Untitled.sagews

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Location	Untitled.sagews
Original file	Untitled.sagews

```
1
```

Problema 3

Define y dibuja el grafo asociado a la matriz de adyacencia

a)Comprueba si es euleriano o no. Encuentra un circuito euleriano si la respuesta es afirmativa

b)Comprueba si es hamiltoniano o no. Encuentra un circuito hamiltoniano si la respuesta es afirmativa

c)Comprueba si es plano o no

d)Calcula su numero cromatico (c) y calcula p(c), siendo p el polinomio cromatico

e)Dibuja una coloracion del grafo

f)Calcula el número de recorridos de longitud 3 que hay entre los vertices 1 y 5

```
2 M = matrix([(0,1,1,1,0,1,1,0,0),(1,0,0,0,1,0,1,0,0),(1,0,0,1,1,1,1,1,1),(1,0,1,0,0,1,0,0,0),(0,1,1,0,0,0,1,1,0),(1,0,1,1,0,0,0,1,0),(1,1,1,0,1,0,0,1,1),(0,0,1,0,1,1,1,0,1),(0,0,1,0,0,0,1,1,0)])
3 G=Graph(M)
4 G.show()
```

```
5 G.is_eulerian()
```

```
False
```

```
6 G.is_hamiltonian()
```

```
True
```

```
7 G.hamiltonian_cycle().show()
```

```
8 G.is_planar()
```

```
False
```

```
9 G.chromatic_number()
```

```
4
```

```
10 G.chromatic_polynomial()
```

```
x^9 - 20*x^8 + 175*x^7 - 874*x^6 + 2719*x^5 - 5376*x^4 + 6561*x^3 - 4482*x^2 + 1296*x
```

```
11 pol=G.chromatic_polynomial()
12 pol(4)
```

```
96
```

```
13 x=4
14 a=x^9-20*x^8+175*x^7-874*x^6+2719*x^5-5376*x^4+6561*x^3-4482*x^2+1296*x
15 show(a)

16 var("x")
17 f(x)=G.chromatic_polynomial()
18 [f(k) for k in range (0,1+G.chromatic_number())]
```

```
[0, 0, 0, 0, 96]
```

```
19 c=G.coloring()
20 G.plot(layout='circular', graph_border=True, partition=c)

21 show((M^3)[1][5])

22

23
```

Problema 1(3p)

Sea la sucesion definida por recurrencia mediante Sn+2=3*Sn+1-2*Sn a partir de S1=1 y S2=4.Define una funcion que permita calcular el valor de Sn para cualquier n entero positivo y muestra el valor de S62

```
24 def p1(n):
25     if n==0:
26         return 1
27     else:
28         if n==1:
29             return 4
30         else:
31             aux0=1;aux1=4;k=1
32             while k<n:
33                 aux2=3*aux1-2*aux0
34                 aux0=aux1
35                 aux1=aux2
36                 k=k+1
37         return aux2

38 p1(61)
```

```
6917529027641081854
```

```
39
```

Problema 2(2p)

Se denominan numeros de woodall a los de la forma n*2^n-1,n=1,2...

Crea una lista con los primeros 100 numeros de woodall. extrae de ella los que sean primos y menores de 10^40

```
[n*2^n-1 for n in range(1,101)]
```

```
[1,
 7,
 23,
 63,
 159,
 383,
 895,
 2047,
 4607,
 10239,
 22527,
 49151,
 106495,
 229375,
 491519,
 1048575,
 2228223,
 4718591,
 9961471,
 20971519,
 44040191,
 92274687,
 192937983,
 402653183,
 838860799,
 1744830463,
 3623878655,
 7516192767,
 15569256447,
 32212254719,
 66571993087,
 137438953471,
 283467841535,
 584115552255,
 1202590842879,
 2473901162495,
 5085241278463,
 10445360463871,
 21440476741631,
 43980465111039,
 90159953477631,
 184717953466367,
 378231999954943,
 774056185954303,
 1583296743997439,
 3236962232172543,
 6614661952700415,
 13510798882111487,
 27584547717644287,
 56294995342131199,
 114841790497947647,
 234187180623265791,
 477381560501272575,
 972777519512027135,
 1981583836043018239,
 4035225266123964415,
 8214565720323784703,
 16717361816799281151,
 34011184385901985791,
 69175290276410818559,
 140656423562035331071,
 285924533142498050047,
 581072438321850875903,
 1180591620717411303423,
 2398076729582241710079,
 4869940435459321626623,
 9887454823508319666175,
 20070057552195992158207,
 40730410914750689968127,
 82641413450218791239679,
 167644010141872405086207,
 340010386766614455386111,
 689465506498968201199615,
 1397820478929414983254015,
 2833419889721787128217599,
 5742397643169488579854335,
 11635911013790805806546943,
 23574053482485268906770431,
 47752569874777852400893951,
 96714065569170333976494079,
 195845982777569926302400511,
 396527668833598369303625727,
 802726744224113772004900863,
 1624796301562061610805100543,
 3288278229351791355200798719,
 6653927711158918977582792703,
 13462597927228510489527975935,
 27234680864278366047780732927,
 55088331748199422233011027967,
 111414603535684224740921180159,
 225305087149939210031640608767,
 455561934457019941162877714431,
 921027389228322924524948422655,
 1861861819085211933448282832895,
 3763337719427556035693337640959,
 7605903601369376408980219232255,
 15370263527767281493147526365183,
 31057439705591620336669228531711,
 62748704711297355374086808666111,
 126765060022822940149670320537599]
```

```
for n in range(1,101):
    if(2*2^n-1).is_prime()==True:
        if(2*2^n-1)<10^40:
            print 2*2^n-1
```

```
3
7
```

```
31
127
8191
131071
524287
2147483647
2305843009213693951
618970019642690137449562111
```

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