5)

a) Goal:

b)

Goal: We were told, in the handout, suggested values for parameterisation for the gaussian bump and subsequently got a very low value for chi squared suggesting the peak was indeed parametrised by these numbers. This part attempt to demonstrates how these numbers could be found experimentally.

Method:

1. ‘Take the bin heights and centres as a new set of data’ Meaning the middle of the tops of each column in the histogram is a now a point in an array.
2. ‘Remove from each bin height the value of the exponential expectation curve at that point’ effectively leaving data as if there was no exponential trend in it. (these are the plotted blue dots)
3. ‘Using an optimiser and initial guesses matching observed data and a least squares method produced a curve of fitted parameters to our data, they were indeed close to the original suggested values’ Basically I just ran the optimiser function through my non-exponential data and low and behold the parameters it suggested for matching that data were basically (700,125,1.5)
4. Plotted that with the other data as an orange line

c)

Goal: Knowing ahead of time that the higgs would appear around 125 is cheating so this is aims to show how by finding the lowest chi squared over a range of masses the higgs mass could be determined.

Method:

1. ‘Set the mass as a range of values and iterate through calculating chi and adding to a list’ Just a simple for loop testing each mass value from 104 to 155 and printing the chi value
2. Plotted line graph of chi, big dip at 125 is significant