In [6]:
```
import numpy as np
import scipy.stats as st
import statsmodels.datasets
import matplotlib.pyplot as plt
import pandas as pd
from math import log,sqrt
%matplotlib inline

lamda1 = 4
randomlist = []
for x in range(0,40):
    i = np.random.uniform()
    randomlist.append({i,(log(1-i))/-lamda1})

random_df = pd.DataFrame(randomlist, columns=['ri','xi'])
random_df
```

Out[6]:

	ri	xi
0	0.077369	0.020131
1	0.400035	0.127721
2	0.394302	0.125343
3	0.979911	0.976891
4	0.401402	0.128291
5	0.042507	0.010859
6	0.240309	0.068711
7	0.223109	0.063114
8	0.036212	0.009221
9	0.545641	0.197217
10	0.259003	0.074940
11	0.096397	0.025341
12	0.050970	0.013079
13	0.309747	0.092674
14	0.290643	0.085849
15	0.646604	0.260041
16	0.645787	0.259464
17	0.424885	0.138296
18	0.791549	0.392012
19	0.366248	0.114025
20	0.944259	0.721759
21	0.534874	0.191362
22	0.873547	0.516971
23	0.650333	0.262693
24	0.350351	0.107831
25	0.319391	0.096192
26	0.768246	0.365520
27	0.872284	0.514486
28	0.039264	0.010014
29	0.814116	0.420658
30	0.316775	0.095233
31	0.944670	0.723609
32	0.745966	0.342572
33	0.019765	0.004991
34	0.489044	0.167868

	ri	xi
35	0.179289	0.049396
36	0.328243	0.099465
37	0.612752	0.237172
38	0.766562	0.363709
39	0.319405	0.096197

In [7]:
```
# random_df = random_df.sort_values(by=['xi'])
# random_df.tail()
```

In [8]:
```
limits_list = []
n = len(random_df.index)
k = round(sqrt(n))
nhigh =  random_df['xi'].max()
nlow =  random_df['xi'].min()
range1 = nhigh - nlow
w = range1 / k

#limites inferiores y superiores
xlimite = nlow
for x in range(0,k):
    if x == 0:
        linf = nlow
        lsup = nlow + w
    else:
        linf = xlimite
        lsup = xlimite + w

    xlimite = xlimite + w
    limits_list.append([linf,lsup])

limits_list = np.around(limits_list, decimals=4)
limits_df = pd.DataFrame(limits_list, columns=['linf','lsup'])
```

In [9]:
```
frecuencies_list = []
ii = 0
for index1, irow in limits_df.iterrows():
    i = 0
    for index2, jrow in random_df.iterrows():
        if index1 == 0:
            if jrow['xi'] >= irow['linf'] and jrow['xi'] <= irow['lsup'] :
                i = i+1
        else:
            if jrow['xi'] > irow['linf'] and jrow['xi'] <= irow['lsup'] :
                i = i+1
    #print(irow['linf'], irow['lsup'],jrow['xi'])
    ii = ii+i
    frecuencies_list.append([irow['linf'], irow['lsup'],i,ii/n,(i/n)*100,ii,(i
i/n)*100])

frecuencies_df = pd.DataFrame(frecuencies_list, columns=['linf','lsup','fabsol
uta','frelativa','fporcentual','Facumulada','Facmporcentual'])
frecuencies_df
```

Out[9]:

	linf	lsup	fabsoluta	frelativa	fporcentual	Facumulada	Facmporcentual
0	0.0050	0.1670	22	0.550	55.0	22	55.0
1	0.1670	0.3290	7	0.725	17.5	29	72.5
2	0.3290	0.4909	5	0.850	12.5	34	85.0
3	0.4909	0.6529	2	0.900	5.0	36	90.0
4	0.6529	0.8149	2	0.950	5.0	38	95.0
5	0.8149	0.9769	1	0.975	2.5	39	97.5

In [10]:
```
fig, (ax1) = plt.subplots(1,1, figsize=(10, 4))
data = random_df['xi']
ax1.plot(sorted(data)[::-1], 'o')
ax1.set_xlabel('muestra xi')
ax1.set_ylabel('valor')
```

Out[10]: Text(0, 0.5, 'valor')