write, using technology, exponential functions that provide a reasonable fit to data and make predictions for real-world problems;
22. add and subtract polynomials of degree one and degree two;
23. multiply polynomials of degree one and degree two;
24. 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;
25. rewrite polynomial expressions of degree one and degree two in equivalent forms using the distributive property;
26. factor, if possible, trinomials with real factors in the form  $ax^2 + bx + c$ , including perfect square trinomials of degree two;
27. 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;
28. simplify numerical radical expressions involving square roots;
29. simplify numeric and algebraic expressions using the laws of exponents, including integral and rational exponents;
30. identify terms of arithmetic and geometric sequences when the sequences are given in function form using recursive processes; and
31. write a formula for the  $n^{\text{th}}$  term of arithmetic and geometric sequences, given the value of several of their terms.

ALG I addresses the required Texas Essential Knowledge and Skills (TEKS). These can be found at the [Texas Education Agency](http://www.tea.state.tx.us/teks/) website.

## Textbook and Materials

### Textbook(s)

The required digital textbook for this course is:

- Larson, R., & Boswell, L. (2015). *Big Ideas Math, Algebra 1*. Erie, PA: Big Ideas Learning, LLC. ISBN 978-1-68033-241-4.

This digital textbook can only be purchased through the TTU K-12 partner bookstore. You can find the link to the bookstore on the [TTU K-12 website](#). Once you have purchased the digital textbook, you will receive a username and password via email. You will log in to [Big Ideas Math](#) to access your textbook.

Before you begin your course, take a few minutes and review the *Help* section in the upper right corner of your textbook dashboard. This section provides several resources that will teach you how to navigate your digital textbook.

Open the *Student Dynamic eBook*. This will provide you with all of the information that you will need for the course. This textbook was designed and chosen so that you can actively participate in your learning with your digital text, explore concepts, take notes, and answer practice questions in your digital textbook.

*Big Ideas Math Algebra 1* is a research-based program that provides a rigorous, focused, and coherent curriculum. You will be encouraged to think and to make conjectures while explaining your thinking. I encourage you to look through your textbook and become familiar with the layout. Page *xvii* in your book explains how to use the math book. Be sure to read this before beginning the course.

Each chapter begins with “Maintaining Mathematical Proficiency” and “Mathematical Thinking.” Each section begins with an essential question and explorations. After that, the lesson concepts and examples are explained. Exercises follow. For extra practice in any chapter, use your *Online Resources*, *Skills Review Handbook*, or your *Student Journal*.

### Other Required Materials

- pencils and erasers
- spiral notebook or paper to write down notes
- straight-edge (ruler)
- graphing calculator

## PDF Assignments

You will submit all lessons for this course electronically. Your work for each lesson will need to be saved as a PDF in order to submit the lesson for grading. See **Requirements for Creating PDFs** in the Syllabus section of your course for information on PDF-creation options.

Be sure to follow the instructions below when preparing your lesson assignments for grading.

- Complete your work in pencil. Make sure the pencil mark is dark enough that it can read by a scanner or photographed.
- Begin each lesson's assignment on a clean sheet of notebook paper.
- Show your work process **down** your paper, **not across**. However, you may make two columns. **Do not write on the back of your paper.**
- Skip a line after each problem, and circle your answer(s).
- When you have completed the assignment, scan it or take a photograph of the pages and assemble the images into a **single PDF** to submit for grading (see **Requirements for Creating PDFs** in the Syllabus section of your course for information on PDF-creation options). Instructions are included in each lesson.
- Don't go too fast through a lesson or you will miss important information. *Don't forget—math takes time and practice, so don't give up!*

You will find a **Sample Lesson Assignment** in the **Resources** section of this course. Look at this sample before you begin Lesson One. Refer to it each time you begin a lesson until you are familiar with the format.

## Technical Requirements

- Internet access – preferably high speed (for accessing Blackboard)
- Email
- Word processing software such as Microsoft Word
- Adobe Reader (download from [Adobe.com](http://Adobe.com))
- Audio and video capabilities (for watching/listening to course content)
- PDF app (free options available)

## Technical Skill Requirements

Be comfortable with the following:

- using a word processor
- Internet search engines and browsers
- creating PDFs (see **Requirements for Creating PDFs** in the Syllabus section of your course)

## Course Organization

This course consists of five lessons and a final examination. Each lesson is broken into multiple sections. Within each section, you will usually have an **Overview**, **Exploration**, and **Communicate Your Answer** questions, a **Lesson**, **Monitoring Progress** questions, and a section **Assignment**.

Each lesson contains the following:

- Introduction and Instructions
- Learning Objectives
- Learning Activities
- Assignments

Each lesson includes several activities that present content knowledge. Each lesson also includes multiple graded assignments to ensure that you learn the content that has been presented in the activities. Be sure you read all instructions carefully and ask your instructor for help if something is not clear.

## Course Outline

Please note that some assignments will be hidden from you when you start the course. As you move through the lessons and complete assignments, more will unlock for you.

Lesson	Topic	Approximate Time for Completion
Lesson 1	Exponential Functions and Sequences	Two weeks
Lesson 2	Polynomial Equations and Factoring – Part 1	Three weeks
Lesson 3	Polynomial Equations and Factoring – Part 2	Three weeks
Lesson 4	Graphing Quadratic Functions	Three weeks
Lesson 5	Solving Quadratic Equations	Three weeks
Final Exam		

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## Assignment Schedule

Each of the following must be completed to complete the course. Items with an asterisk (\*) indicate that these are summative assessments for the course.

Lesson	Weeks	Assignments
1	1-2	Checkpoint 1 (Non-graded) Section 6-1 Assignment Upload Section 6-2 Assignment Upload Section 6-3 Assignment Upload Section 6-4 Assignment Upload Section 6-5 Assignment Upload Section 6-6 Assignment Upload *Chapter 6 Exam
2	3-5	Section 7-1 Assignment Upload Section 7-2 Assignment Upload Section 7-3 Assignment Upload Section 7-4 Assignment Upload Section 7-5 Assignment Upload <i>(Chapter Exam taken at the end of Lesson Three.)</i>
3	6-8	Section 7-6 Assignment Upload Section 7-7 Assignment Upload Section 7-8 Assignment Upload Section 7-9 Assignment Upload *Chapter 7 Exam Checkpoint 2 (Non-graded)
4	9-11	Section 8-1 Assignment Upload Section 8-2 Assignment Upload Section 8-3 Assignment Upload Section 8-4 Assignment Upload Section 8-5 Assignment Upload Section 8-6 Assignment Upload *Chapter 8 Exam
5	12-14	Section 9-1 Assignment Upload Section 9-2 Assignment Upload Section 9-3 Assignment Upload Section 9-4 Assignment Upload Section 9-5 Assignment Upload *Chapter 9 Exam Checkpoint 3 (Non-graded)
		<b>Final Exam</b>

## Course Credit

The course grade will be calculated as follows:

- 50% coursework average;
- 50% summative assessment average, including the final exam;
- A passing course grade is 70 or higher.

Students must attempt all assignments in the course. The final exam will not be available until all assignments have been accepted and graded by the teacher.

Students who score below 70% on the final exam will be eligible for one re-exam opportunity.

## Coursework

The graded assignments within each lesson are formative in nature. This means that they are designed to assist you in applying and demonstrating the lesson concepts, as well as identifying areas in which you need additional review. You may use all the lesson's learning activities to assist you as you complete the graded assignments.

## Summative Assessments

Summative assessments are those that allow you to demonstrate mastery of the course objectives. For summative assessments, you will NOT be allowed to use the learning materials. These are opportunities for you to show what you have learned by that point in the course. Summative assessments may be proctored using the online proctoring system Proctorio. Information about Proctorio is provided in **Remote Proctoring** in the Syllabus section of your course. The summative assessments for this course are as follows:

- Summative Assessments **(20% of Course Grade)**
  - Chapter 6 Exam (40 points)
  - Chapter 7 Exam (32 points)
  - Chapter 8 Exam (30 points)
  - Chapter 9 Exam (32 points)
- Summative Final Exam **(30% of Course Grade)**

## Course Completion

- Students may not complete the course in less than 30 days.
- All courses expire six months after the enrollment date.



## Academic Integrity

It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity. The attempt of students to present as their own any work not honestly performed is regarded by the faculty and administration as a most serious offense and renders the offenders liable to serious consequences, possibly suspension.

“Scholastic dishonesty” includes, but is not limited to, cheating, plagiarism, collusion, falsifying academic records, misrepresenting facts, and any act designed to give unfair academic advantage to the student (such as, but not limited to, submission of essentially the same written assignment for two courses without the prior permission of the instructor) or the attempt to commit such an act.

## Student Expectations

You will be expected to log into the Blackboard course regularly to be aware of possible announcements/reminders and to pace your progress in the course.

Students are expected to maintain an online environment conducive to learning, which includes “netiquette” (Internet etiquette). Please review the basic rules for [Online Discussion Netiquette](#). Ensure that your email messages, discussion board postings, and other electronic communications are thoughtful and respectful. Diverse opinions are welcome in this course, and you are expected to demonstrate an open mind and courtesy when responding to the thoughts and ideas of others.

The following are prohibited:

- making offensive remarks in email or the discussion board;
- using inappropriate language or discussing inappropriate topics online;
- spamming;
- hacking;
- using TTU or Blackboard email or discussion boards for commercial purposes;
- using all caps (considered shouting in online communications); and
- cyber-bullying or online harassment of any type.

Inappropriate behavior shall result in consequences ranging from a request to correct the problem, to removal from the course or even the university, depending on the severity of the behavior. Disciplinary actions will be taken according to the TTU K-12 Student Handbook.

## Communication

- You can expect a reply from your instructor within 2 business days.
- Use the Blackboard Course Messages tool for sending messages to your instructor.

## Submitting Assignments

You will submit all assignments through the Blackboard Assignment Tool, rather than by mail or email.

## Technical Difficulties

### ***Getting Help***

For student assistance with Blackboard, visit [TTU K-12 Support](#).

### ***Computer Problems***

A working computer is necessary for online coursework. Computer problems will not be accepted as a valid reason for failure to complete course activities within the allotted time frame. Identify a second computer, before the course begins, that you can use if you experience computer problems.

### ***Server Problems***

When the Blackboard server needs to be taken down for maintenance, the Blackboard administrator will post an announcement in your course informing you of the time and date. If the server experiences unforeseen problems, your course instructor will notify you.

### ***Lost or Corrupted Files***

You must keep/save a copy of every project/assignment on an external disk or personal computer. In the event of any kind of technology failure (e.g., Blackboard server crash or virus infection, students' own computer problems, loss of files in cyberspace, etc.) or any disputes, the instructor may request or require you to resubmit the files. In some instances, the instructor may need to open another attempt within Blackboard, so communication with your instructor is critical in these circumstances.