



CODE->

```
step_size_vector=c(seq(from=10, to=100, by=10), seq(from=200, to=1000, by=
100), seq(from=2000, to=5000, by=1000))
sd_vector=c()
for(step_size in step_size_vector){
+   x_coord_vector=c()
+   y_coord_vector=c()
+   displacement_vector=c()
+   for(trials in 1:10000){
+     random_angle=runif(step_size)
+     random_angle=random_angle*2*pi
+     x_coord=0
+     y_coord=0
+     for(single_step in random_angle){
+       x_coord = x_coord + cos(single_step)
+       y_coord = y_coord + sin(single_step)
+     }
+     x_coord_vector=c(x_coord_vector, x_coord)
+     y_coord_vector=c(y_coord_vector, y_coord)
+     displacement_vector=sqrt(x_coord_vector*x_coord_vector + y_coord
_vector*y_coord_vector)
+   }
+   sd_vector=c(sd_vector, sd(displacement_vector))
+ }
```

OBSERVATION->

The plot of standard deviation vs number of steps taken per trial, for total number of trials of 10,000 per given step amount looks like a parabola.