


- Please read through all of these directions before starting – and plan to do that in calculus class next year as well. I will sometimes have surprises in my directions.
- The ability to do basic algebra and trigonometry is critical to success in calculus. Sometimes students understand the calculus, but don't arrive at a correct answer because their algebra or trigonometry skills are weak. Over the past couple of years I have noticed an increasing trend in this direction. As a result, I am assigning this algebra/trigonometry review as a summer assignment for all AP Calculus AB students for the 2009/2010 school year.
- This assignment will be due on the first day of class (8 SEP 2009). I will not take any late assignments. It will be graded and scored as a test grade for the first nine weeks.
- The assignment consists of a problem set divided into 25 sections in three categories: algebra, trigonometry, and exponentials/logarithms. Each of the sections consists of a few problems that will check your understanding of that topic. The problem set is contained in the adobe file shown in the next bullet (hopefully this is a link that will open the document – if not, copy it.)
- AP Calculus AB Summer Algebra-Trig Review Problems.pdf 
AP Calculus AB
Summer Algebra-Trig
- You should be able to complete all of the problems in this document – that is your assignment. Show your work on lined notebook paper. Use pencil and work neatly. **Show your work!** Place only one section on each page (your final report will be at least 25 pages of notebook paper. Number each section per the listing in the next section of this document and write the section title at the top of each page. For instance, the first page will be labeled: 1. Exponents. The second page will be labeled: 2. Absolute Value.
- Copy each problem you do in order on your paper and then show how you arrived at the solution.
- Place your work in order in a pocket folder with fasteners – no loose papers. Don't forget to include your name!
- You must complete the last two problems in each section, but you should do them all. I will grade at least one of the last two problems in each of the 25 sections, and will grade other randomly selected problems from throughout the assignment. The answer alone will be worth at most ½ of the points on each problem graded. Again, show your work.
- The .pdf file contains only the problems. But if you don't know how to do them, all is not lost.
- This assignment is from *Paul's Online Math Notes* at Lamar University in Beaumont, Texas. It is copyrighted. I have obtained permission (from Paul) to use it for this summer assignment.
- The following pages of this document explain Paul's rationale for preparing this algebra/trig review. It also lists each of the 25 topics. There is a link listed for the website which contains this tutorial. Each of the 25 topic names should also be a link that goes to that specific page of the tutorial. Feel free to use these links when you run into problems.
- The document that I have provided a link to not only contains the questions, but it also provides all of the solutions! The first solution in each of the 25 sections is generally more detailed than the rest, explaining the procedure necessary to solve that type of problem.
- I recommend that you work on this assignment one section at a time. When you are finished – or if you have difficulties with that section – go to the website and check out the solution provided. There is no excuse for anyone to miss any of these problems. You should all start out calculus next year with an A for a test grade.
- This is for your benefit. Certainly you can just copy all of the solutions and get an A. However, it is in your best interest to ensure that you understand this material if you want to succeed in calculus.
- Don't wait until the end of summer to start on this. It will take you a good amount of time to complete it.

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<http://tutorial.math.lamar.edu/Extras/AlgebraTrigReview/AlgebraTrigIntro.aspx>

Algebra/Trig Review – What this assignment is about:

This review was originally written for my Calculus I class but it should be accessible to anyone needing a review in some basic algebra and trig topics. The review contains the occasional comment about how a topic will/can be used in a calculus class. If you aren't in a calculus class you can ignore these comments. I don't cover all the topics that you would see in a typical Algebra or Trig class, I've mostly covered those that I feel would be most useful for a student in a Calculus class although I have included a couple that are not really required for a Calculus class. These extra topics were included simply because they do come up on occasion and I felt like including them. There are also, in all likelihood, a few Algebra/Trig topics that do arise occasionally in a Calculus class that I didn't include.

Because this review was originally written for my Calculus students (at Lamar) to use as a test of their algebra and/or trig skills it is generally in the form of a problem set. The solution to the first problem in a set contains detailed information on how to solve that particular type of problem. The remaining solutions are also fairly detailed and may contain further required information that wasn't given in the first problem, but they probably won't contain explicit instructions or reasons for performing a certain step in the solution process. It was my intention in writing the solutions to make them detailed enough that someone needing to learn a particular topic should be able to pick the topic up from the solutions to the problems. I hope that I've accomplished this.

So, why did I even bother to write this?

The ability to do basic algebra is absolutely vital to successfully passing a calculus class. As you progress through a calculus class you will see that almost every calculus problem involves a fair amount of algebra. In fact, in many calculus problems, 90% or more of the problem is algebra.

So, while you may understand the basic calculus concepts, if you can't do the algebra you won't be able to do the problems. If you can't do the problems you will find it very difficult to pass the course.

Likewise you will find that many topics in a calculus class require you to be able to basic trigonometry. In quite a few problems you will be asked to work with trig functions, evaluate trig functions and solve trig equations. Without the ability to do basic trig you will have a hard time doing these problems.

Good algebra and trig skills will also be required in Calculus II or Calculus III. So, if you don't have good algebra or trig skills you will find it very difficult to complete this sequence of courses.

Most of the following set of problems illustrates the kinds of algebra and trig skills that you will need in order to successfully complete any calculus course here at Lamar University. The algebra and trig in these problems fall into three categories:

- Easier than the typical calculus problem,
- Similar to a typical calculus problem, and
- Harder than a typical calculus problem.

Which category each problem falls into will depend on the instructor you have. In my calculus course you will find that most of these problems falling into the first two categories.

Depending on your instructor, the last few sections ([Inverse Trig Functions](#) through [Solving Logarithm Equations](#)) may be covered to one degree or another in your class. However, even if your instructor does cover this material you will find it useful to have gone over these sections. In my course I spend the first couple of days covering the basics of exponential and logarithm functions since I tend to use them on a regular basis.

This problem set is not designed to discourage you, but instead to make sure you have the background that is required in order to pass this course. If you have trouble with the material on this worksheet (especially the Exponents - Solving Trig Equations sections) you will find that you will also have a great deal of trouble passing a calculus course.

Please be aware that this problem set is NOT designed to be a substitute for an algebra or trig course. As I have already mentioned I do not cover all the topics that are typically covered in an Algebra or Trig course. Most of the topics covered here are those that I feel are important topics that you MUST have in order to successfully complete a calculus course (in particular my Calculus course). You may find that there are other algebra or trig skills that are also required for you to be successful in this course that are not covered in this review. You may also find that your instructor will not require all the skills that are listed here on this review.

Here is a brief listing and quick explanation of each topic covered in this review.

Algebra

1. [Exponents](#) A brief review of the basic exponent properties.
2. [Absolute Value](#) A couple of quick problems to remind you of how absolute value works.
3. [Radicals](#) A review of radicals and some of their properties.
4. [Rationalizing](#) A review of a topic that doesn't always get covered all that well in an algebra class, but is required occasionally in a Calculus class.
5. [Functions](#) Function notation and function evaluation.
6. [Multiplying Polynomials](#) A couple of polynomial multiplication problems illustrating common mistakes in a Calculus class.
7. [Factoring](#) Some basic factoring.
8. [Simplifying Rational Expressions](#) The ability to simplify rational expressions can be vital in some Calculus problems.
9. [Graphing and Common Graphs](#) Here are some common functions and how to graph them. The functions include parabolas, circles, ellipses, and hyperbolas.
10. [Solving Equations, Part I](#) Solving single variable equations, including the quadratic formula.
11. [Solving Equations, Part II](#) Solving multiple variable equations.
12. [Solving Systems of Equations](#) Solving systems of equations and some interpretations of the solution.
13. [Solving Inequalities](#) Solving polynomial and rational inequalities.
14. [Absolute Value Equations and Inequalities](#) Solving equations and inequalities that involve absolute value.

Trigonometry

15. [Trig Function Evaluation](#) How to use the unit circle to find the value of trig functions at some basic angles.
16. [Graphs of Trig Functions](#) The graphs of the trig functions and some nice properties that can be seen from the graphs.
17. [Trig Formulas](#) Some important trig formulas that you will find useful in a Calculus course.
18. [Solving Trig Equations](#) Techniques for solving equations involving trig functions.
19. [Inverse Trig Functions](#) The basics of inverse trig functions.

Exponentials / Logarithms

20. [Basic Exponential Functions](#) Exponential functions, evaluation of exponential functions and some basic properties.
21. [Basic Logarithm Functions](#) Logarithm functions, evaluation of logarithms.
22. [Logarithm Properties](#) These are important enough to merit their own section.
23. [Simplifying Logarithms](#) The basics for simplifying logarithms.
24. [Solving Exponential Equations](#) Techniques for solving equations containing exponential functions.
25. [Solving Logarithm Equations](#) Techniques for solving equations containing logarithm functions.