

## Graph of radioactive decay

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This programme uses predefined values for the number of nuclei and the half-life of the nuclei and plots a graph of exponential decay over a certain time period. The formulae used are:

$$\lambda = \frac{\ln(2)}{T_{1/2}}$$

$$N_t = N_0 e^{-\lambda t}$$

The steps in this programme:

- Define the values of  $N_0$ ,  $T_{1/2}$  and  $t$
- Input the values into the above formulae
- Plot the number of nuclei as a function of time

In [2]:

```
import numpy as np
import matplotlib.pyplot as plt

#Define an array of t-values
t = np.linspace(0, 20, 100)

#Set specific values asked for
N = 10**6
T = 4.7

#Calculate decay constant(k)
k = np.log(2)/T

#Calculate N(t) for each time value
N_t = N*np.exp((-k*t))

#Plot N_t as a function of time
plt.plot(t,N_t)
plt.title("Radioactive decay of a sample")
plt.xlabel("Time(Days)")
plt.ylabel("Number of nuclei")
plt.grid
plt.show()
```

