In [29]:
```
import numpy as np
import random
import math as m
import matplotlib.pyplot as plt
def integral(n):
    out =0
    inn =0
    for i in range(n):
        x=random.uniform(0, m.pi)
        y=random.uniform(0, 1)
        if np.sin(x)<y:
            out+=1
        if np.sin(x)>y:
            inn+=1

    J=inn*m.pi/n
    return J
```

In [30]:
```
integral(1000)
```

Out[30]:
```
2.004336112990288
```

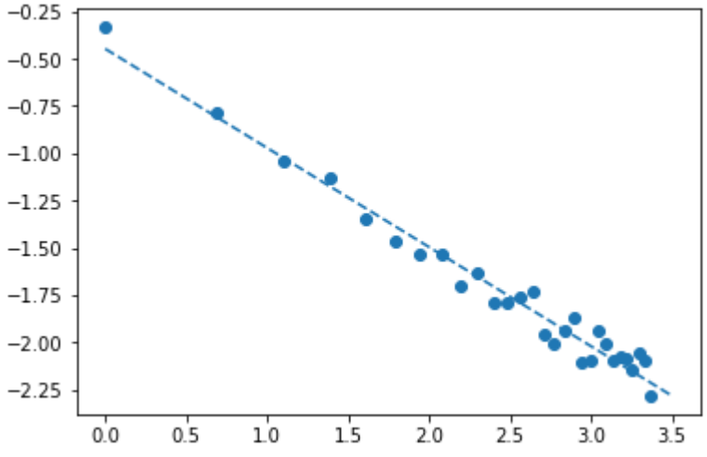
In [31]:
```
def avg_beta(n):
    beta=0
    for i in range(1,100):
        beta+=abs(integral(n)-2)/2
    return beta/100
```

In [35]:
```
avg_beta(250)
```

Out[35]:
```
0.03893538218689018
```

In [33]:
```
def figure(n):
    y=[]
    a=np.linspace(0,3.5)
    x=range(1,n)
    for i in x:
        y.append(avg_beta(i))
    plt.scatter(np.log(x),np.log(y))
    p=np.polyfit(np.log(x),np.log(y),1)
    plt.plot(a,(np.poly1d(p))(a), linestyle='--')
```

In [34]:
```
figure(30)
```



In [ ]: