Modelo logistico

Librerias

In [28]:
```
import pandas as pd
import numpy as np
from datetime import datetime,timedelta
from sklearn.metrics import mean_squared_error
from scipy.optimize import curve_fit
from scipy.optimize import fsolve
from sklearn import linear_model
import matplotlib.pyplot as plt
%matplotlib inline
from xml.dom import minidom
from datetime import datetime
instanteInicial = datetime.now()
```

Cargar datos

In [27]:
```
url = 'covid.csv'
df = pd.read_csv(url)
df = df.fillna(0)
df
```

Out[27]:

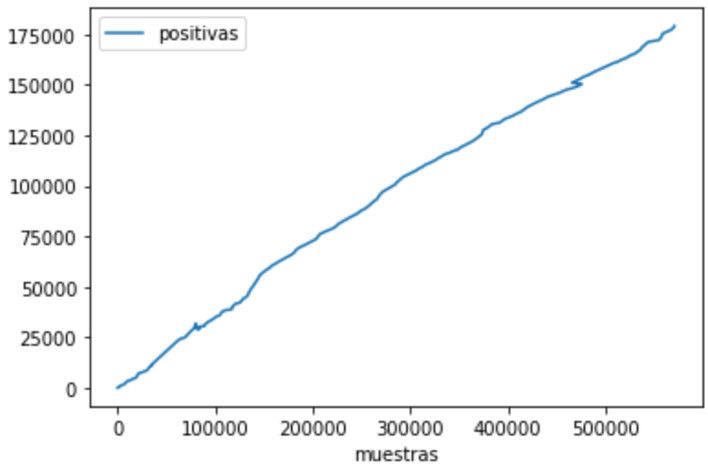
	muestras	muestras_pcr	muestras_pcr_nuevas	pruebas_rezagadas	muertes_confirmadas	muertes_probabl
0	129	129	0	106	1	
1	206	206	77	178	2	
2	273	273	67	236	2	
3	354	354	81	296	2	
4	762	762	408	651	2	
...	...	...	...	...	...	
231	562074	541502	3709	53605	8321	43
232	567080	546508	5006	53176	8357	43
233	569362	548790	2282	51707	8371	43
234	569798	549226	436	50815	8380	43
235	570515	549943	717	49712	8386	43

236 rows × 32 columns

Modelo de orden

In [33]:
```
df = df.loc[:,['muestras','positivas']]
FMT = '%Y-%m-%d'
#date = df['muestras']
df
df.plot(x ='muestras', y='positivas')
```

Out[33]: <matplotlib.axes._subplots.AxesSubplot at 0x1ef7b41bc08>



Modelo lineal

In [24]:
```
x = list(df.iloc [:, 0])
y = list(df.iloc [:, 1])
regr = linear_model.LinearRegression()

regr.fit(np.array(x).reshape(-1, 1) ,y)
print('Coefficients: \n', regr.coef_)
print('Independent term: \n', regr.intercept_)
```

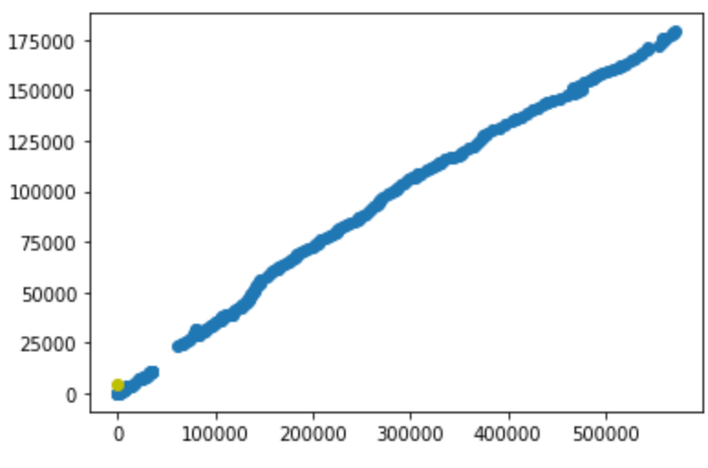
```
Coefficients:
 [0.31872296]
Independent term:
 4093.072591469696
```

In [35]:
```
y_prediccion = regr.predict([[100]])
print(int(y_prediccion))
```

```
4124
```

In [39]:
```
plt.scatter(x, y)
x_real = np.array(range(0,100))
puntos=regr.predict(x_real.reshape(-1, 1))
plt.plot(x_real,puntos, color='red')
plt.plot(37,puntos[37],'oy')
print ('Predicción a 7 días sumando desde el ultimo día en x(30):', puntos[37], 'contagiad
plt.show()
```

```
Predicción a 7 días sumando desde el ultimo día en x(30): 4104.865341020039 contagiados
```



Modelo logistico

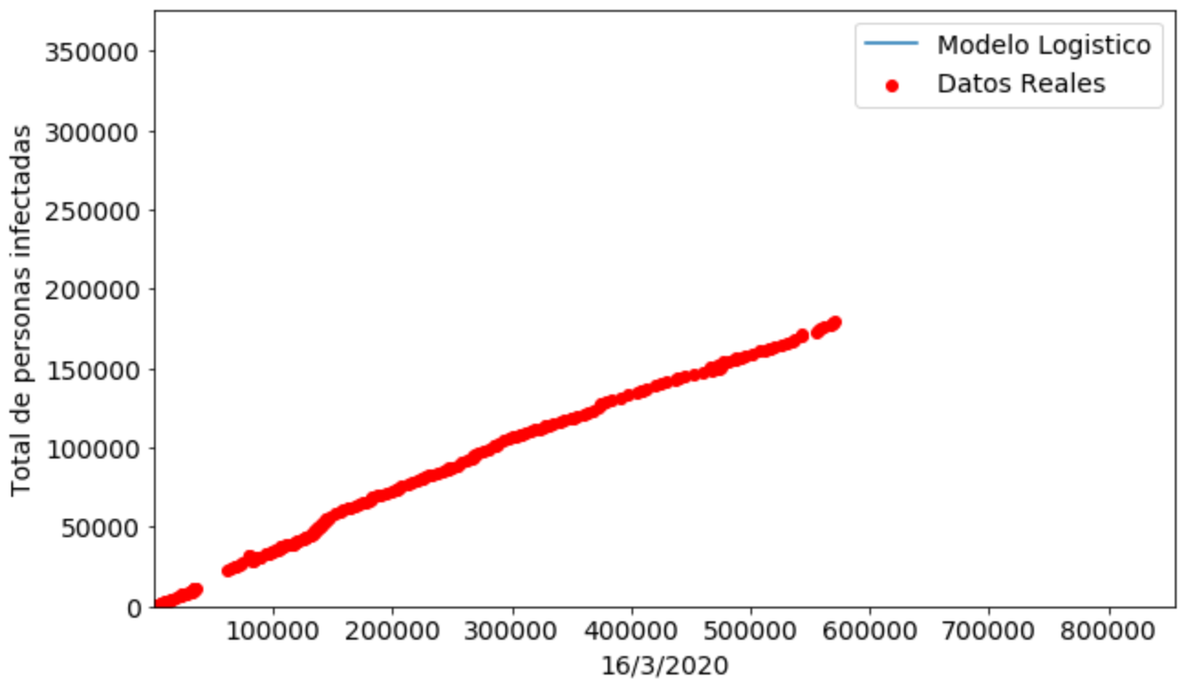
In [40]:
```
def modelo_logistico(x,a,b):
    return a+b*np.log(x)

exp_fit = curve_fit(modelo_logistico,x,y)
print(exp_fit)
```

```
(array([-244702.08796256,   27326.51286535]), array([[ 2.43827803e+08, -2.05065445e+07],
       [-2.05065445e+07,  1.75679864e+06]]))
```

In [41]:
```
pred_x = list(range(1,100))
plt.rcParams['figure.figsize'] = [10, 6]
plt.rc('font', size=14)
pdb.set_trace()
plt.scatter(x,y,label="Datos Reales",color="red")
puntos=[modelo_logistico(i,exp_fit[0][0],exp_fit[0][1]) for i in pred_x]
plt.plot(pred_x,puntos , label="Modelo Logistico" )
plt.legend()
plt.xlabel("16/3/2020")
plt.ylabel("Total de personas infectadas")
plt.ylim((0,max(y)*2.1))
plt.xlim((min(x),max(x)*1.5))
plt.plot(37,puntos[37],'oy')
print ('Predicción a 7 días sumando desde el ultimo día en x(30):', puntos[37], 'contagiad
plt.show()
```

```
Predicción a 7 días sumando desde el ultimo día en x(30): -145299.54296997195 contagiados
```



Conclusiones:

Los modelos matematicos nos ayudan a predecir el numero de infectados que se tendran en los proximos dias para estar preparados