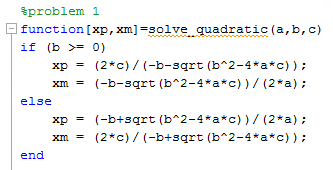
**Problem 1:**

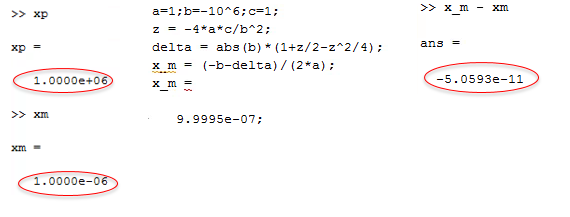
Since , will be very close to . To get the smaller root, we subtract the .

When b is positive, for the x+, the numerator would be close to , and subtracting a nearly equal quantity will result in large relative errors.

When b is negative, for the x-, the numerator would be close to , and subtracting a nearly equal quantity will result in large relative errors.



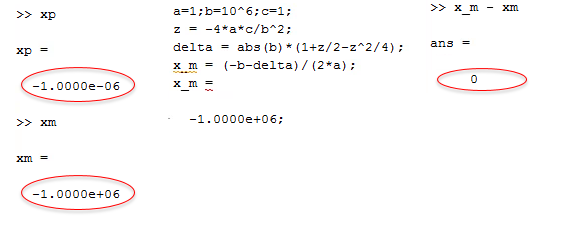
The x+ is , the x- is .

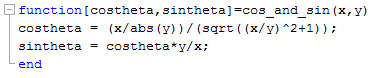
The error in the smaller root is

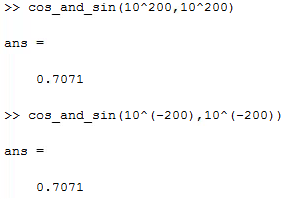
(codes and results are on the next page)

The x+ is , the x- is .

The error in the smaller root is

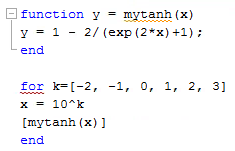


**Problem 2:**



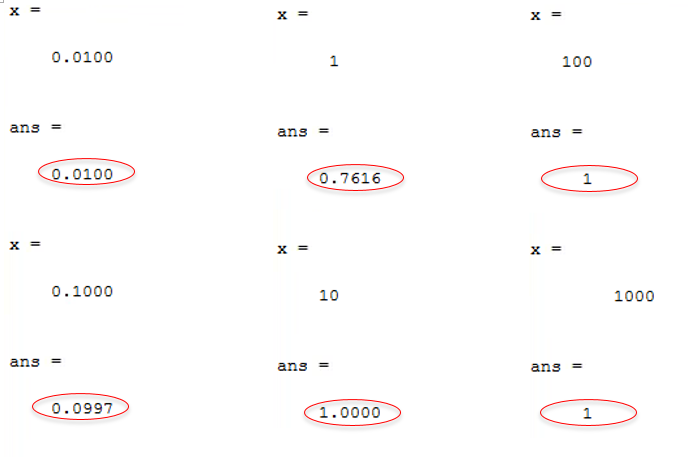
The answers are 0.7071. By reducing the power of x and y, we prevent the overflow.

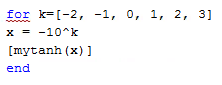
**Problem 3:**

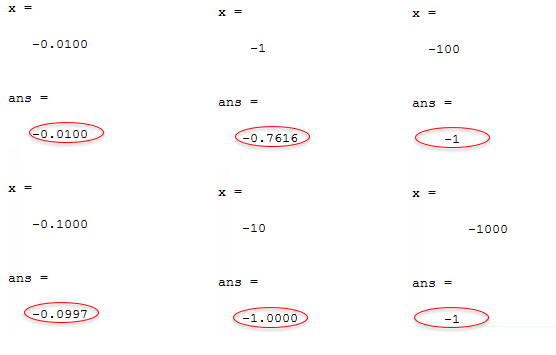


The results are on the next page.

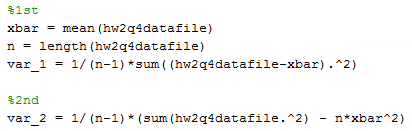
k = -2, -1: k = 0, 1: k = 2, 3:

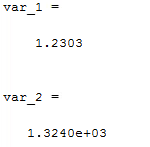




k = -2, -1: k = 0, 1: k = 2, 3:

**Problem 4:**





The second variance = 1.324e+03 is more accurate. Since all entries are the same, we expect the variance to be 0. In the first function, we keep adding , the subtracting will lead to a large relative error.