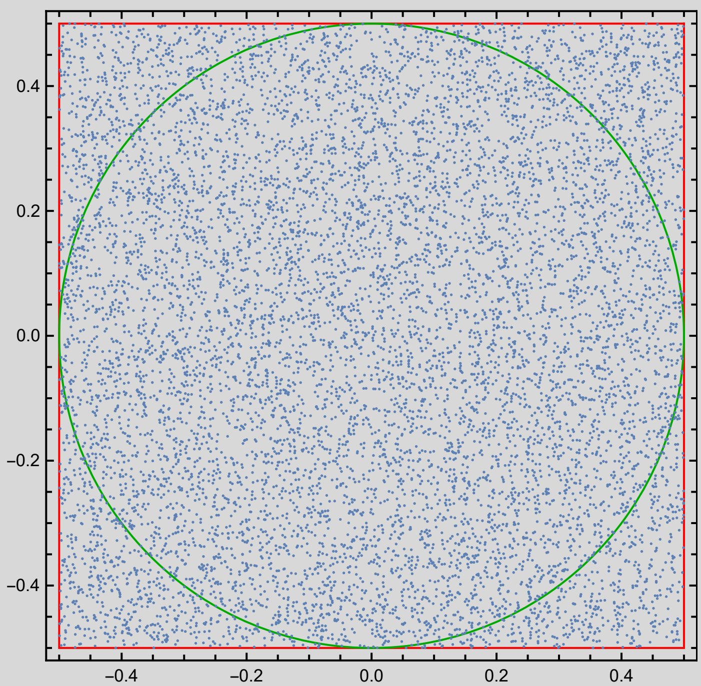
```
sqr = Graphics[
   {Red, Line[{{0.5, 0.5}, {0.5, -0.5}, {-0.5, -0.5}, {-0.5, 0.5}, {0.5, 0.5}}]},
   Frame → True];
cir = Graphics[{Darker[Green], Circle[{0, 0}, 0.5]}, Frame → True] ;
(*We can use functions to plot this, that is, y=Sqrt[1/4-x^2] and y=-Sqrt[1/4-x^2] *)
coordx = RandomVariate[UniformDistribution[{-0.5, 0.5}], 10000];
coordy = RandomVariate[UniformDistribution[{-0.5, 0.5}], 10000];
points = Transpose[{coordx, coordy}];
lstplt = ListPlot[points];
Show[sqr, cir, lstplt]
n1 = 0;
For[i = 1, i ≤ 10000, i++, If[Sqrt[(coordx[[i]])^2 + (coordy[[i]])^2] ≤ 0.5, n1++]]
Print["The number of points inside the circle is, n=", n1]
result1 = n1/10000 * 4;
Print["The ratio n/N *4 =", N[result1]]
```

Out[ ]=



The number of points inside the circle is, n=7861

The ratio $\frac{n}{N}*4$ =3.1444

In[ ]:=
```
(*For N=10*)
coordx = RandomVariate[UniformDistribution[{-0.5, 0.5}], 10];
coordy = RandomVariate[UniformDistribution[{-0.5, 0.5}], 10];
n2 = 0;
For[i = 1, i ≤ 10, i++, If[√((coordx[[i]])^2 + (coordy[[i]])^2) ≤ 0.5, n2++]]
Print["The number of points inside the circle is, n=", n2]
result2 = n2/10 * 4;
Print["The ratio n/N *4 =", N[result2]]
```

The number of points inside the circle is, n=9

The ratio $\frac{n}{N}*4$ =3.6

In[ ]:=
```
(*For N=100*)
coordx = RandomVariate[UniformDistribution[{-0.5, 0.5}], 100];
coordy = RandomVariate[UniformDistribution[{-0.5, 0.5}], 100];
n3 = 0;
For[i = 1, i ≤ 100, i++, If[√((coordx[[i]])^2 + (coordy[[i]])^2) ≤ 0.5, n3++]]
Print["The number of points inside the circle is, n=", n3]
result3 = n3/100 * 4;
Print["The ratio n/N *4 =", N[result3]]
```

The number of points inside the circle is, n=82

The ratio $\frac{n}{N}*4$ =3.28

In[ ]:=
```
(*For N=1000*)
coordx = RandomVariate[UniformDistribution[{-0.5, 0.5}], 1000];
coordy = RandomVariate[UniformDistribution[{-0.5, 0.5}], 1000];
n4 = 0;
For[i = 1, i ≤ 1000, i++, If[√((coordx[[i]])^2 + (coordy[[i]])^2) ≤ 0.5, n4++]]
Print["The number of points inside the circle is, n=", n4]
result4 = n4/1000 * 4;
Print["The ratio n/N *4 =", N[result4]]
```

The number of points inside the circle is, n=786

The ratio $\frac{n}{N}*4$ =3.144

In[ ]:=
```
Print["The ratio n/N*4 is very close to π."]
Print["Reason:- "]
Print[
 "The number of points is proportional to the value of area. The total number of
   points is proportional to the area of the square and the number of
   points inside the circle is proportional to the area of the circle."]
Print["n α π/4"]
Print ["N α 1"]
Print["Therefore, n/N=π/4 and n/N*4=π"]
Print["Also, we can note that the values of the ratio is closer to π for
   N=10000 compared to for N=10, because more points means more accuracy."]
```

The ratio $\frac{n}{N}*4$ is very close to π.

Reason:-

The number of points is proportional to the value of area. The total number of points is proportional to the area of the square and the number of points inside the circle is proportional to the area of the circle.

n α $\frac{\pi}{4}$

N α 1

Therefore, $\frac{n}{N}=\frac{\pi}{4}$ and $\frac{n}{N}*4=\pi$

Also, we can note that the values of the ratio is closer to π for N=10000 compared to for N=10, because more points means more accuracy.