In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
```

In [2]:
```
dias = np.random.randint(1, 20,size=20)
print(dias)
```

```
[11 15  9 18  9 13  6 13 16 17  1  9  7 15  7 18 11  1  9 12]
```

In [3]:
```
def generaDias(nEstudiantes):
    dias = np.random.randint(1, 366,size=nEstudiantes)
    op=False
    for i in range(0,nEstudiantes):
        n1=dias[i]
        v=dias[i+1:]
        for j in range(0,len(v)):
            if n1==v[j]:
                op=True
    return op
```

In [4]:
```
n=0
for i in range(1000):
    if generaDias(20)==True:
        n+=1
print(n/1000*100)
```

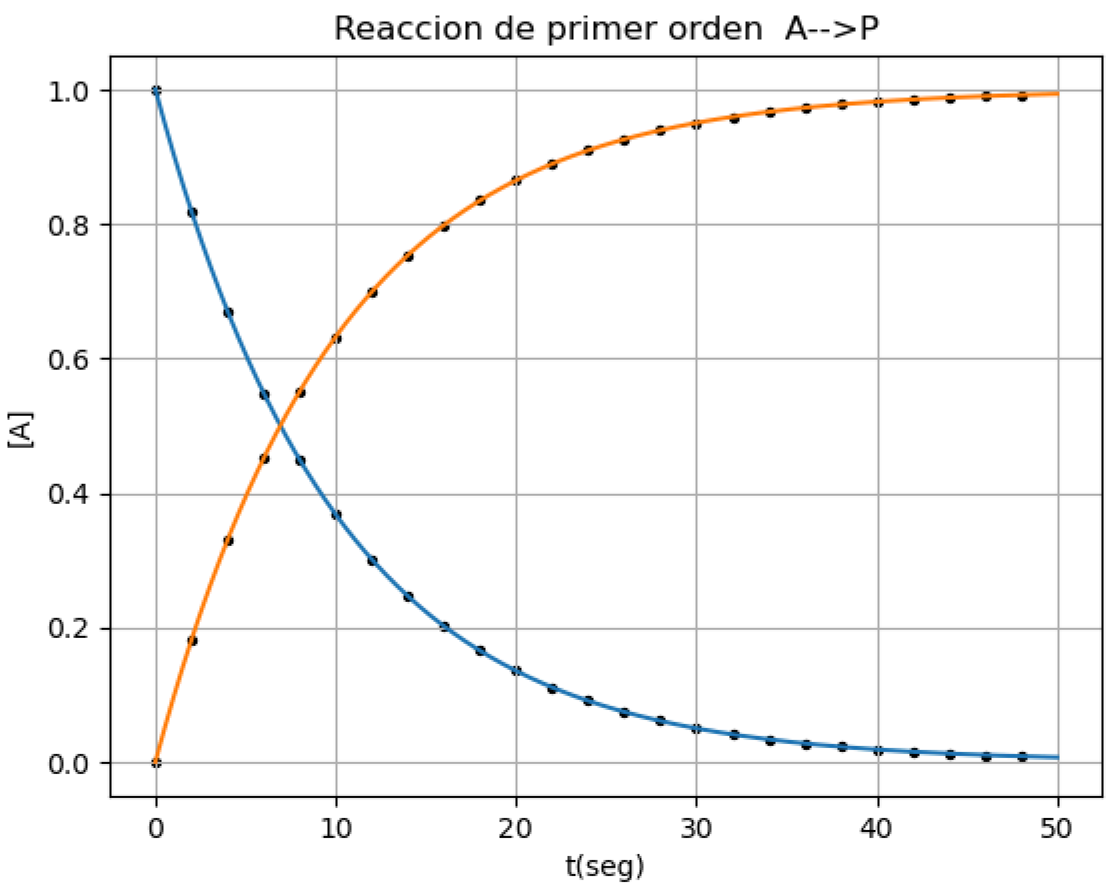
```
42.8
```

$$-\frac{d[A]}{dt} = k \cdot [A]$$

Reacción Química A --> P k

In [11]:
```
A=1.0
P=0.0
k=0.1
t=0
dt=0.01
tt=[]
AA=[]
PP=[]
while t<50:
    tt.append(t)
    AA.append(A)
    PP.append(P)
    dA=-k*A*dt
    dP=k*A*dt
    A=A+dA
    P=P+dP
    t+=dt
tt=np.array(tt)
AA=np.array(AA)
PP=np.array(PP)
```

```python
x=np.arange(0,50,2)
y=np.exp(-k*x)
y2=1-y

plt.plot(tt,AA)
plt.plot(tt,PP)

plt.scatter(x,y,color='black',s=8)
plt.scatter(x,y2,color='black',s=8)

plt.xlabel("t(seg)")
plt.ylabel("[A]")
plt.title("Reaccion de primer orden  A-->P")
plt.grid(True)
plt.show()
```

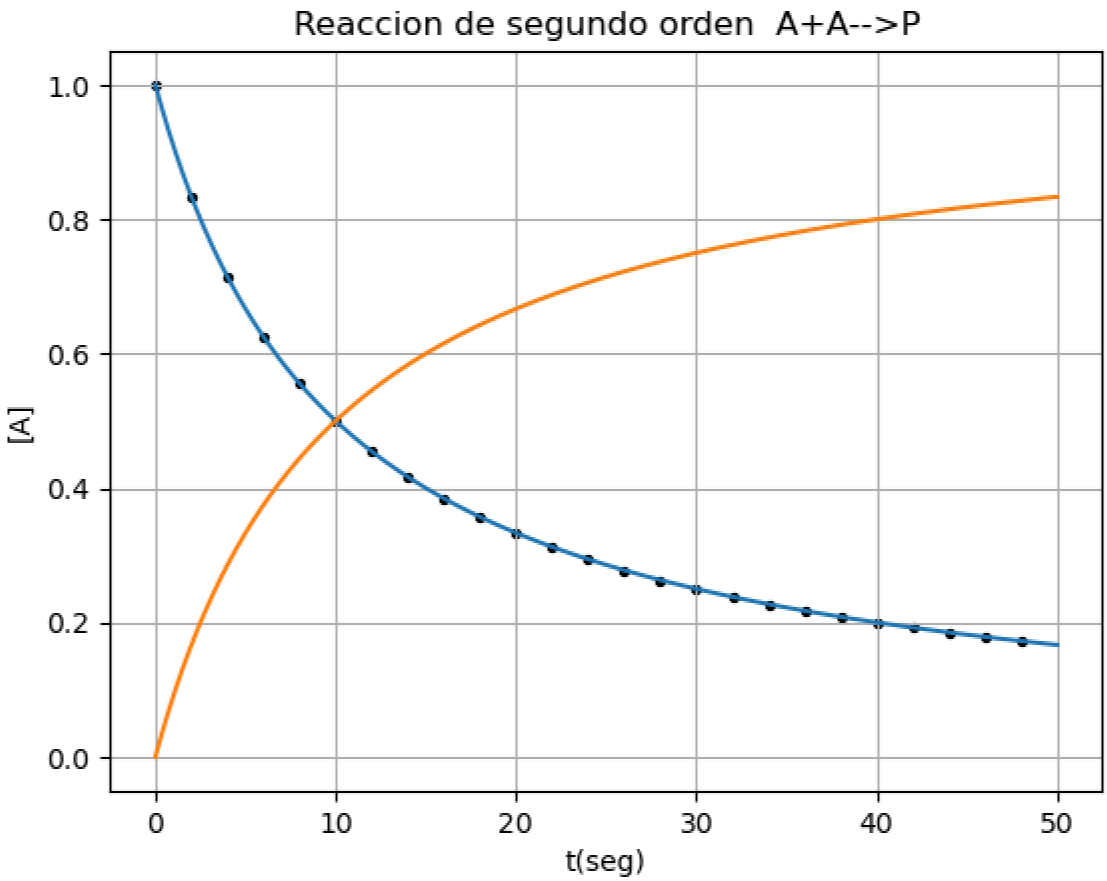


$$\frac{1}{[A]_t} = kt + \frac{1}{[A]_0}$$

A+A --> P

In [13]:
```python
A=1.0
P=0.0
k=0.1
t=0
dt=0.01
tt=[]
AA=[]
```

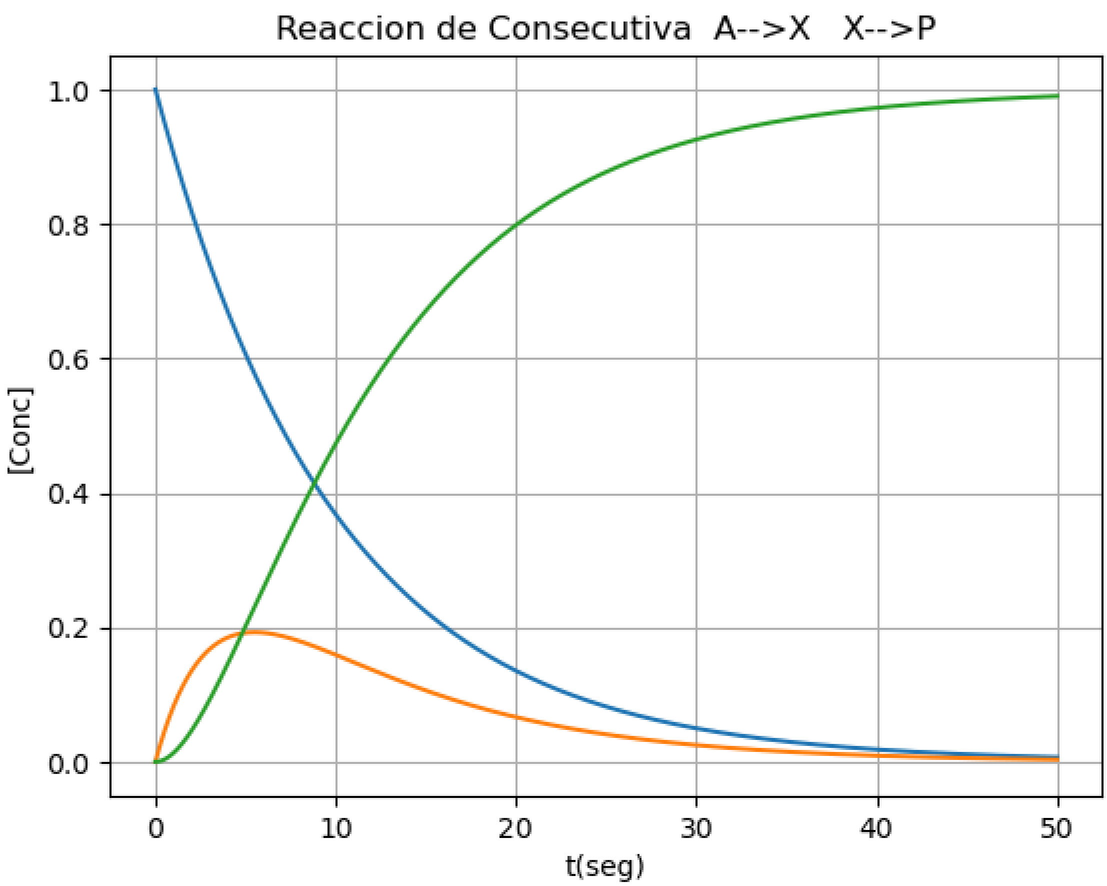
```
PP=[]
while t<50:
    tt.append(t)
    AA.append(A)
    PP.append(P)
    dA=-k*A*A*dt
    dP=k*A*A*dt
    A=A+dA
    P=P+dP
    t+=dt
tt=np.array(tt)
AA=np.array(AA)
PP=np.array(PP)

x=np.arange(0,50,2)
Ao=1.0
invAt=k*x+1/Ao
y=1/invAt

plt.plot(tt,AA)
plt.plot(tt,PP)

plt.scatter(x,y,color="black",s=8)

plt.xlabel("t(seg)")
plt.ylabel("[A]")
plt.title("Reaccion de segundo orden  A+A-->P")
plt.grid(True)
plt.show()
```



In [ ]:
```
A --> X    k1     vA=-k1*[A]     vX=k1*[A]-k2*[X]   vP=k2*[X]
X --> P    k2
```

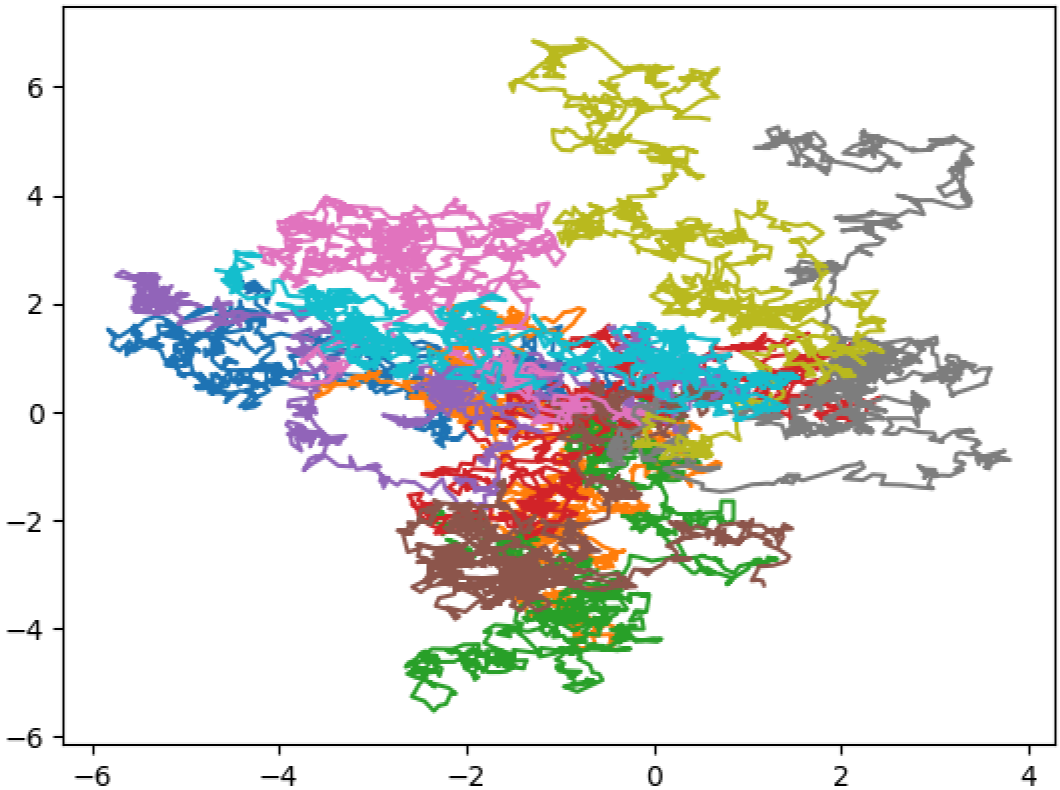
In [15]:
```
A=1.0
P=0.0
X=0.0
k1=0.1
k2=0.3
t=0
dt=0.01
tt=[]
AA=[]
PP=[]
XX=[]
while t<50:
    tt.append(t)
    AA.append(A)
    PP.append(P)
    XX.append(X)
    dA=-k1*A*dt
    dX=k1*A*dt-k2*X*dt
    dP=k2*X*dt
    A=A+dA
    X=X+dX
    P=P+dP
    t+=dt
tt=np.array(tt)
AA=np.array(AA)
```

```
PP=np.array(PP)
XX=np.array(XX)


plt.plot(tt,AA)
plt.plot(tt,XX)
plt.plot(tt,PP)



plt.xlabel("t(seg)")
plt.ylabel("[Conc]")
plt.title("Reaccion de Consecutiva  A-->X   X-->P")
plt.grid(True)
plt.show()
```



In [ ]:
```
TAREA07:   A + B --> C  k1    B -->P  k2    C --> B   k3
```

In [32]:
```
for i in range(0,10):
    dx=np.random.normal(0,0.1,size=1000)
    dy=np.random.normal(0,0.1,size=1000)
    x=np.cumsum(dx)
    y=np.cumsum(dy)
    plt.plot(x,y)
plt.show()
```



In [ ]:
```
TAREA:  ATGC   Generar una secuencia de 500 nucleotidos al azar
```

In [ ]:
```
TAREA: Contar cuantas A , T , G , C
```

In [ ]:
```

```