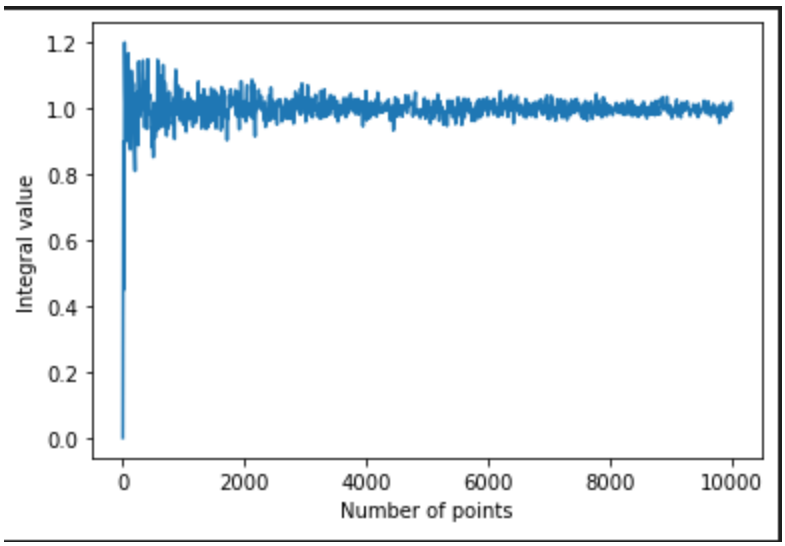
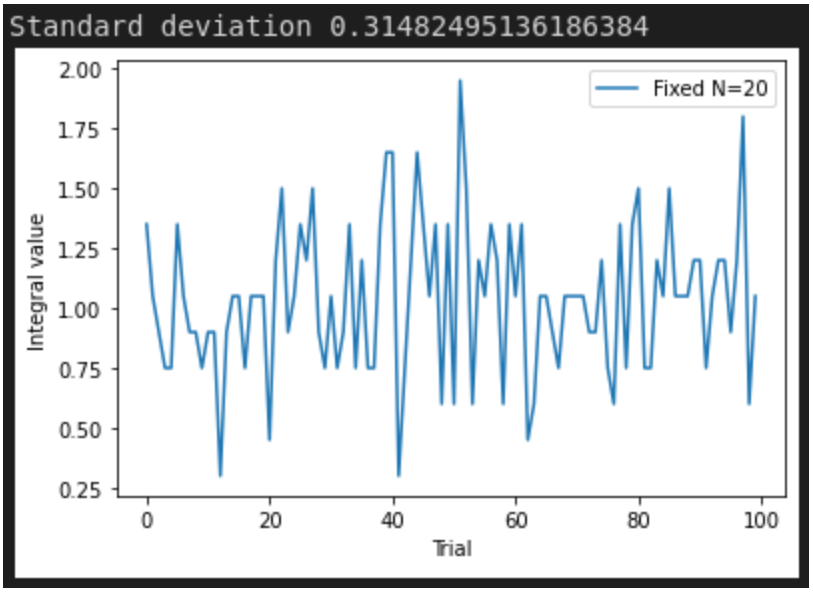
Report - 6

$I = \int_0^1 3x^2 dx$

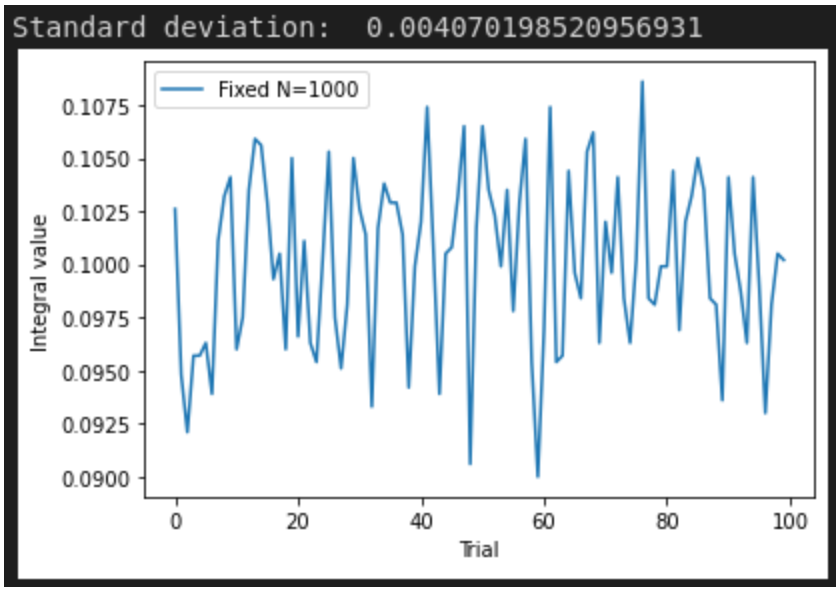
True value : 1



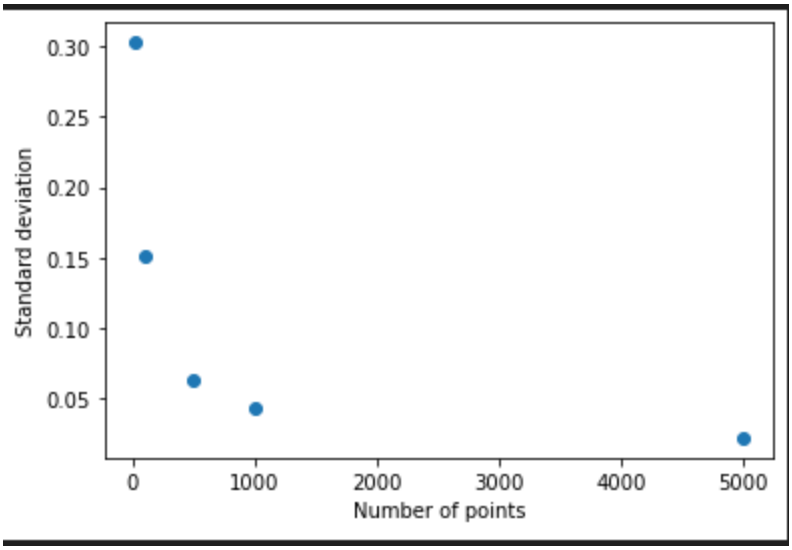
The integral vs number of points graph



The integral vs trial number graph for N=20 along with the variance



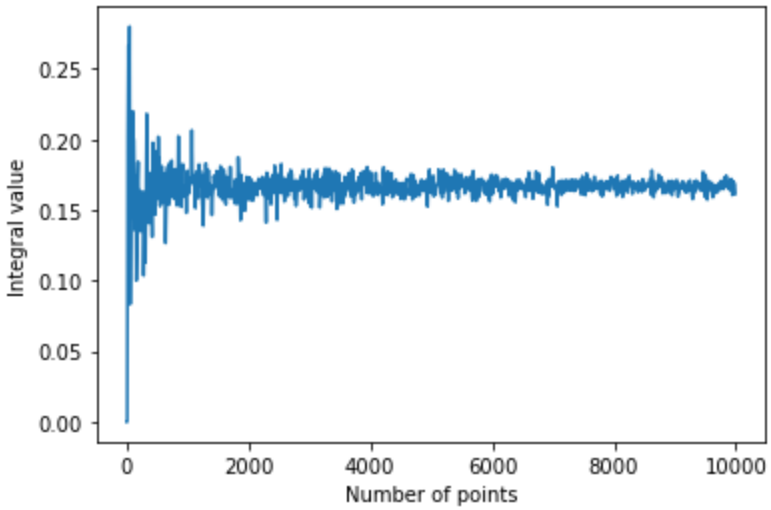
The integral vs trial number graph for N=1000 along with the variance



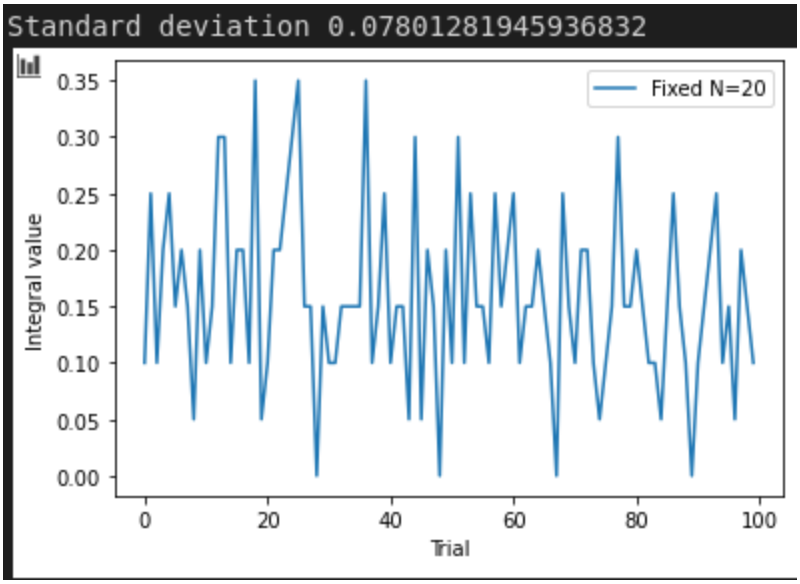
The standard deviation vs N graph

$$I = \int_0^1 \int_0^1 x^2 y \, dx dy$$

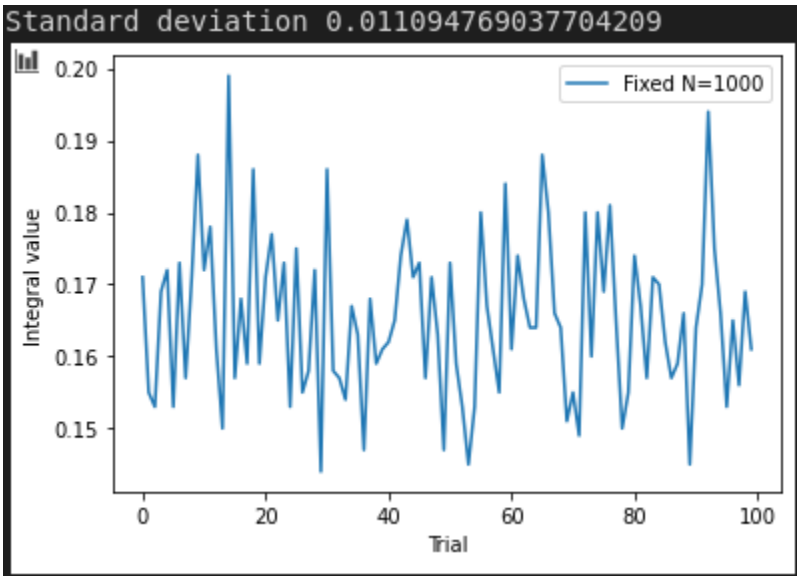
True value : 0.167



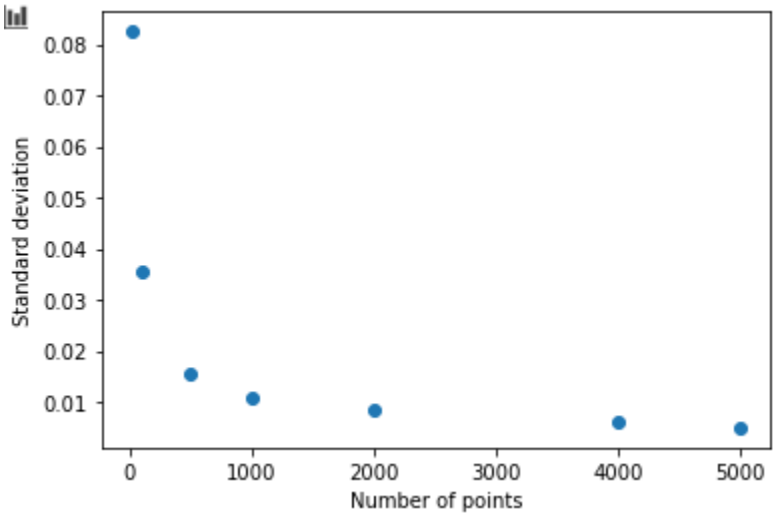
The integral vs number of points graph



The integral vs trial number graph for N=20 along with the variance



The integral vs trial number graph for N=1000 along with the variance



The standard deviation vs N graph

Conclusion

As we can see in both the standard deviation plots, the standard deviation is proportional to $\sqrt{N}$.