Here are the solutions to the practice problems for my Calculus I notes. Some solutions will have more or less detail than other solutions. The level of detail in each solution will depend up on several issues. If the section is a review section, this mostly applies to problems in the first chapter, there will probably not be as much detail to the solutions given that the problems really should be review. As the difficulty level of the problems increases less detail will go into the basics of the solution under the assumption that if you’ve reached the level of working the harder problems then you will probably already understand the basics fairly well and won’t need all the explanation.

This document was written with presentation on the web in mind. On the web most solutions are broken down into steps and many of the steps have hints. Each hint on the web is given as a popup however in this document they are listed prior to each step. Also, on the web each step can be viewed individually by clicking on links while in this document they are all showing. Also, there are liable to be some formatting parts in this document intended for help in generating the web pages that haven’t been removed here. These issues may make the solutions a little difficult to follow at times, but they should still be readable.
Solving Quadratic Equations: A Summary

1. Use the discriminant to determine the type of roots for the following equation. Do not find any roots.

\[ 169x^2 - 182x + 49 = 0 \]

Step 1
There really isn’t too much to this problem. First we need to identify the values for computing the discriminant.

\[ a = 169 \quad b = -182 \quad c = 49 \]

Step 2
Plugging these into the formula for the discriminant gives,

\[ b^2 - 4ac = (-182)^2 - 4(169)(49) = 0 \]

Step 3
The discriminant is zero and so we know that this equation will have a **double root**.

2. Use the discriminant to determine the type of roots for the following equation. Do not find any roots.

\[ x^2 + 28x + 61 = 0 \]

Step 1
There really isn’t too much to this problem. First we need to identify the values for computing the discriminant.

\[ a = 1 \quad b = 28 \quad c = 61 \]

Step 2
Plugging these into the formula for the discriminant gives,

\[ b^2 - 4ac = (28)^2 - 4(1)(61) = 540 \]

Step 3
The discriminant is positive and so we know that this equation will have **two real roots**.

3. Use the discriminant to determine the type of roots for the following equation. Do not find any roots.

\[ 49x^2 - 126x + 102 = 0 \]
4. Use the discriminant to determine the type of roots for the following equation. Do not find any roots.

\[ 9x^2 + 151 = 0 \]

Step 1
There really isn’t too much to this problem. First we need to identify the values for computing the discriminant.

\[ a = 9 \quad b = 0 \quad c = 151 \]

Step 2
Plugging these into the formula for the discriminant gives,

\[ b^2 - 4ac = (0)^2 - 4(9)(151) = -5436 \]

Step 3
The discriminant is negative and so we know that this equation will have two complex roots.