1.

a. Why is it justified to modify the algorithm to set B to B – R-1QT**r**?

A property of QR factorizations is that QQT is equal to I. Therefore:

(JTJ)-1JT = ((QR)TQR)-1(QR)T

= (RTQTQR)-1RTQT

= (RTR)-1RTQT

= R-1(RT) RTQT

= R-1QT

b. With the modified version, the algorithm can converge even with a bad initial approximation of the coefficient factors or if JTJ has a condition number that is very high. This results in the error in the computation of its inverse being very high. With the unmodified version, the algorithm can converge slowly or even diverge if the initial approximations are far from the minimum.

2.

Because the plots are plotting nearly identical data over identical ranges, the graphs look highly similar.