RESOLUCIONES EJERCICIOS DE FUNCIONES

1.

```
#a)
sinx=function(x,a,n){
        suma=0
        for(i in 0:n){
                suma=suma+((-1)**i)*((x-a)**(2*i+1)/factorial(2*i+1))
        }
        return(suma)
}
#---------------------------------------------------------------------
#b)
RN=function(x,a,n){
        abs((x-a)**(n+1)/factorial(n+1))
}
#---------------------------------------------------------------------
#c)
#i.
        sinx(pi/24,0,0)
        RN(pi/24,0,0)
#ii.
        sinx(pi/24,0,1)
        RN(pi/24,0,1)
#iii.
        sinx(3.2*pi,2*pi,13)
        RN(3.2*pi,2*pi,13)
#iv.
        error_cometido=abs(sin(3.2*pi)-sinx(3.2*pi,2*pi,13))
        error_cometido
#---------------------------------------------------------------------
#d)
xx=seq(-pi,pi,length=10000)
plot(xx,sin(xx),type='l',col='dark blue',ylab='seno x',ylim=c(-1,1))
par(new='TRUE')
plot(xx,sinx(xx,0,0),type='l',col='red',xlab='',ylab='',axes='false')
par(new='TRUE')
plot(xx,sinx(xx,0,1),type='l',col='orange',xlab='',ylab='',axes='false')
par(new='TRUE')
plot(xx,sinx(xx,0,2),type='l',col='green',xlab='',ylab='',axes='false')
```

2.

```
Vector_n=function(n){
        A=0
        for(i in 1:n){
                if(n-i>5){
                        A[i]=7*cos(i*pi/180)*(n+i)
                        }else{
                                A[i]=(n+i)**(n-i)
                        }
        }
        return(A)
}
B=Vector_n(19)
```

3.

```
phi=(sqrt(5)+1)/2
theta=function(n){
        A=0
        for(i in 1:n){
                A[i]=i*2*pi*(1-(1/phi))
        }
        return(A)
}
c=2;n=101
x=0;y=0;thetan=theta(n)
for(i in 1:n){
        x[i]=c*sqrt(i)*cos(thetan[i])
        y[i]=c*sqrt(i)*sin(thetan[i])
}
plot(x,y,col='orange',type='l')
```

4.

```
IntegralR=function(a,b,f){
        f(a)*(b-a)
}
IntegralT=function(a,b,f){
        (f(a)+f(b))*(b-a)/2
}
IntegralS=function(a,b,f){
        ((b-a)/6)*(f(a)+4*f((a+b)/2)+f(b))
}
IntegralSC=function(a,b,f){
        T=0
}
Riemann=function(a,b,f){
        dx=0.0001;suma=0
        if(a<b){
```

```
                while(a<=b){
                        suma=suma+f(a)*dx
                        a=a+dx
                        }
                }else{
                        while(b<=a){
                                suma=suma+f(b)*dx
                                b=b+dx
                        }
                        suma=-1*suma

        }
        return(suma)
}
#a)
f=function(x){
        2*x+9
}
IntegralR(2,5.9,f)
IntegralT(2,5.9,f)
IntegralS(2,5.9,f)
Riemann(2,5.9,f)
#b)
h=function(V){
        1/V
}
IntegralR(1,0.5,h)
IntegralT(1,0.5,h)
IntegralS(1,0.5,h)
Riemann(1,0.5,h)
#c)
g=function(x){
        sin(x)
}
IntegralR(1,100,g)
IntegralT(1,100,g)
IntegralS(1,100,g)
Riemann(1,100,g)
#d)
j=function(phi){
        atan(phi)*cos(phi)+sin(phi)*a*tan(phi)
}
IntegralR(0,pi,j)
IntegralT(0,pi,j)
IntegralS(0,pi,j)
Riemann(0,pi,j)
#e)
k=function(x)
```

```
        exp(-(x**2))
}
IntegralR(5,100,k)
IntegralT(5,100,k)
IntegralS(5,100,k)
Riemann(5,100,k)
```