

```
In [1]: # En primer lugar se cargan las librerías necesarias para el desarrollo del problema
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

```
In [2]: #Se procede a la lectura de los datos, la información será almacenada de la siguiente manera:
# Datos Davivienda -> Información de los datos de entradas (mayoría de variables) y variable de salida
# Datos mensuales: Datos de los datos que presentan lag por mes
Datos_Davivienda=pd.read_csv('dav_data.csv', header=0)
Datos_Mensuales=pd.read_csv('datos_mensuales.csv', header=0)
```

```
In [3]: #Se visualiza la información para notar que fue cargada correctamente
Datos_Davivienda.head()
Datos_Mensuales.head()
```

Out[3]:

	CONSECUTIVO	mes_lag	MORA_DAV	MORA_SF	NUM_CONS
0	1	0	0.0	0.0	2.0
1	1	1	0.0	0.0	2.0
2	1	2	0.0	0.0	3.0
3	1	3	0.0	0.0	3.0
4	2	0	0.0	0.0	2.0

```
In [5]: #Se comprueba si la matriz cargada contiene datos vacíos o no numéricos
#El resultado es que si
Datos_Davivienda.isnull().any().any()
```

Out[5]: True

```
In [6]: #Se convierte a columna cada una de las lags de las variables de Datos_mensual
es, de tal manera que se aumente el número de columnas de acuerdo a la
#Lag respectiva, de esta manera la nueva matriz Datos_arreglados tendrá 13 col
umnas, la incial CONSECUTIVO, y las variables
#MORA_DAV|zero,MORA_DAV|one,MORA_DAV|two,MORA_DAV|three, MORA_SF|zero,MORA_SF|
one,MORA_SF|two,MORA_SF|three,NUM_CONS|zero,NUM_CONS|one,NUM_CONS|two,NUM_CONS
|three
#Esto reduce el número de filas y aumenta el de columnas.
Datos_arreglados= Datos_Mensuales.pivot(index='CONSECUTIVO',columns='mes_lag',
values=['MORA_DAV','MORA_SF','NUM_CONS'])
Datos_arreglados.columns.set_levels(['zero','one','two','three'],level=1,inpla
ce=True)
Datos_arreglados.columns = Datos_arreglados.columns.map('|'.join).str.strip(
'|')
#Datos_arreglados.loc[:, 'MORA_DAV|zero': 'MORA_SF|three'] = Datos_arreglados.Lo
c[:, 'MORA_DAV|zero': 'MORA_SF|three'].astype('bool')
Datos_arreglados.reset_index(level=['CONSECUTIVO'], inplace=True)

#Se procede a visualizar los datos para notar que quedaron arreglados correcta
mente
Datos_arreglados.head()
```

Out[6]:

	CONSECUTIVO	MORA_DAV zero	MORA_DAV one	MORA_DAV two	MORA_DAV three	MORA_SF zero
0	1	0.0	0.0	0.0	0.0	0.0
1	2	0.0	0.0	0.0	0.0	0.0
2	3	0.0	0.0	0.0	0.0	0.0
3	4	0.0	0.0	0.0	0.0	0.0
4	5	0.0	0.0	0.0	0.0	0.0

```
In [7]: #Se imprimen los nombres de las columnas de la nueva matriz
print(Datos_arreglados.columns)
```

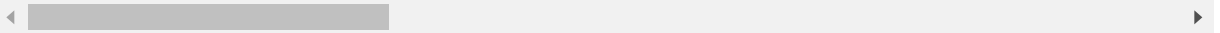
```
Index(['CONSECUTIVO', 'MORA_DAV|zero', 'MORA_DAV|one', 'MORA_DAV|two',
      'MORA_DAV|three', 'MORA_SF|zero', 'MORA_SF|one', 'MORA_SF|two',
      'MORA_SF|three', 'NUM_CONS|zero', 'NUM_CONS|one', 'NUM_CONS|two',
      'NUM_CONS|three'],
      dtype='object')
```

```
In [8]: #Se unen las dos matrices de datos en una sola datos, de tal manera que se com
pacte la información
datos=pd.merge(Datos_Davivienda,Datos_arreglados)
datos.head()
```

Out[8]:

	CONSECUTIVO	COMPRA_CARTERA	EDAD	ACIERTA	QUANTO	ACT_LAB	ANT_DAV	SALDI
0	1		1	50.0	894.0	14227.0	I	3.08
1	2		1	60.0	654.0	8322.0	E	14.08
2	3		0	40.0	806.0	1681.0	E	4.50
3	4		1	40.0	807.0	12661.0	E	1.50
4	5		0	50.0	823.0	1697.0	NaN	0.92

5 rows × 31 columns



```
In [9]: #Se agrupan las variables por tipo
tipos_Datos = datos.columns.to_series().groupby(datos.dtypes).groups
# se guardan en la lista categoricas las variables que no sean numéricas
categoricas = tipos_Datos[np.dtype('object')]
columnastotales = datos.columns
categoricas=list(set(categoricas))
# Se aumenta la lista de categoricas adicionando las variables que a pesar de
ser numéricas son discretas
categoricas.extend(['EDAD', 'MORA_DAV|zero', 'MORA_DAV|one', 'MORA_DAV|two', 'MO
RA_DAV|three', 'MORA_SF|zero', 'MORA_SF|one', 'MORA_SF|two',
'MORA_SF|three', 'NUM_CONS|zero', 'NUM_CONS|one', 'NUM_CONS|two',
'NUM_CONS|three', 'NUM_PROD_P1', 'NUM_PROD_P2', 'NUM_PROD_P3', 'NUM_PROD_P
4'])
#Se guarda en variable numericas todas aquellas que no sean categoricas
numericas = [e for e in list(set(columnastotales)) if e not in categoricas]
numericas = [e for e in numericas if e not in ['CONSECUTIVO', 'COMPRA_CARTERA'
]]
#Se elimina la variable ENTIDAD_COMPRA de las variables categoricas, ya que es
normal que esta variable no presente información
categoricas = [e for e in categoricas if e not in ['ENTIDAD_COMPRA']]
```

```
In [10]: #Se llenan todos los datos vacios de las variables numéricas continuas con la
mediana de los datos
for c in numericas:
    mediana = datos[c].median()
    datos[c] = datos[c].fillna(mediana)
```

```
In [11]: #Se llenan todos los datos faltantes de las variables categoricas o discretas
con la moda
for c in categoricas:
    moda = datos[c].mode()[0]
    datos[c] = datos[c].fillna(moda)
```

```
In [12]: #Se crea una categoría para los datos faltantes de la variable ENTIDAD_COMPRA
datos['ENTIDAD_COMPRA']=datos['ENTIDAD_COMPRA'].fillna("Ninguna")
```

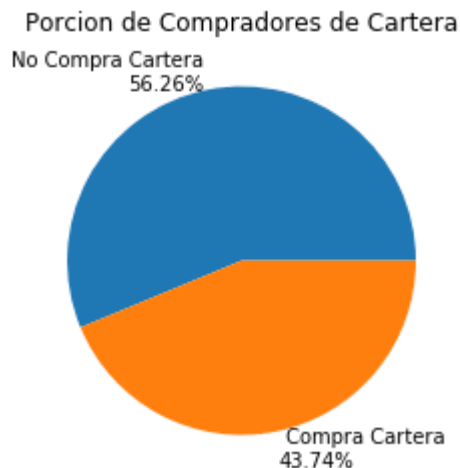
```
In [13]: #Se agreg esta variable al Listado de categóricas
categoricas.extend(['ENTIDAD_COMPRA'])
```

```
In [14]: #Se calcula el porcentaje e lo registros que poseen compra de cartera, dado a
         #que se obtiene como resultado 43% se puede concluir
         #que los datos pueden usarse tranquilamente para el entrenamiento, pues no hay
         #un desbalance entre las etiquetas de la salida
porcentaje_compra=datos[datos.COMPRA_CARTERA==1]['COMPRA_CARTERA'].count()/datos['COMPRA_CARTERA'].count()
print(porcentaje_compra*100)
```

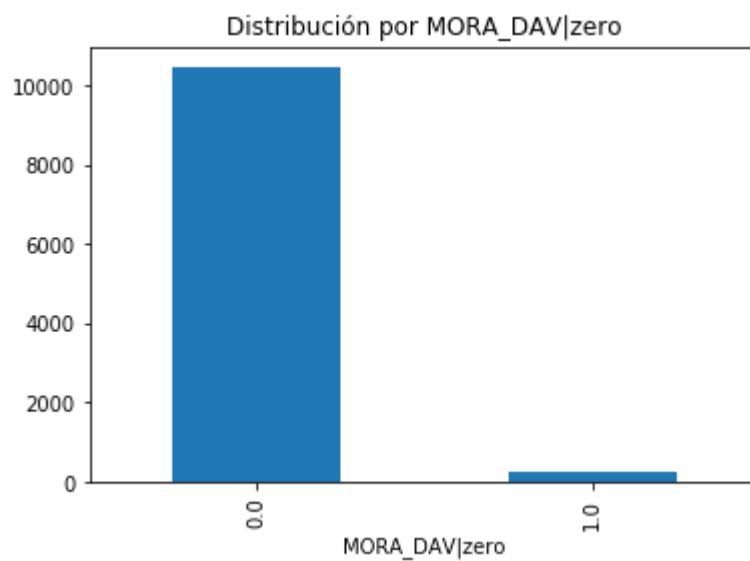
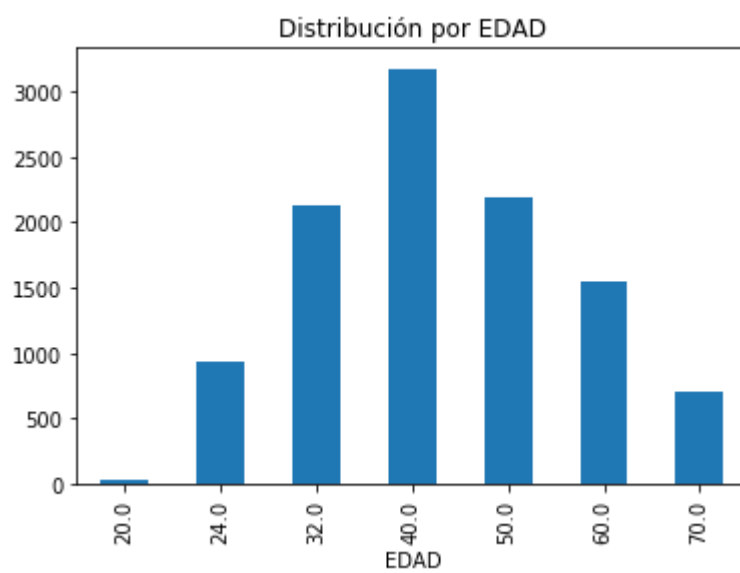
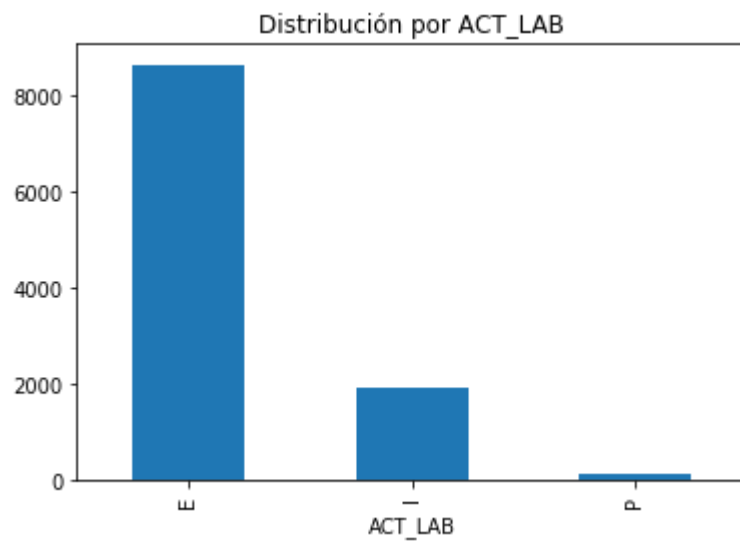
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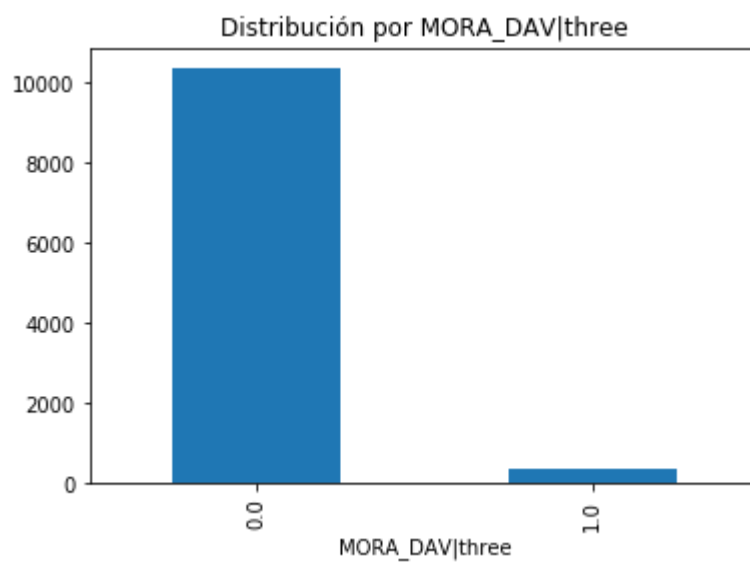
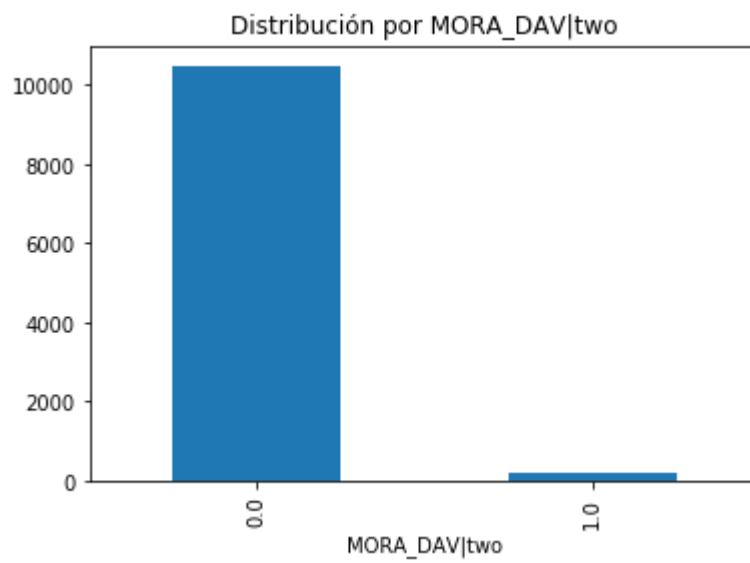
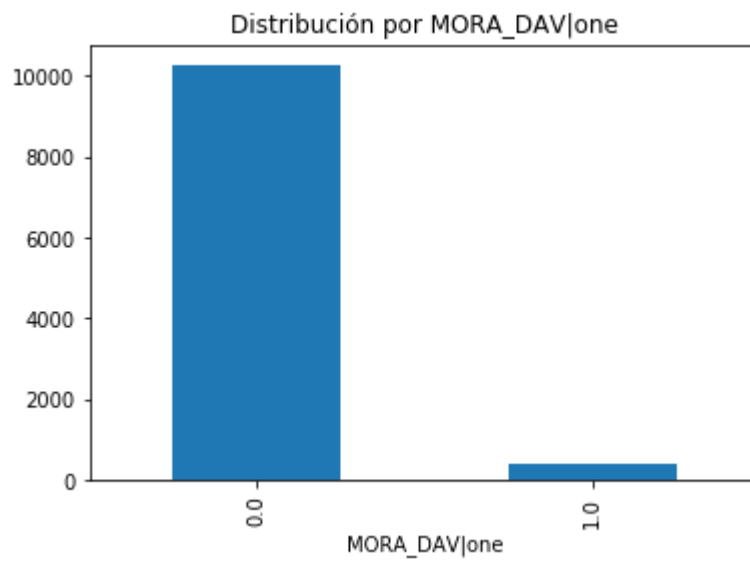
```
In [15]: # se crea el Grafico de totas del porcentaje de compra de cartera para una mejor
         # visualización
         # Agrupando por COMPRA_CARTERA
compradores = datos.groupby('COMPRA_CARTERA').CONSECUTIVO.count()
# Creando las Leyendas del grafico.
labels = [ ' Compra Cartera\n' + str(round(x * 1.0 / compradores.sum() * 100.0
, 2)) + '%' for x in compradores ]
labels[0] = 'No' + labels[0]

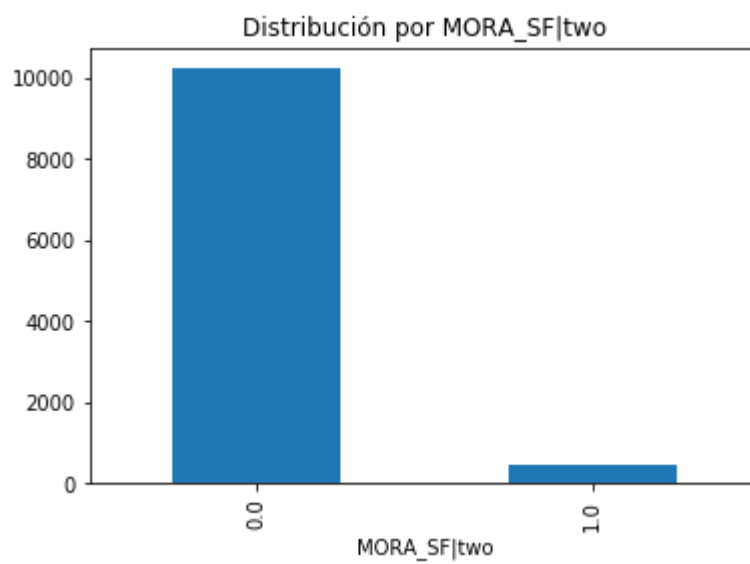
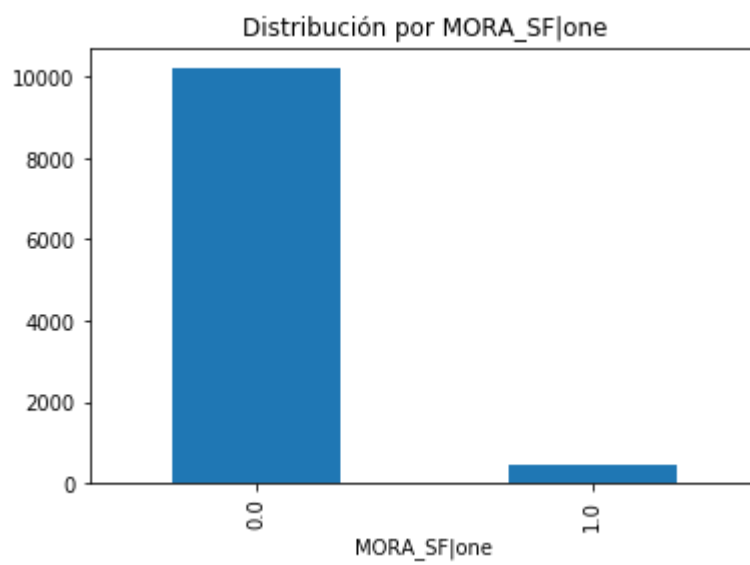
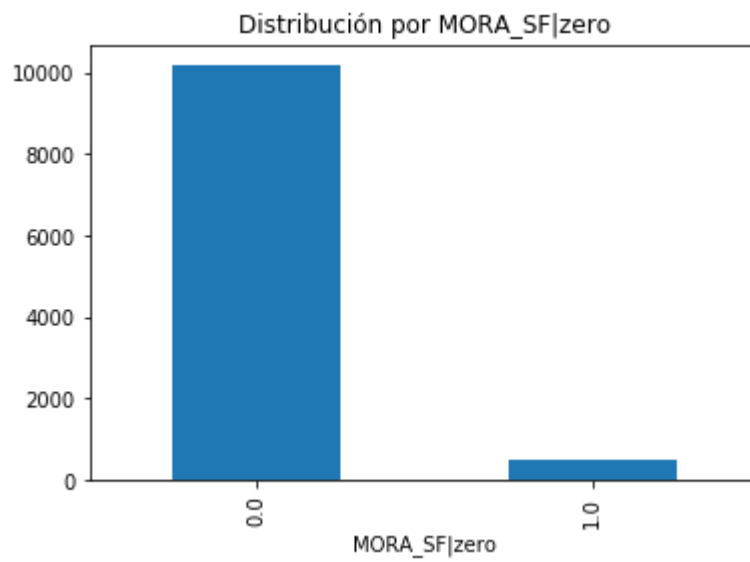
plt.pie(compradores, labels=labels)
plt.title('Porcion de Compradores de Cartera')
plt.show()
#Se genera el gráfico
```

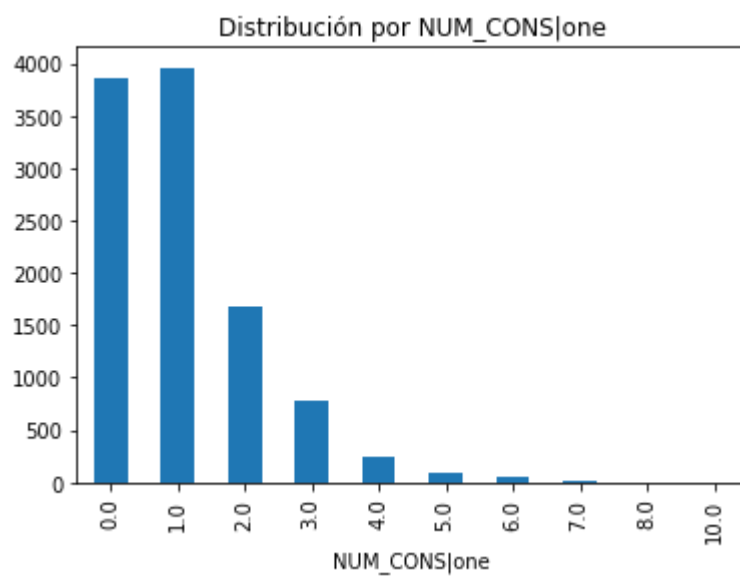
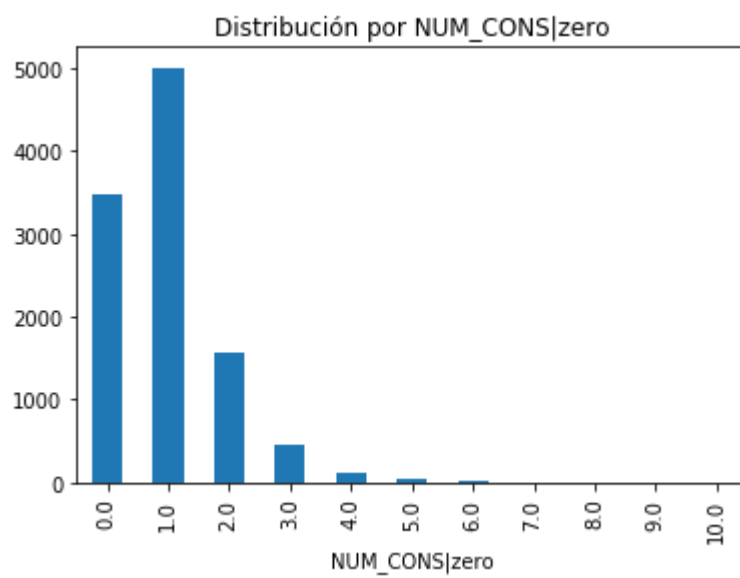
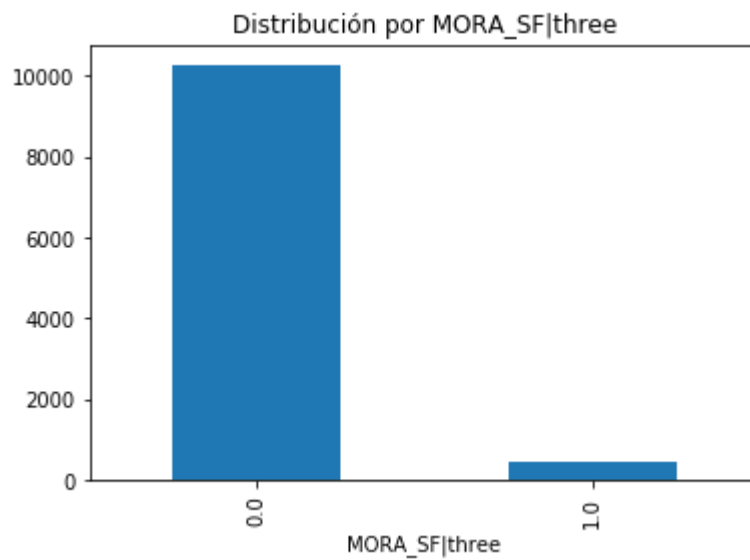


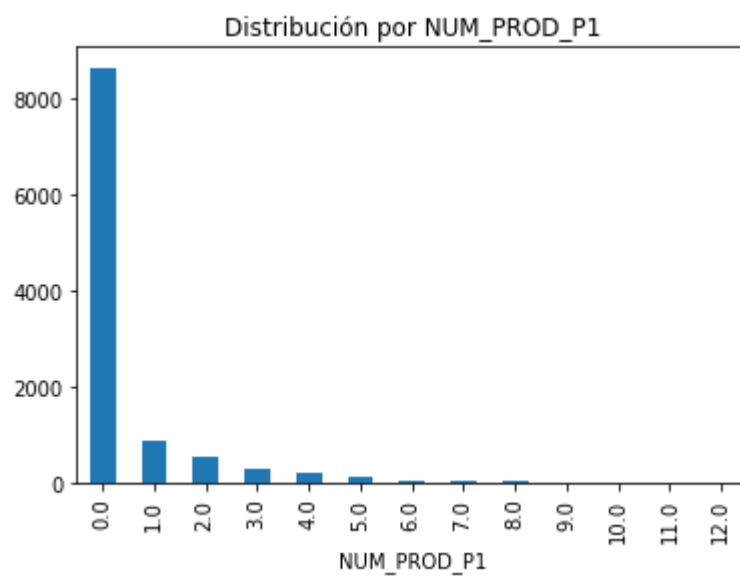
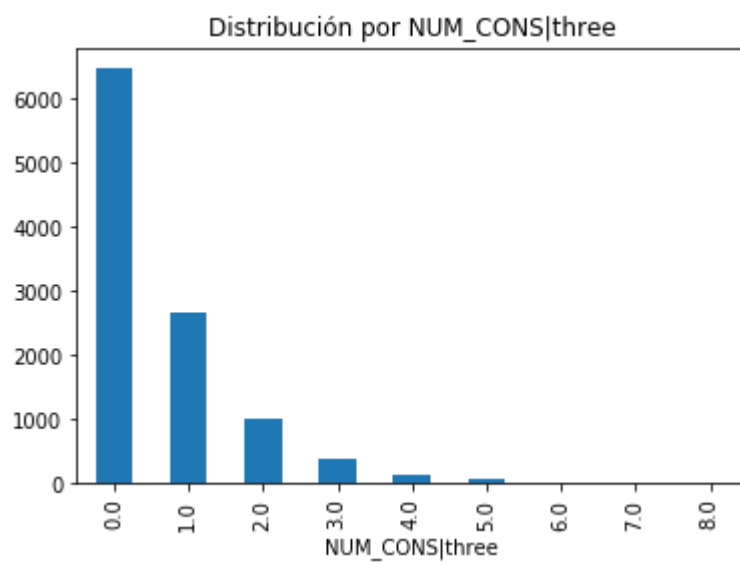
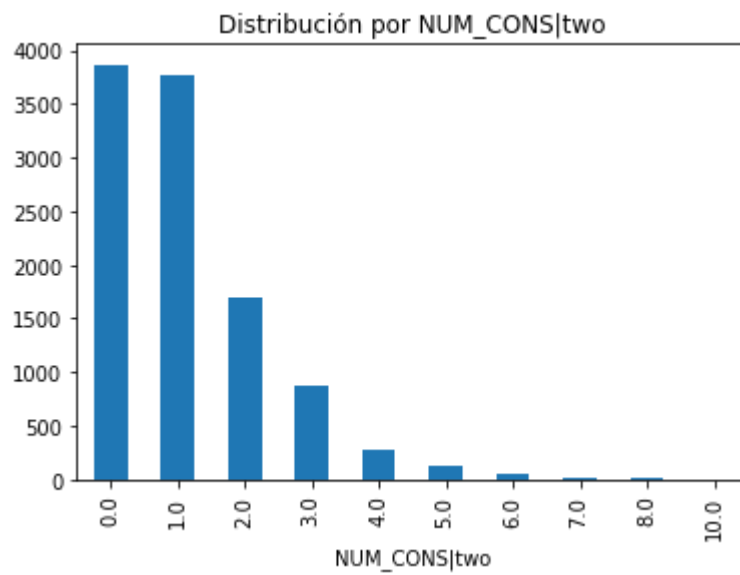
```
In [16]: #Para todas las variables categóricas se crea un gráfico que permita observar  
el histograma de las variables.  
for c in categoricas:  
    datos.groupby(c).size().plot(kind='bar')  
    plp.title('Distribución por ' + c)  
    plp.show()  
  
datos.groupby('ENTIDAD_COMPRA').size().plot(kind='bar')  
plp.title('Distribución por ENTIDAD_COMPRA')  
plp.show()
```

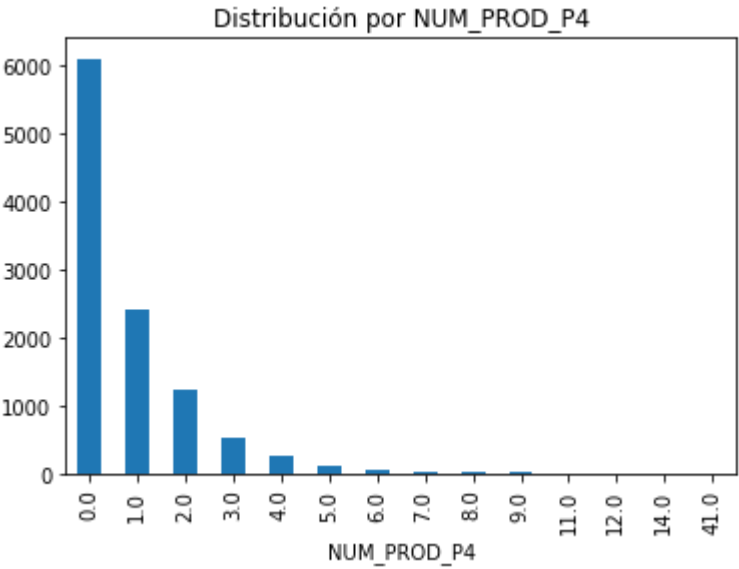
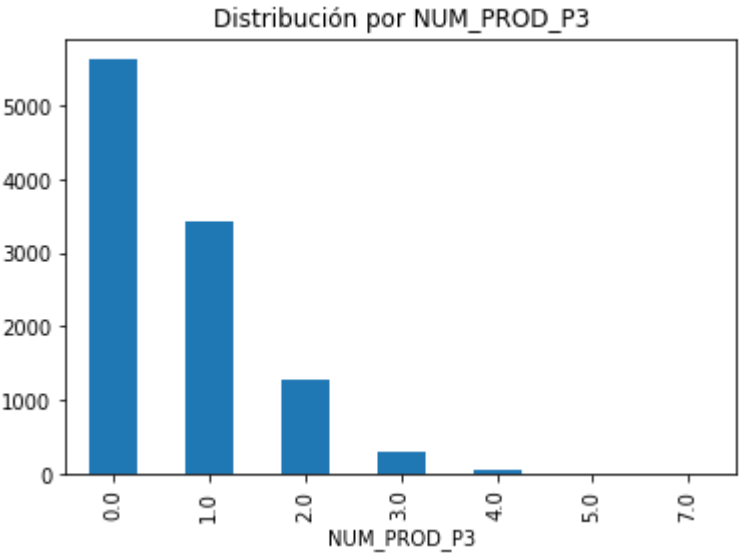
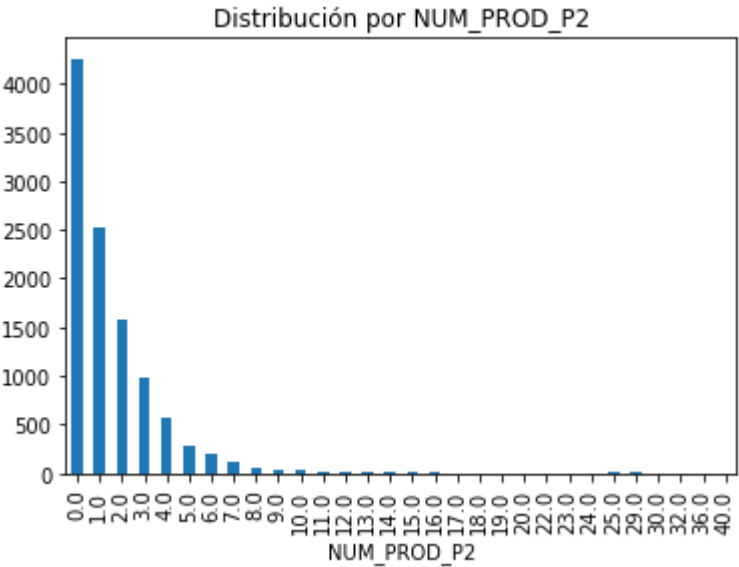


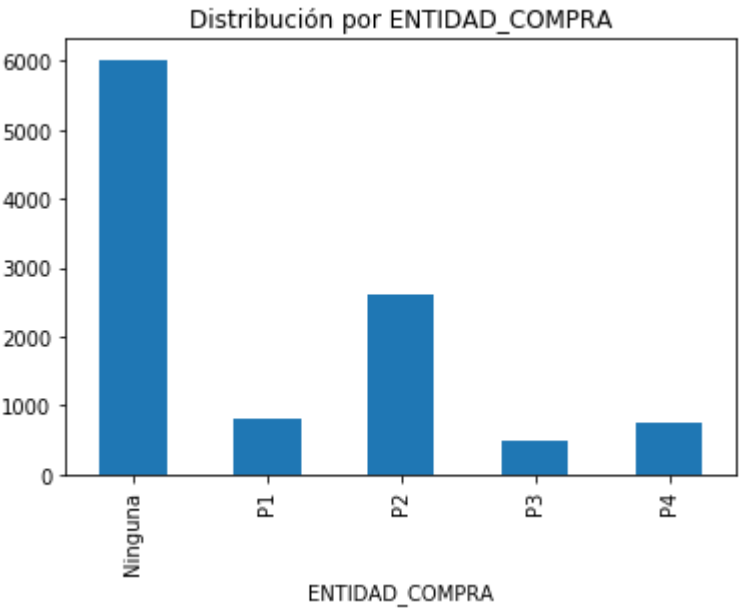
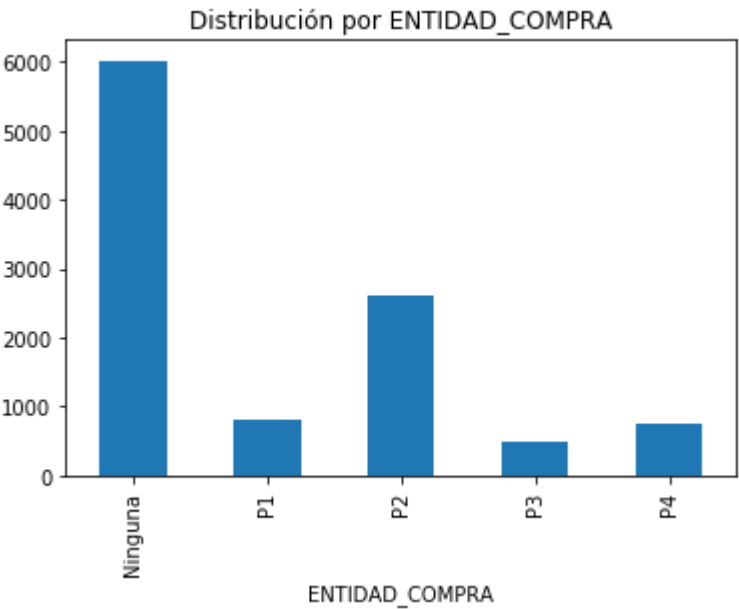




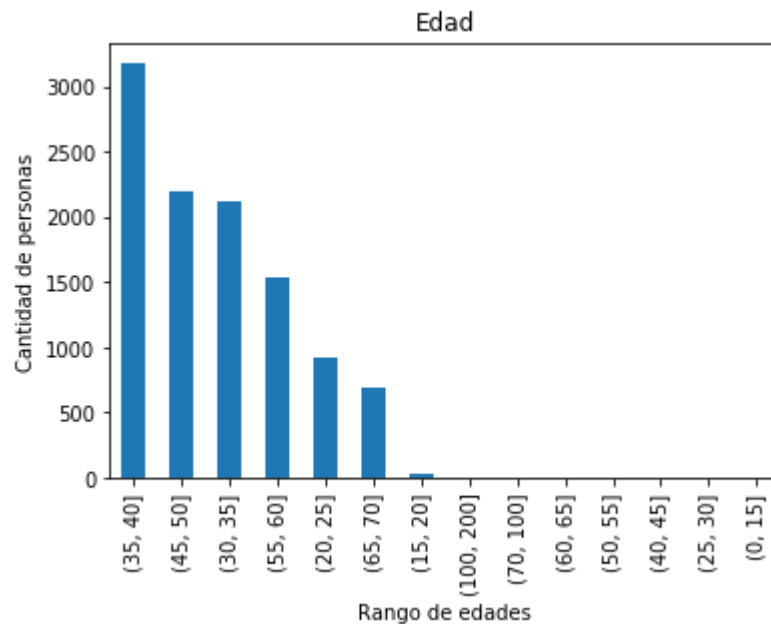




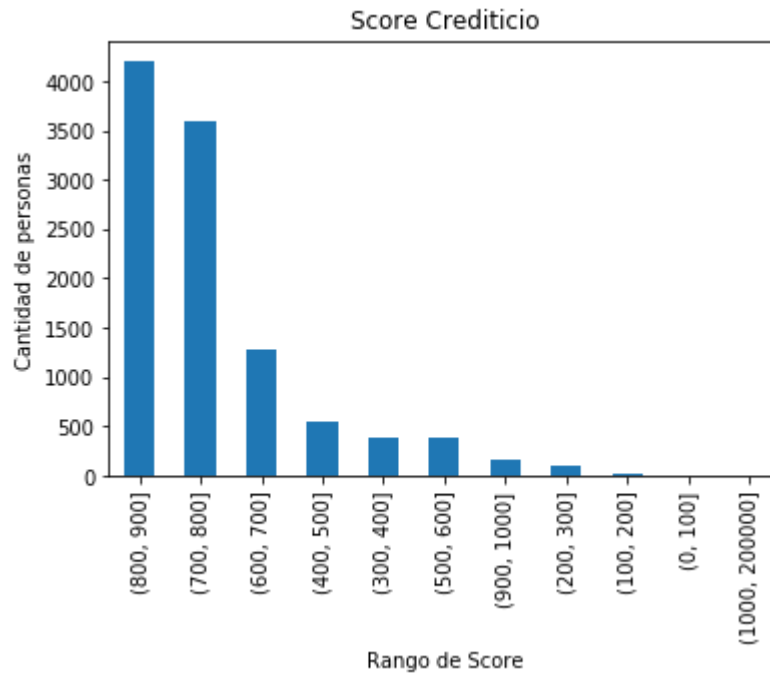




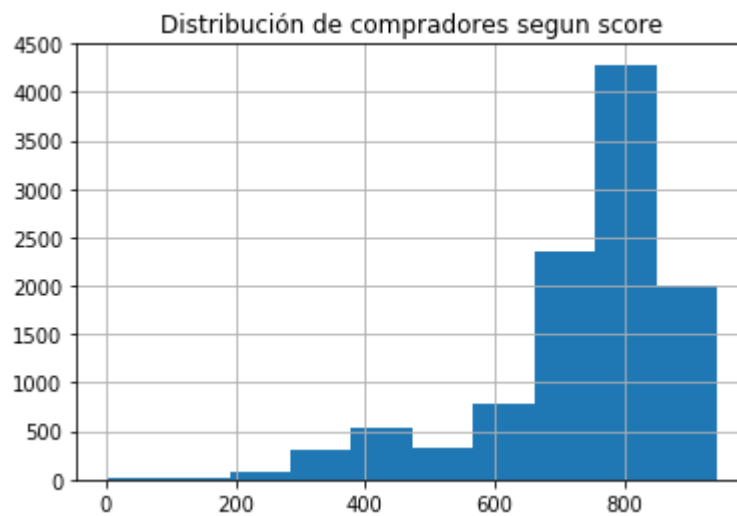
```
In [17]: # Se analiza y grafica la variable edad, partiendo las edades por rangos
imp_segm = pd.cut(datos['EDAD'],
                  [0, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 100, 200
                  ])
# Creando el grafico de barras desde pandas
plot = pd.value_counts(imp_segm).plot(kind='bar',
                                     title='Edad')
plot.set_ylabel('Cantidad de personas')
plot.set_xlabel('Rango de edades')
plt.show()
```



```
In [18]: # Se analiza y grafica la variable score crediticio, partiendo las scores crediticios por rangos
imp_segm = pd.cut(datos['ACIERTA'], [0, 100,200,300,400, 500,600,700,800,900,1000,200000])
# Creando el grafico de barras desde pandas
plot = pd.value_counts(imp_segm).plot(kind='bar',
                                     title='Score Crediticio')
plot.set_ylabel('Cantidad de personas')
plot.set_xlabel('Rango de Score')
plt.show()
```



```
In [19]: #Se crea un histograma para la variable SCORE, para observar su distribución
datos['ACIERTA'].hist().set_title('Distribución de compradores segun score')
plt.show()
```



```
In [20]: #Se hallan las estadísticas descriptivas de las variables a ser procesadas  
print(datos.describe())  
datos3=pd.merge(Datos_Davivienda,Datos_arreglados)  
print(datos3.describe().QUANTO)
```

	CONSECUTIVO	COMPRA_CARTERA	EDAD	ACIERTA	QUANTO
\					
count	10693.000000	10693.000000	10693.000000	10693.000000	10693.000000
mean	5347.000000	0.437389	43.856729	737.566819	6665.307023
std	3086.947548	0.496088	12.562885	143.263697	5951.736716
min	1.000000	0.000000	20.000000	3.000000	0.000000
25%	2674.000000	0.000000	32.000000	697.000000	2707.000000
50%	5347.000000	0.000000	40.000000	779.000000	4496.000000
75%	8020.000000	1.000000	50.000000	835.000000	8645.000000
max	10693.000000	1.000000	70.000000	942.000000	71143.000000

	ANT_DAV	SALDO_DAV_ANT	SALDO_DAV_ACT	CUPO_DAV	\
count	10693.000000	10693.000000	10693.000000	10693.000000	
mean	5.926432	12583.977357	9110.981690	15929.730945	
std	7.804880	20854.242585	18813.487169	26181.007214	
min	0.000000	0.000000	0.000000	0.000000	
25%	1.170000	2137.670000	717.000000	1299.000000	
50%	2.750000	5107.000000	2301.000000	6599.000000	
75%	7.580000	13542.320000	9027.000000	19400.000000	
max	55.250000	360538.000000	360044.000000	545000.000000	

	ANT_SF	...	MORA_DAV two	MORA_DAV three	MORA_SF zero	\
count	10693.000000	...	10693.000000	10693.000000	10693.000000	
mean	6.518806	...	0.020200	0.030581	0.047040	
std	6.242564	...	0.140691	0.172187	0.211735	
min	0.000000	...	0.000000	0.000000	0.000000	
25%	1.830000	...	0.000000	0.000000	0.000000	
50%	5.080000	...	0.000000	0.000000	0.000000	
75%	9.830000	...	0.000000	0.000000	0.000000	
max	49.170000	...	1.000000	1.000000	1.000000	

	MORA_SF one	MORA_SF two	MORA_SF three	NUM_CONS zero	NUM_CONS one	\
count	10693.000000	10693.000000	10693.000000	10693.000000	10693.000000	
mean	0.043860	0.042925	0.040026	0.967081	1.085757	
std	0.204794	0.202698	0.196030	0.941936	1.168644	
min	0.000000	0.000000	0.000000	0.000000	0.000000	
25%	0.000000	0.000000	0.000000	0.000000	0.000000	
50%	0.000000	0.000000	0.000000	1.000000	1.000000	
75%	0.000000	0.000000	0.000000	1.000000	2.000000	
max	1.000000	1.000000	1.000000	10.000000	10.000000	

	NUM_CONS two	NUM_CONS three
count	10693.000000	10693.000000
mean	1.127092	0.625269
std	1.220318	0.981852
min	0.000000	0.000000
25%	0.000000	0.000000
50%	1.000000	0.000000
75%	2.000000	1.000000
max	10.000000	8.000000

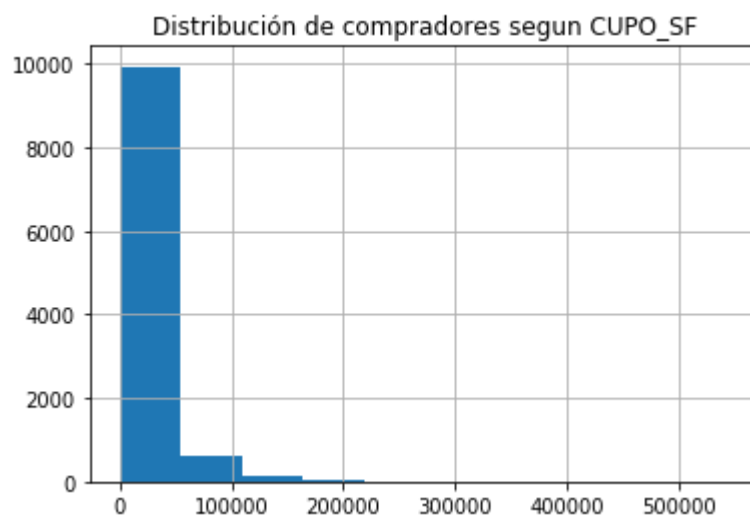
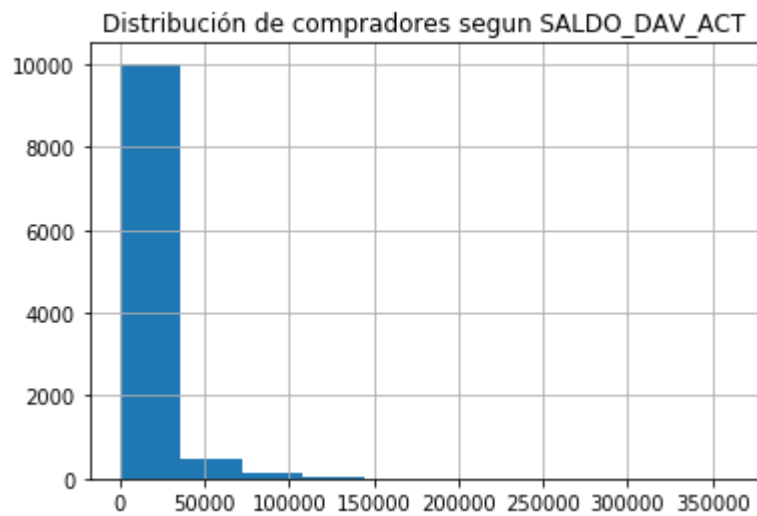
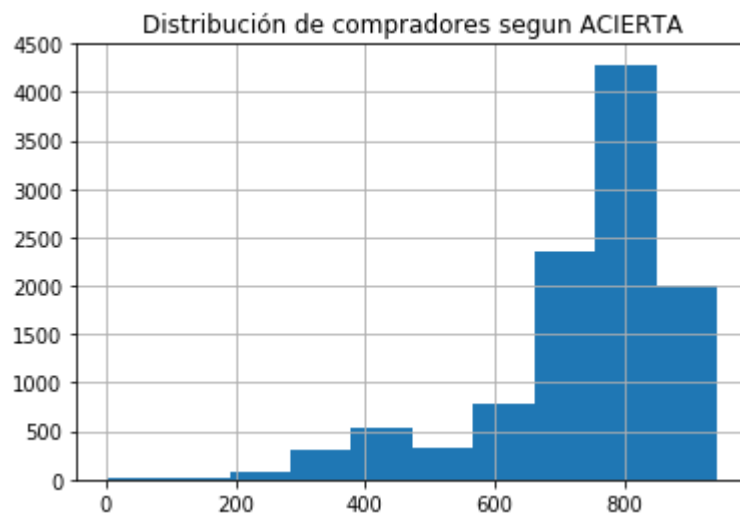
[8 rows x 29 columns]	
count	10689.000000
mean	6666.118814
std	5952.702349
min	0.000000

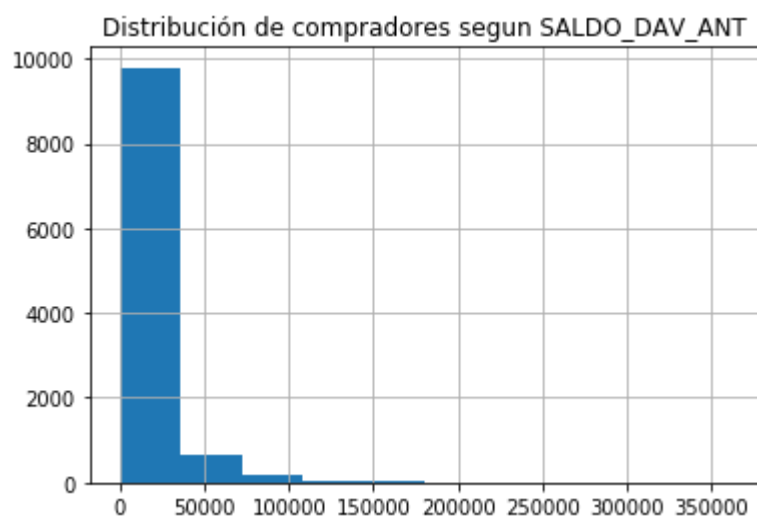
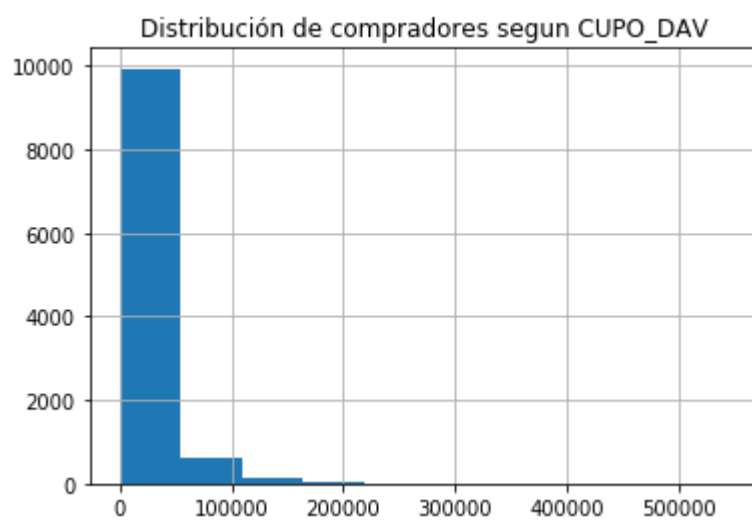
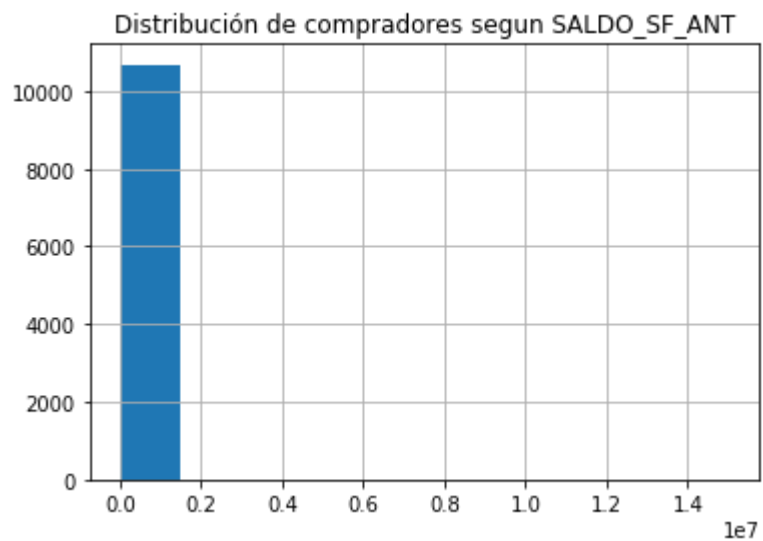
25%	2707.000000
50%	4496.000000
75%	8645.000000
max	71143.000000

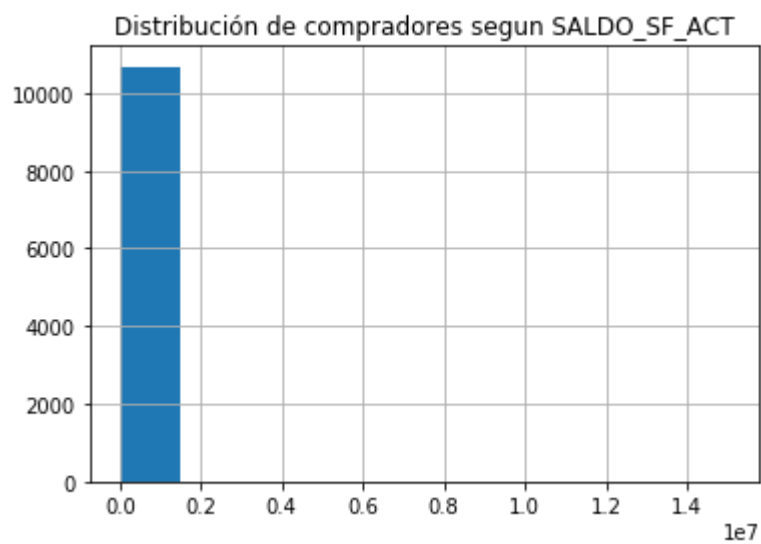
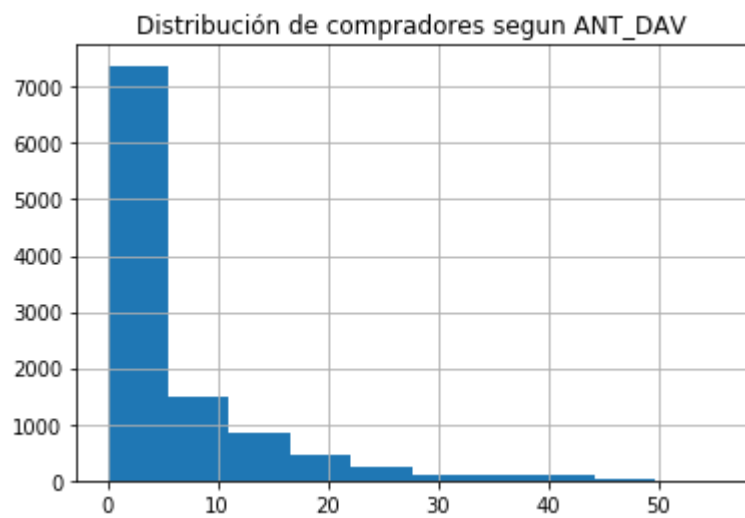
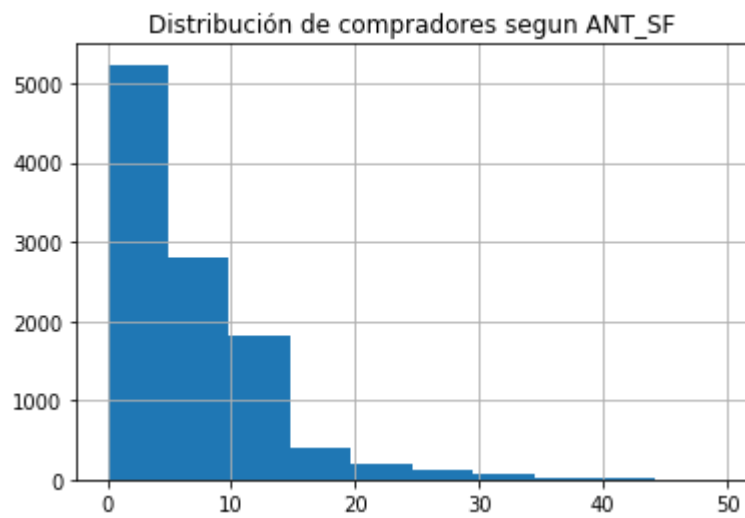
Name: QUANTO, dtype: float64

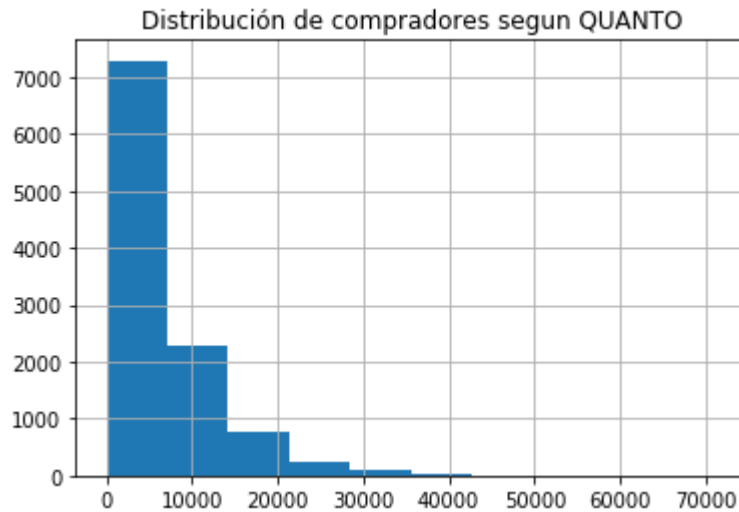


```
In [21]: #Se realiza el histograma de todas las variables numéricas continuas  
for c in numericas:  
    datos[c].hist().set_title('Distribución de compradores segun '+ c)  
    plt.show()  
#Se observa que existen múltiples variables que son outliers
```



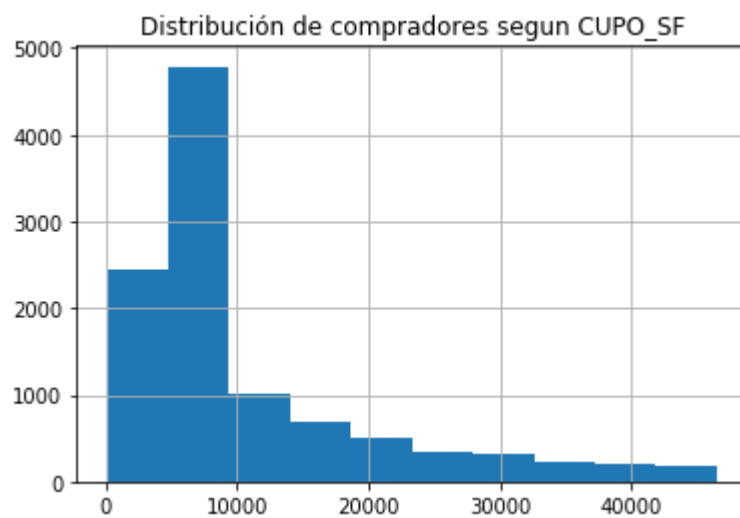
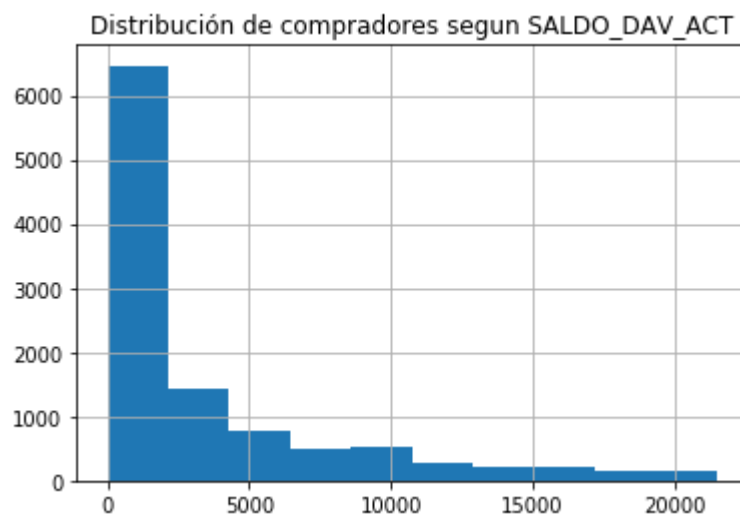
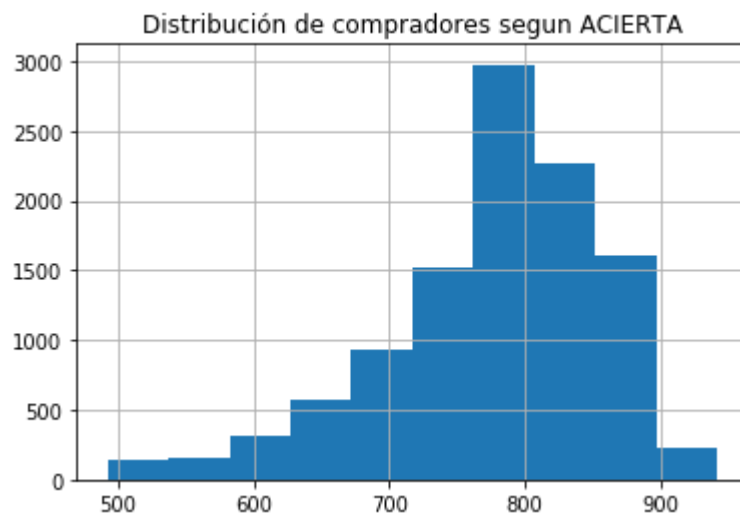


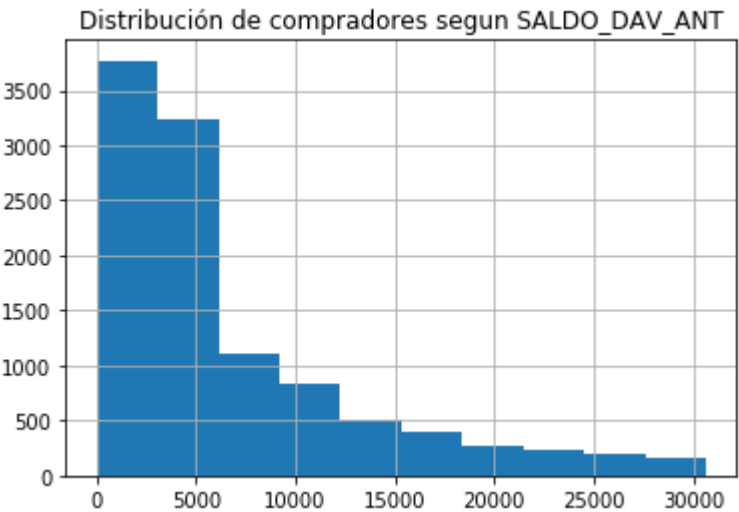
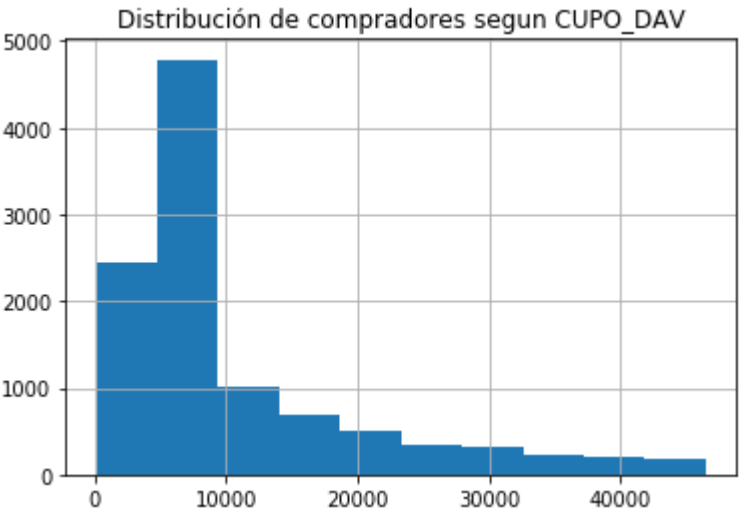
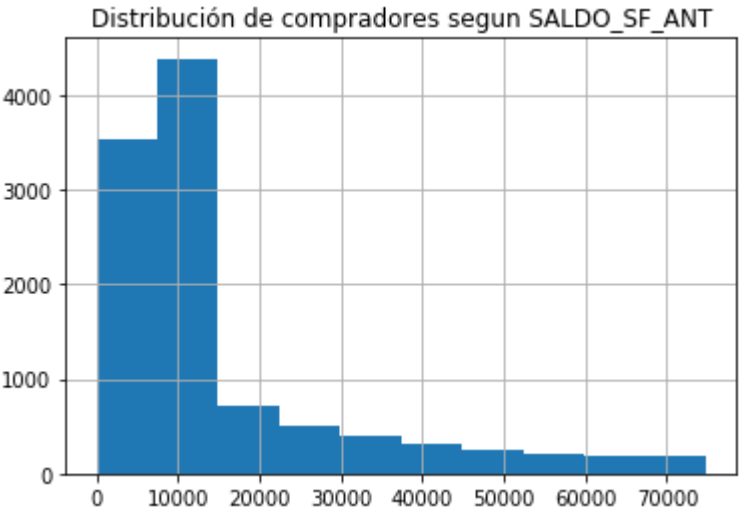


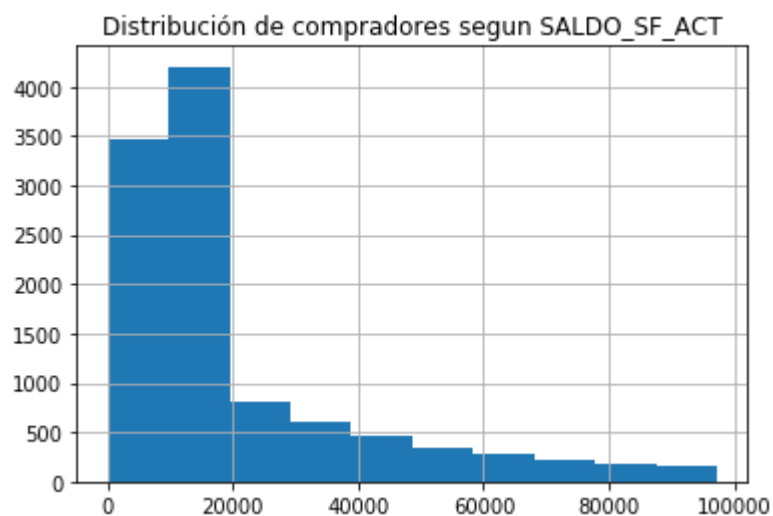
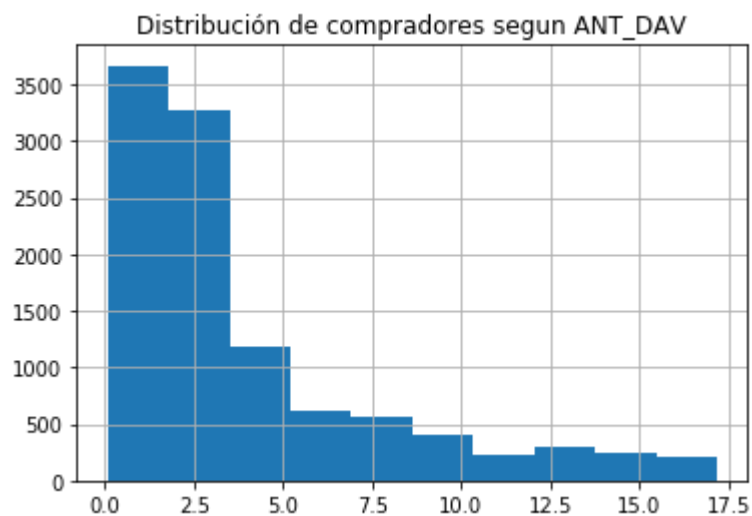
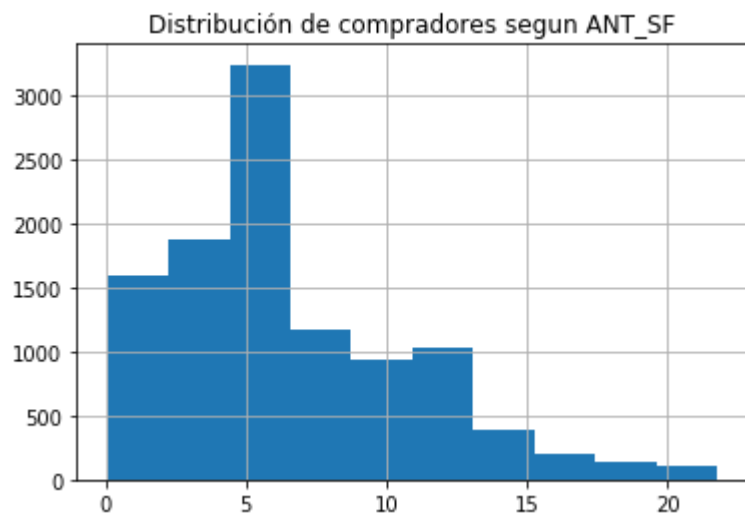


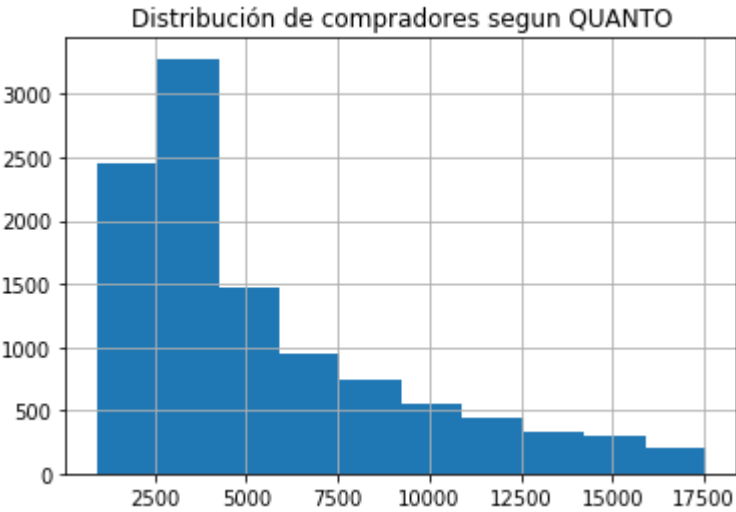
```
In [23]: #Se realiza el reemplazo de los outliers en las variables continuas por la mediana de la variable, para esto se usa el algoritmo iqr
#En donde se consideran outliers los datos inferiores al percentil25-1.5*(percentil 75- percentil 25) y superiores al
#percentil75+1.5*(percentil 75- percentil 25)
for c in numericas:
    ordenado=sorted(datos[c])
    outliers=[]
    q1, q3= np.percentile(ordenado,[25,75])
    iqr = q3 - q1
    lower_bound = max(0,q1 -(1.5 * iqr))
    upper_bound = q3 +(1.5 * iqr)
    datosup = datos.loc[datos[c]<upper_bound, c]
    median = datosup.loc[datosup> lower_bound].median()
    datos.loc[datos[c]>=upper_bound, c] = np.nan
    datos.loc[datos[c]<=lower_bound, c] = np.nan
    datos.fillna(median,inplace=True)
```

```
In [24]: #Se vuelve a graficar el histograma de las variables para observar la remoción de outliers  
for c in numericas:  
    datos[c].hist().set_title('Distribución de compradores segun '+ c)  
    plt.show()
```









```
In [25]: #Se hallan nuevamente las estadísticas descriptivas de los datos para notar qu  
e se han eliminado los outliers  
print(datos.describe())  
print(datos.describe().SALDO_SF_ACT)
```

	CONSECUTIVO	COMPRA_CARTERA	EDAD	ACIERTA	QUANTO
\					
count	10693.000000	10693.000000	10693.000000	10693.000000	10693.000000
mean	5347.000000	0.437389	43.856729	777.162349	5491.828112
std	3086.947548	0.496088	12.562885	80.365548	3807.056613
min	1.000000	0.000000	20.000000	492.000000	919.000000
25%	2674.000000	0.000000	32.000000	735.000000	2707.000000
50%	5347.000000	0.000000	40.000000	790.000000	4181.000000
75%	8020.000000	1.000000	50.000000	835.000000	7328.000000
max	10693.000000	1.000000	70.000000	942.000000	17547.000000

	ANT_DAV	SALDO_DAV_ANT	SALDO_DAV_ACT	CUPO_DAV	ANT_SF
\					
count	10693.000000	10693.000000	10693.000000	10693.000000	10693.000000
mean	3.899936	6667.244099	3700.272322	11065.948658	6.566048
std	3.904093	6578.653305	4588.417648	9522.669711	4.275538
min	0.080000	1.000000	0.010000	99.000000	0.080000
25%	1.250000	2152.620000	840.840000	5100.000000	3.420000
50%	2.500000	4243.000000	1832.280000	8399.000000	5.750000
75%	5.000000	8917.300000	4571.200000	12599.000000	9.000000
max	17.170000	30638.000000	21484.000000	46512.000000	21.750000

	...	MORA_DAV two	MORA_DAV three	MORA_SF zero	MORA_SF one	\
count	...	10693.000000	10693.000000	10693.000000	10693.000000	
mean	...	0.020200	0.030581	0.047040	0.043860	
std	...	0.140691	0.172187	0.211735	0.204794	
min	...	0.000000	0.000000	0.000000	0.000000	
25%	...	0.000000	0.000000	0.000000	0.000000	
50%	...	0.000000	0.000000	0.000000	0.000000	
75%	...	0.000000	0.000000	0.000000	0.000000	
max	...	1.000000	1.000000	1.000000	1.000000	

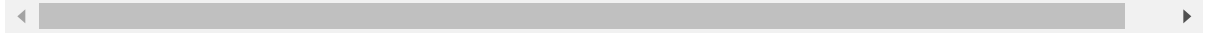
	MORA_SF two	MORA_SF three	NUM_CONS zero	NUM_CONS one	NUM_CONS two
\					
count	10693.000000	10693.000000	10693.000000	10693.000000	10693.000000
mean	0.042925	0.040026	0.967081	1.085757	1.127092
std	0.202698	0.196030	0.941936	1.168644	1.220318
min	0.000000	0.000000	0.000000	0.000000	0.000000
25%	0.000000	0.000000	0.000000	0.000000	0.000000
50%	0.000000	0.000000	1.000000	1.000000	1.000000
75%	0.000000	0.000000	1.000000	2.000000	2.000000
max	1.000000	1.000000	10.000000	10.000000	10.000000

	NUM_CONS three
count	10693.000000
mean	0.625269
std	0.981852
min	0.000000
25%	0.000000
50%	0.000000
75%	1.000000
max	8.000000

[8 rows x 29 columns]	
count	10693.000000
mean	19365.187880
std	20671.699267

min	2.000000
25%	6031.000000
50%	12320.000000
75%	23399.000000
max	97253.000000

Name: SALDO_SF_ACT, dtype: float64



```
In [26]: #Se crea datosfilt con únicamente las variables continuas  
datosfilt=datos.loc[:,numericas ]  
datosfilt
```

Out[26]:

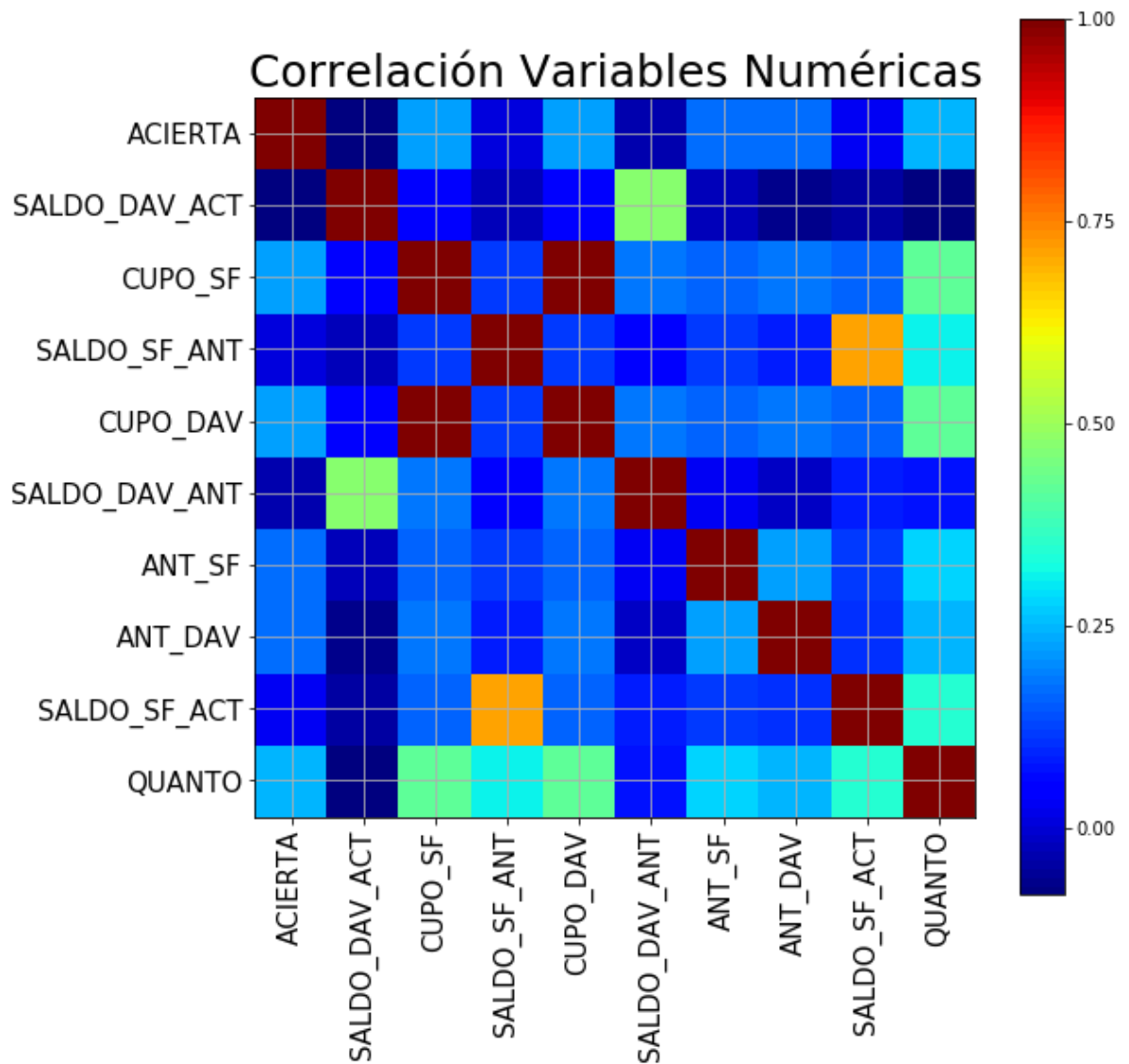
	ACIERTA	SALDO_DAV_ACT	CUPO_SF	SALDO_SF_ANT	CUPO_DAV	SALDO_DAV_ANT
0	894.0	3092.32	8399.0	8325.0	8399.0	6884.26
1	654.0	1534.87	5599.0	8325.0	5599.0	3504.91
2	806.0	1637.00	8399.0	8325.0	8399.0	1231.00
3	807.0	1360.74	11999.0	8325.0	11999.0	13282.84
4	823.0	1019.00	1999.0	14078.0	1999.0	1019.00
5	830.0	5064.00	8399.0	3041.0	8399.0	4864.00
6	873.0	2461.33	19999.0	872.0	19999.0	4993.23
7	846.0	1048.00	8399.0	71.0	8399.0	1777.00
8	741.0	106.00	4509.0	1460.0	4509.0	4784.94
9	653.0	1200.00	1599.0	8325.0	1599.0	1067.00
10	790.0	1832.28	8399.0	3073.0	8399.0	24005.00
11	619.0	1832.28	8399.0	8325.0	8399.0	25000.00
12	851.0	212.00	15700.0	8325.0	15700.0	188.00
13	860.0	149.50	8399.0	73068.0	8399.0	1302.23
14	763.0	12846.00	2499.0	8325.0	2499.0	12610.00
15	844.0	458.00	14999.0	20457.0	14999.0	1623.16
16	795.0	980.00	37000.0	8325.0	37000.0	103.00
17	679.0	5020.00	5399.0	6420.0	5399.0	5899.00
18	739.0	2264.00	11999.0	8325.0	11999.0	1676.00
19	720.0	640.00	799.0	8325.0	799.0	544.00
20	873.0	166.38	39999.0	8325.0	39999.0	7629.25
21	795.0	2968.80	21689.0	8325.0	21689.0	10119.41
22	845.0	5534.00	9999.0	2597.0	9999.0	9588.00
23	871.0	192.00	41469.0	3958.0	41469.0	454.00
24	760.0	3616.00	8399.0	13899.0	8399.0	3492.00
25	790.0	3531.00	4399.0	6252.0	4399.0	2938.00
26	801.0	1091.08	8399.0	8325.0	8399.0	2202.85
27	701.0	8039.00	8399.0	39184.0	8399.0	9806.00
28	729.0	4453.00	8399.0	70625.0	8399.0	4377.00
29	881.0	2180.00	4099.0	1661.0	4099.0	1994.00
...
10663	851.0	1832.28	8399.0	8325.0	8399.0	4243.00
10664	858.0	1706.00	19999.0	3052.0	19999.0	1468.00
10665	725.0	1127.00	3399.0	5693.0	3399.0	1307.00
10666	733.0	5171.33	5499.0	8589.0	5499.0	13900.05

	ACIERTA	SALDO_DAV_ACT	CUPO_SF	SALDO_SF_ANT	CUPO_DAV	SALDO_DAV_ANT
10667	865.0	942.68	21817.0	9195.0	21817.0	2092.13
10668	790.0	3451.00	6300.0	8325.0	6300.0	3451.00
10669	774.0	89.33	4299.0	25635.0	4299.0	3962.17
10670	792.0	3598.63	26729.0	45939.0	26729.0	9878.59
10671	901.0	1535.83	8399.0	16746.0	8399.0	4134.26
10672	784.0	1185.00	1499.0	1843.0	1499.0	1120.00
10673	780.0	5612.00	14999.0	2445.0	14999.0	5115.00
10674	580.0	15638.00	22509.0	8325.0	22509.0	18832.00
10675	733.0	8679.00	199.0	1176.0	199.0	8713.00
10676	754.0	2698.00	8399.0	1122.0	8399.0	2585.00
10677	877.0	719.13	35249.0	8325.0	35249.0	3928.00
10678	827.0	16509.00	8399.0	4825.0	8399.0	16345.00
10679	768.0	20459.00	1999.0	67257.0	1999.0	19822.00
10680	591.0	1832.28	8399.0	34979.0	8399.0	21615.00
10681	726.0	1832.28	27000.0	44739.0	27000.0	4243.00
10682	790.0	9161.00	8399.0	1467.0	8399.0	9161.00
10683	844.0	1832.28	25000.0	62119.0	25000.0	1575.04
10684	690.0	7628.33	8399.0	68061.0	8399.0	4243.00
10685	847.0	2247.00	26999.0	6827.0	26999.0	8147.00
10686	829.0	497.00	4699.0	8325.0	4699.0	2360.00
10687	881.0	20689.00	8399.0	14281.0	8399.0	4243.00
10688	761.0	5688.00	9099.0	20450.0	9099.0	5398.00
10689	791.0	692.62	22599.0	46119.0	22599.0	3005.93
10690	828.0	5981.00	1499.0	8325.0	1499.0	5795.00
10691	594.0	1832.28	8399.0	29417.0	8399.0	4243.00
10692	669.0	20405.00	8399.0	435.0	8399.0	20267.00

10693 rows × 10 columns



```
In [27]: #Se realiza y grafica la matriz de correlación de las variables continuas, para  
a observar si hay información con alta probabilidad  
#de estar duplicada, y poder elegir las mejores variables en el análisis.  
def correlation_matrix(df):  
    from matplotlib import pyplot as plt  
    from matplotlib import cm as cm  
  
    fig = plt.figure(figsize=(9, 9))  
    ax1 = fig.add_subplot(111)  
    cmap = cm.get_cmap('jet', 100)  
    cax = ax1.imshow(df.corr(), interpolation="nearest", cmap=cmap)  
    ax1.grid(True)  
    plt.title('Correlación Variables Numéricas', fontsize=25)  
    labels=list(df.columns.values)  
    ax1.set_xticks(np.arange(10))  
    ax1.set_xticklabels(labels,fontsize=15)  
    ax1.set_yticks(np.arange(10))  
    ax1.set_yticklabels(labels,fontsize=15)  
    plt.xticks(rotation=90)  
    # Add colorbar, make sure to specify tick locations to match desired tick labels  
    fig.colorbar(cax, ticks=[0,.25,.5,.75,1])  
    plt.show()  
  
correlation_matrix(datosfilt)
```



```
In [28]: #Se filtran las variables continuas que se consideran más relevantes en el problema
filtrar=['ACIERTA','QUANTO','ANT_DAV']
datosfilt=datos.loc[:,filtrar]
```

In [29]: `datosfilt`

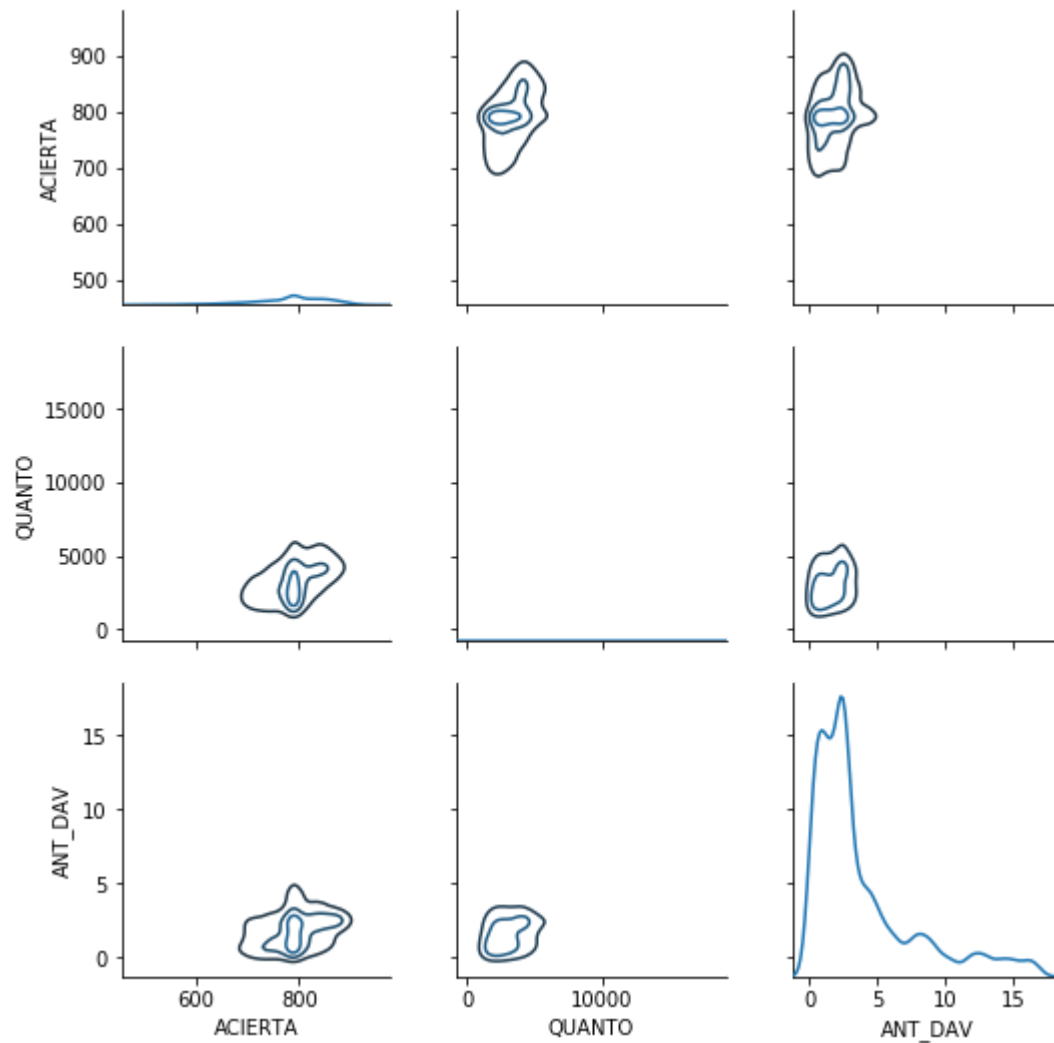
Out[29]:

	ACIERTA	QUANTO	ANT_DAV
0	894.0	14227.0	3.08
1	654.0	8322.0	14.08
2	806.0	1681.0	4.50
3	807.0	12661.0	1.50
4	823.0	1697.0	0.92
5	830.0	4248.0	2.00
6	873.0	16595.0	2.58
7	846.0	16462.0	5.58
8	741.0	3047.0	4.50
9	653.0	1093.0	0.33
10	790.0	3817.0	0.92
11	619.0	2674.0	2.50
12	851.0	3759.0	2.50
13	860.0	10856.0	4.42
14	763.0	1954.0	1.92
15	844.0	8744.0	13.25
16	795.0	6566.0	5.42
17	679.0	4662.0	1.08
18	739.0	4430.0	0.50
19	720.0	1474.0	9.00
20	873.0	9465.0	3.17
21	795.0	4181.0	2.50
22	845.0	5175.0	2.75
23	871.0	6666.0	2.50
24	760.0	1763.0	2.67
25	790.0	1970.0	2.00
26	801.0	4181.0	8.67
27	701.0	3362.0	0.25
28	729.0	5415.0	1.75
29	881.0	2525.0	1.67
...
10663	851.0	4181.0	13.25
10664	858.0	7138.0	1.75
10665	725.0	1904.0	0.42
10666	733.0	2873.0	2.08

	ACIERTA	QUANTO	ANT_DAV
10667	865.0	8521.0	1.67
10668	790.0	2368.0	10.50
10669	774.0	3999.0	4.67
10670	792.0	13895.0	2.50
10671	901.0	4181.0	2.50
10672	784.0	1962.0	0.58
10673	780.0	4869.0	4.75
10674	580.0	5142.0	11.17
10675	733.0	1532.0	1.25
10676	754.0	1035.0	0.33
10677	877.0	4181.0	2.50
10678	827.0	3585.0	1.75
10679	768.0	7825.0	5.75
10680	591.0	4786.0	0.83
10681	726.0	7891.0	3.00
10682	790.0	2343.0	0.33
10683	844.0	10517.0	1.25
10684	690.0	14367.0	17.17
10685	847.0	4910.0	0.67
10686	829.0	1979.0	0.33
10687	881.0	4181.0	15.42
10688	761.0	4140.0	1.50
10689	791.0	4181.0	2.50
10690	828.0	1134.0	1.00
10691	594.0	6384.0	3.58
10692	669.0	1631.0	1.17

10693 rows × 3 columns

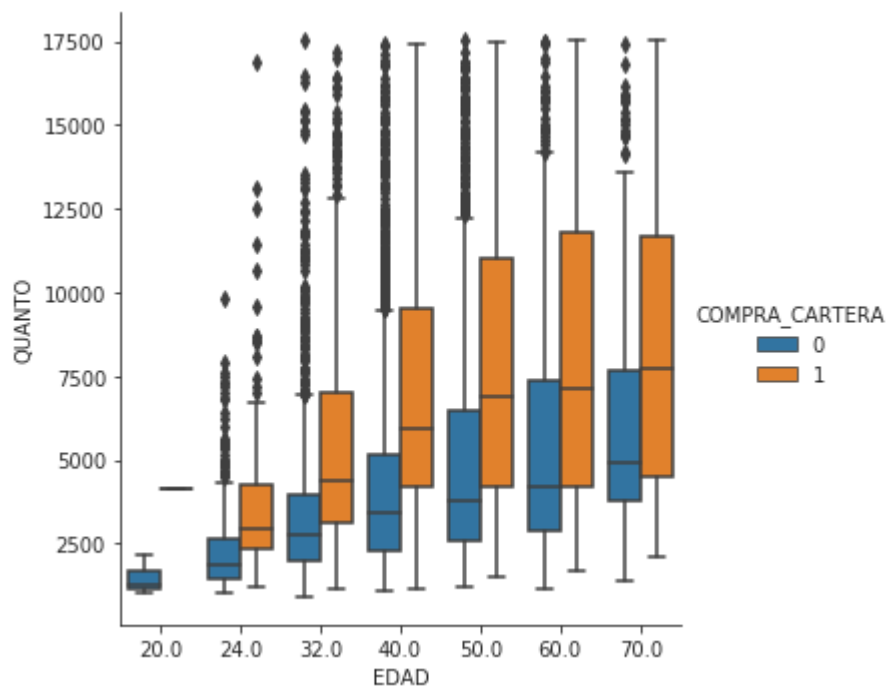
```
In [30]: #Se gráfica la distribución de probabilidad conjunta entre estas variables, pa  
ra observar si existe una concentración  
#particular de información dados unos parámetros definidos.  
import seaborn as sns  
g = sns.PairGrid(datosfilt)  
g.map_diag(sns.kdeplot)  
g.map_offdiag(sns.kdeplot, n_levels=3);
```



```
In [31]: #Se procede a explorar la variable Explicativa de COMPRA_CARTERA, POR INGRESOS
y por EDAD, se puede observar que quienes compran cartera
#generalmente tienen más edad y mas ingresos.
with sns.axes_style(style='ticks'):
    g = sns.factorplot("EDAD", "QUANTO", "COMPRA_CARTERA", data=datos, kind="box")
    g.set_axis_labels("EDAD", "QUANTO");
```

C:\Users\anmam\Anaconda3\lib\site-packages\seaborn\categorical.py:3666: UserWarning: The `factorplot` function has been renamed to `catplot`. The original name will be removed in a future release. Please update your code. Note that the default `kind` in `factorplot` (`'point'`) has changed to `strip` in `catplot`.

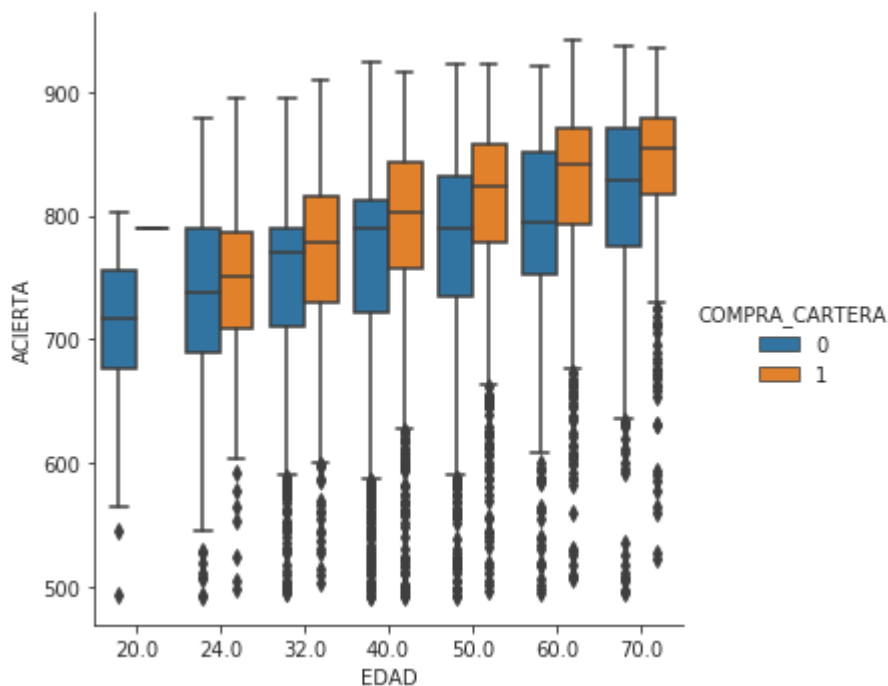
warnings.warn(msg)




```
In [32]: #Se procede a explorar la variable Explicativa de COMPRA_CARTERA, POR SCORE y
#por EDAD, se puede observar que quienes compran cartera
#generalmente tienen más edad y mas score crediticio.
with sns.axes_style(style='ticks'):
    g = sns.factorplot("EDAD", "ACIERTA", "COMPRA_CARTERA", data=datos, kind=
"box")
    g.set_axis_labels("EDAD", "ACIERTA");
```

C:\Users\anmam\Anaconda3\lib\site-packages\seaborn\categorical.py:3666: UserWarning: The `factorplot` function has been renamed to `catplot`. The original name will be removed in a future release. Please update your code. Note that the default `kind` in `factorplot` (`'point'`) has changed to `strip` in `catplot`.

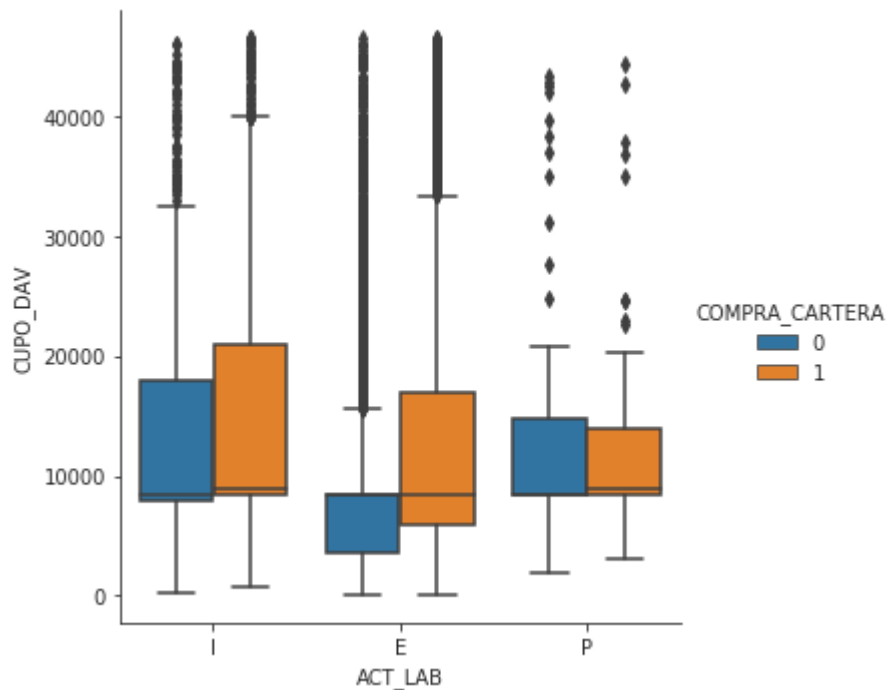
```
warnings.warn(msg)
```



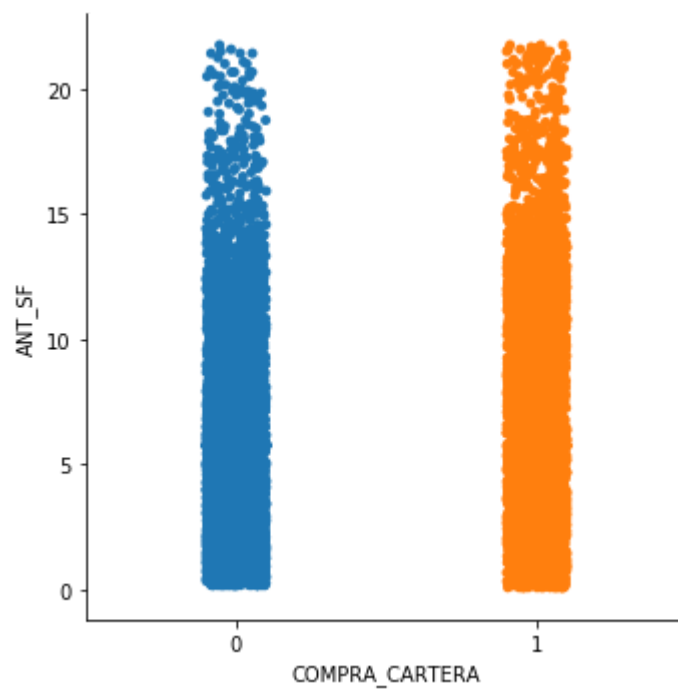
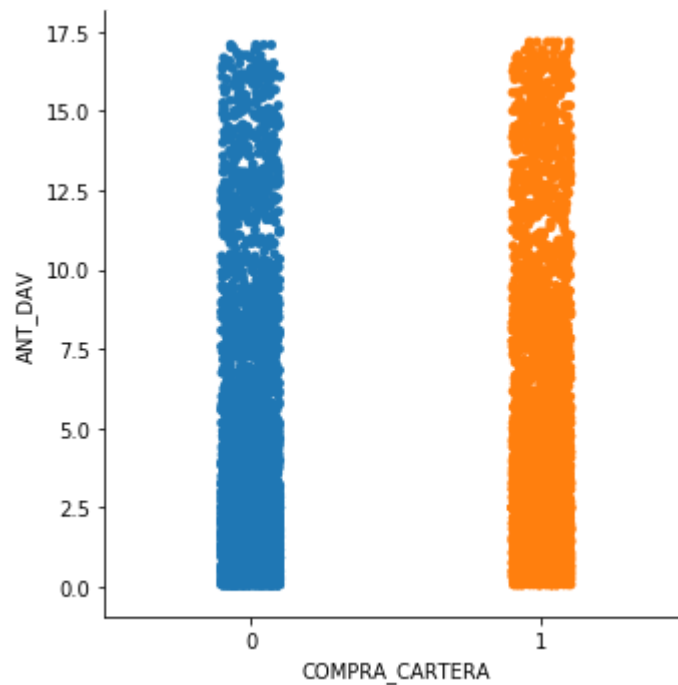
```
In [33]: #Se procede a explorar la variable Explicativa de COMPRA_CARTERA, POR cupo_dav
y por act_lab, se puede observar que quienes compran cartera
#generalmente tienen más cupo y son empleados.
with sns.axes_style(style='ticks'):
    g = sns.factorplot("ACT_LAB", "CUPO_DAV", "COMPRA_CARTERA", data=datos, kind="box")
    g.set_axis_labels("ACT_LAB", "CUPO_DAV");
```

C:\Users\anmam\Anaconda3\lib\site-packages\seaborn\categorical.py:3666: UserWarning: The `factorplot` function has been renamed to `catplot`. The original name will be removed in a future release. Please update your code. Note that the default `kind` in `factorplot` (`'point'`) has changed to `strip` in `catplot`.

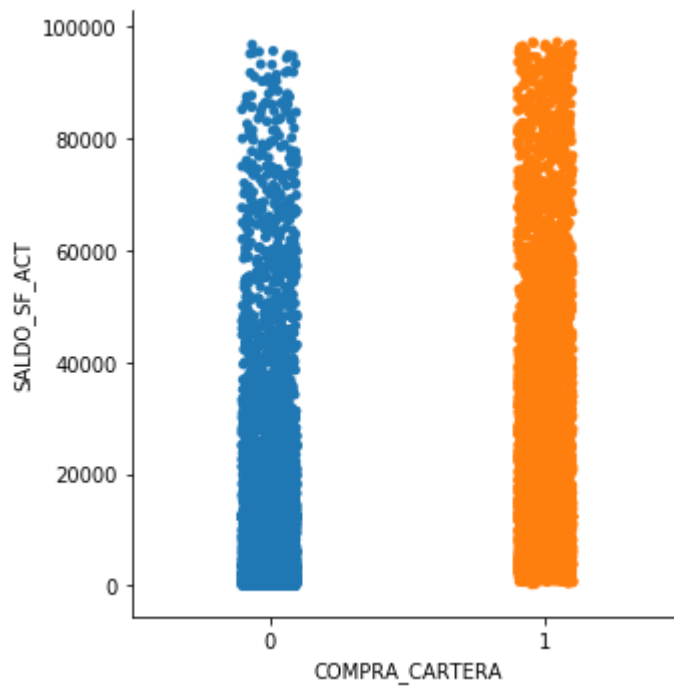
warnings.warn(msg)



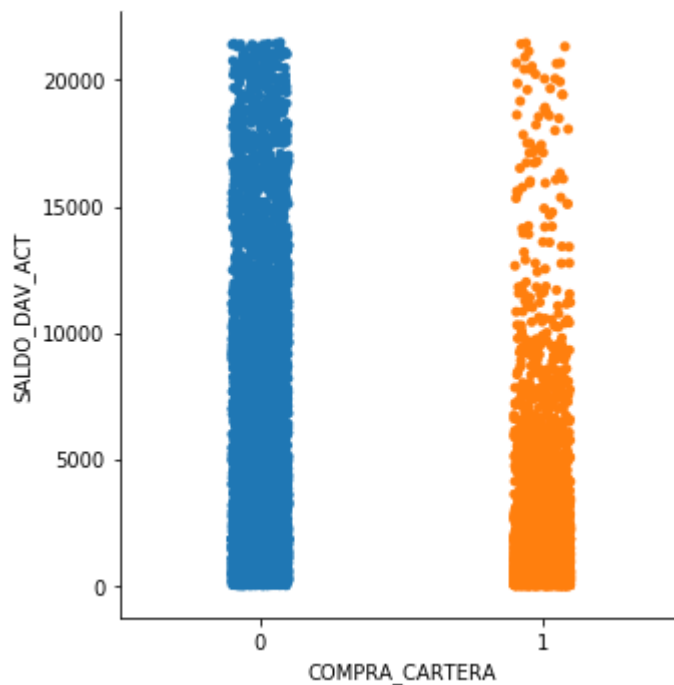
```
In [34]: #Se realiza un catplot para observar gráficamente si existe significancia en l
a variable COMPRA_CARTERA el comportamiento de antigüedad
#En Davivienda y en el sector financiero, se observa que parecen ser variables
no significativa.
sns.catplot(x="COMPRA_CARTERA", y="ANT_DAV", order=[0, 1], data=datos);
sns.catplot(x="COMPRA_CARTERA_SF", y="ANT_SF", order=[0, 1], data=datos);
```



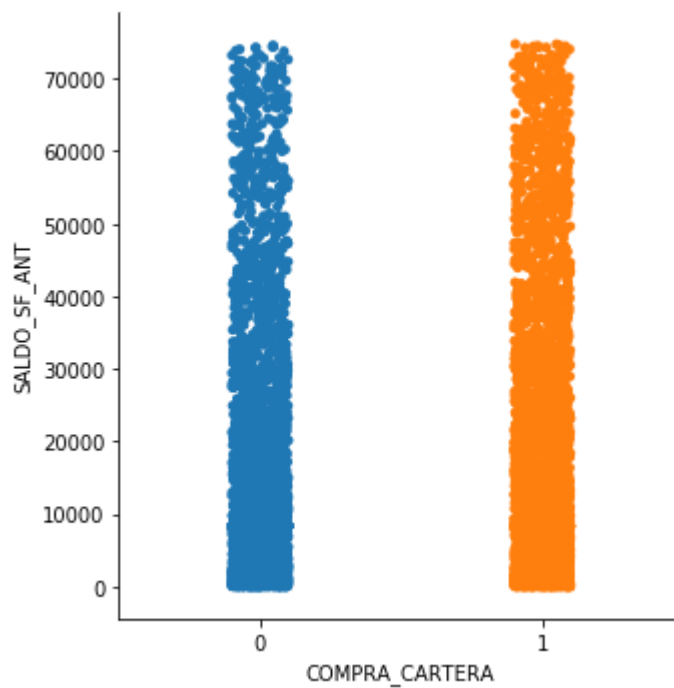
```
In [35]: #Se realiza un catplot para observar gráficamente si existe significancia en l  
a variable COMPRA_CARTERA el comportamiento de saldo  
#actual en el sector financiero, se observa que parece ser que entre mayor sal  
do mayor probabilidad de compra de cartera.  
sns.catplot(x="COMPRA_CARTERA", y="SALDO_SF_ACT", order=[0, 1], data=datos);
```



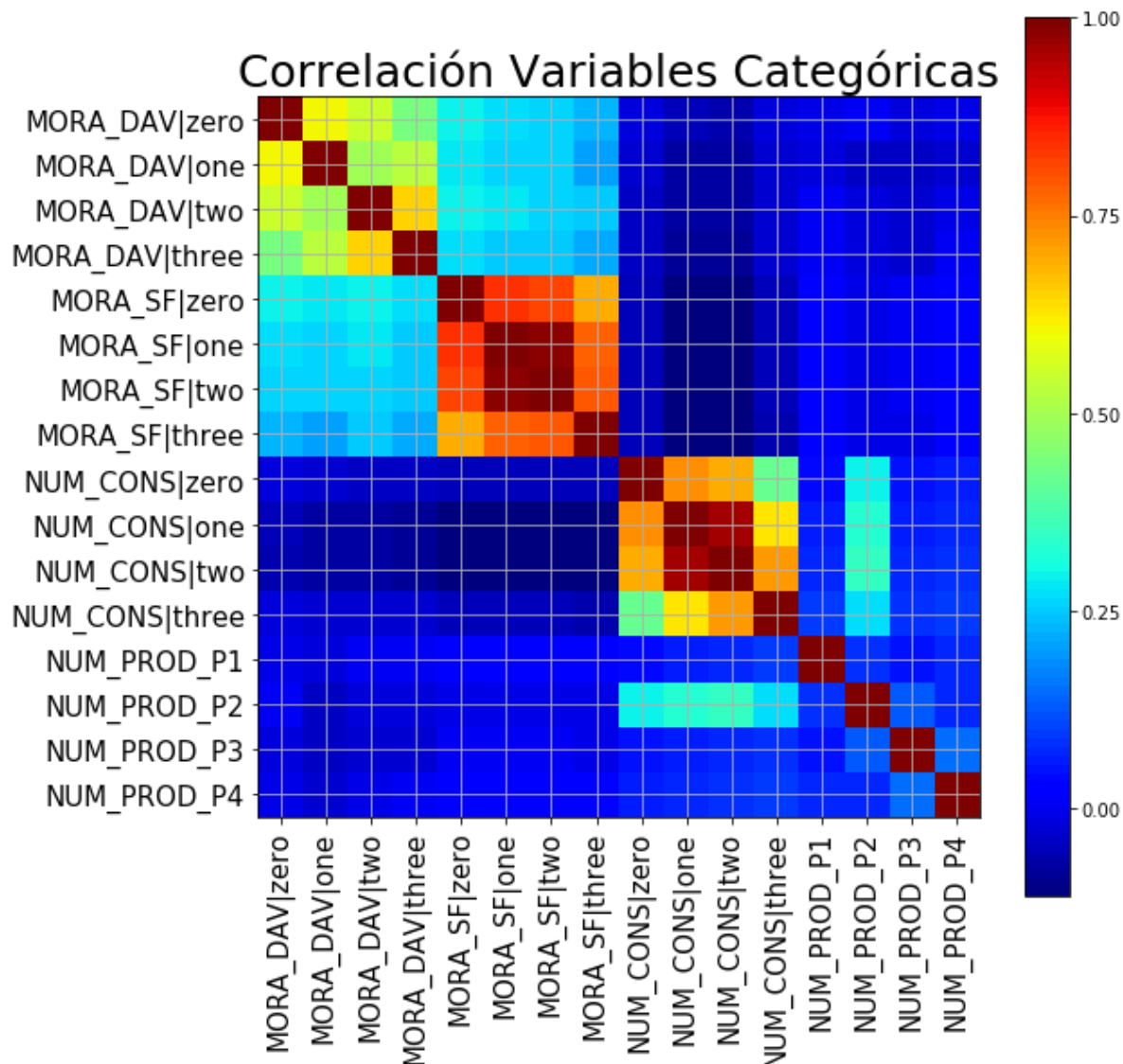
```
In [36]: #Se realiza un catplot para observar gráficamente si existe significancia en l  
a variable COMPRA_CARTERA el comportamiento de saldo  
#actual en Davivienda, se observa que parece ser que entre mayor saldo menor p  
robabilidad de compra de cartera.  
sns.catplot(x="COMPRA_CARTERA", y="SALDO_DAV_ACT", order=[0, 1], data=datos);
```



```
In [37]: #Se realiza un catplot para observar gráficamente si existe significancia en la variable COMPRA_CARTERA el comportamiento de saldo anterior en el sector financiero, se observa que parece ser que entre mayor saldo mayor probabilidad de compra de cartera.  
sns.catplot(x="COMPRA_CARTERA", y="SALDO_SF_ANT", order=[0, 1], data=datos);
```



```
In [39]: #Se realiza y grafica la matriz de correlación de las variables dummies, para  
observar si hay información con alta probabilidad  
#de estar duplicada, y poder elegir las mejores variables en el análisis.  
datosfilt2=datos.loc[:,categoricas ]  
datosfilt2=datosfilt2.loc[:, 'MORA_DAV|zero': 'NUM_PROD_P4' ]  
def correlation_matrix2(df):  
    from matplotlib import pyplot as plt  
    from matplotlib import cm as cm  
  
    fig = plt.figure(figsize=(9, 9))  
    ax1 = fig.add_subplot(111)  
    cmap = cm.get_cmap('jet', 100)  
    cax = ax1.imshow(df.corr(), interpolation="nearest", cmap=cmap)  
    ax1.grid(True)  
    plt.title('Correlación Variables Categóricas', fontsize=25)  
    labels=list(df.columns.values)  
    ax1.set_xticks(np.arange(16))  
    ax1.set_xticklabels(labels,fontsize=15)  
    ax1.set_yticks(np.arange(16))  
    ax1.set_yticklabels(labels,fontsize=15)  
    plt.xticks(rotation=90)  
    # Add colorbar, make sure to specify tick locations to match desired tickl  
abels  
    fig.colorbar(cax, ticks=[0,.25,.5,.75,1])  
    plt.show()  
  
correlation_matrix2(datosfilt2)
```



```
In [ ]: # Se observa que existen altas correlaciones entre todos los lags de la variable MORA_SF, entre todos los lags de MORA_DAV
#por lo que es conveniente seleccionar solo una combinación lineal de estas variables como parámetro.
```

```
In [40]: #Se visualiza y explora el resultado de las variables anteriormente mencionadas
datosfilt2=datos.loc[:,categoricas]
```

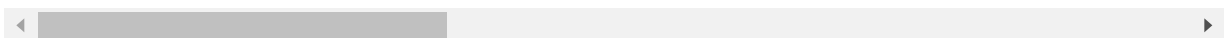
```
In [41]: datosfilt2.loc[:, 'MORA_DAV|zero': 'NUM_PROD_P4']
```


Out[41]:

	MORA_DAV zero	MORA_DAV one	MORA_DAV two	MORA_DAV three	MORA_SF zero	MOF
0	0.0	0.0	0.0	0.0	0.0	
1	0.0	0.0	0.0	0.0	0.0	
2	0.0	0.0	0.0	0.0	0.0	
3	0.0	0.0	0.0	0.0	0.0	
4	0.0	0.0	0.0	0.0	0.0	
5	0.0	0.0	0.0	0.0	0.0	
6	0.0	0.0	0.0	0.0	0.0	
7	0.0	0.0	0.0	0.0	0.0	
8	0.0	0.0	0.0	0.0	0.0	
9	0.0	0.0	0.0	0.0	0.0	
10	0.0	0.0	0.0	0.0	0.0	
11	0.0	0.0	0.0	0.0	0.0	
12	0.0	0.0	0.0	0.0	0.0	
13	0.0	0.0	0.0	0.0	0.0	
14	0.0	0.0	0.0	0.0	0.0	
15	0.0	0.0	0.0	0.0	0.0	
16	0.0	0.0	0.0	0.0	0.0	
17	0.0	0.0	0.0	0.0	0.0	
18	0.0	0.0	0.0	0.0	0.0	
19	0.0	0.0	0.0	0.0	0.0	
20	0.0	0.0	0.0	0.0	0.0	
21	0.0	0.0	0.0	0.0	0.0	
22	0.0	0.0	0.0	0.0	0.0	
23	0.0	0.0	0.0	0.0	0.0	
24	0.0	0.0	0.0	0.0	0.0	
25	0.0	0.0	0.0	1.0	0.0	
26	0.0	0.0	0.0	0.0	0.0	
27	0.0	0.0	0.0	0.0	0.0	
28	0.0	0.0	0.0	0.0	0.0	
29	0.0	0.0	0.0	0.0	0.0	
...
10663	0.0	0.0	0.0	0.0	0.0	
10664	0.0	0.0	0.0	0.0	0.0	
10665	0.0	0.0	0.0	0.0	0.0	
10666	0.0	0.0	0.0	0.0	0.0	

	MORA_DAV zero	MORA_DAV one	MORA_DAV two	MORA_DAV three	MORA_SF zero	MOF
10667	0.0	0.0	0.0	0.0	0.0	
10668	1.0	1.0	1.0	1.0	0.0	
10669	0.0	0.0	0.0	0.0	0.0	
10670	0.0	0.0	0.0	0.0	0.0	
10671	0.0	0.0	0.0	0.0	0.0	
10672	0.0	0.0	0.0	0.0	0.0	
10673	0.0	0.0	0.0	0.0	0.0	
10674	0.0	0.0	0.0	0.0	0.0	
10675	0.0	0.0	0.0	0.0	0.0	
10676	0.0	0.0	0.0	0.0	0.0	
10677	0.0	0.0	0.0	0.0	0.0	
10678	0.0	0.0	0.0	0.0	0.0	
10679	0.0	0.0	0.0	0.0	0.0	
10680	0.0	0.0	0.0	0.0	0.0	
10681	0.0	0.0	0.0	0.0	0.0	
10682	0.0	1.0	0.0	0.0	1.0	
10683	0.0	0.0	0.0	0.0	0.0	
10684	0.0	0.0	0.0	0.0	0.0	
10685	0.0	0.0	0.0	0.0	0.0	
10686	0.0	0.0	0.0	0.0	0.0	
10687	0.0	0.0	0.0	0.0	0.0	
10688	0.0	0.0	0.0	0.0	0.0	
10689	0.0	0.0	0.0	0.0	0.0	
10690	0.0	0.0	0.0	0.0	0.0	
10691	0.0	1.0	1.0	1.0	0.0	
10692	0.0	0.0	0.0	0.0	0.0	

10693 rows × 16 columns

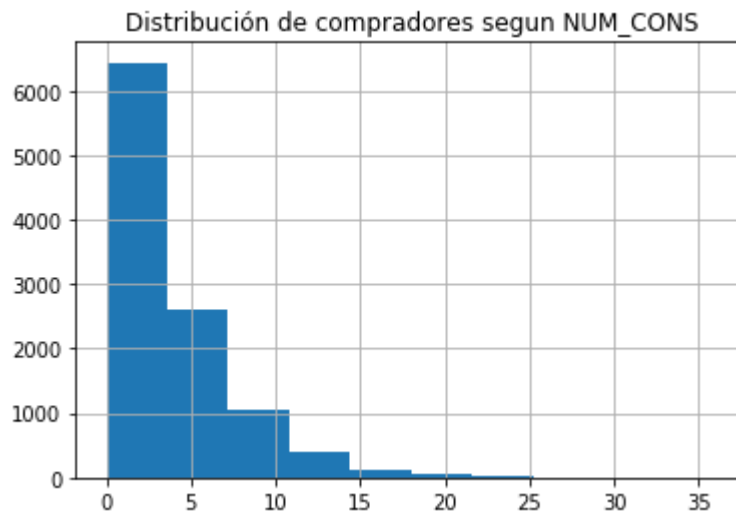


```
In [42]: #Se importa el paquete de Machine Learning, llamo sklearn
import sklearn
import numpy as np
```

```
In [43]: #Se crean las siguientes variables:
#en_Mora_Dav si existe alguna mora en los meses que se tiene información del cliente
#en_Mora_SF si existe alguna mora en los meses que se tiene información del cliente
#NUM_CONS que representa el número total de consultas en centrales de riesgo en los últimos 3 meses
datos['en_Mora_Dav']=datos.apply(lambda row: bool(row['MORA_DAV|zero']) | bool(row['MORA_DAV|one'])|bool(row['MORA_DAV|two'])|bool(row['MORA_DAV|three']), axis=1)
datos['en_Mora_SF']=datos.apply(lambda row: bool(row['MORA_SF|zero']) | bool(row['MORA_SF|one'])|bool(row['MORA_SF|two'])|bool(row['MORA_SF|three']), axis=1)
datos['NUM_CONS']=datos.apply(lambda row: row['NUM_CONS|zero']+ row['NUM_CONS|one']+row['NUM_CONS|two']+row['NUM_CONS|three'], axis=1)
```

```
In [44]: #Se realiza un backup de la información
datosrep=datos.copy()
```

```
In [45]: #Se realiza el histograma de la nueva variable NUM_CONS para observar su consistencia.
datos['NUM_CONS'].hist().set_title('Distribución de compradores segun NUM_CONS')
plt.show()
```

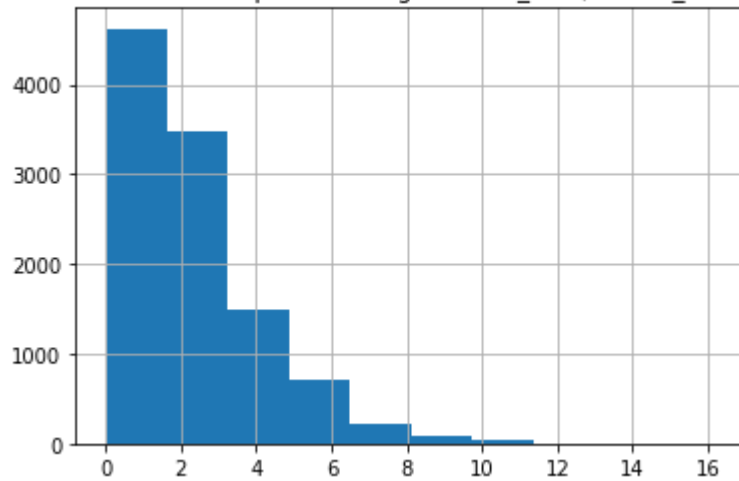


```
In [46]: #Se crea una nueva variable CUPO_MAX/VALOR_INGRESOS, que indica el porcentaje de cupo sobre el total del ingreso, ya que se considera que esta relación de variables puede ser útil en si un cliente decide comprar cartera o no
datos['CUPO_MAX/VALOR_INGRESOS']=datos.apply(lambda row: row['CUPO_DAV']/row['QUANTO'] if row['QUANTO']!=0 else 0,axis=1)
```

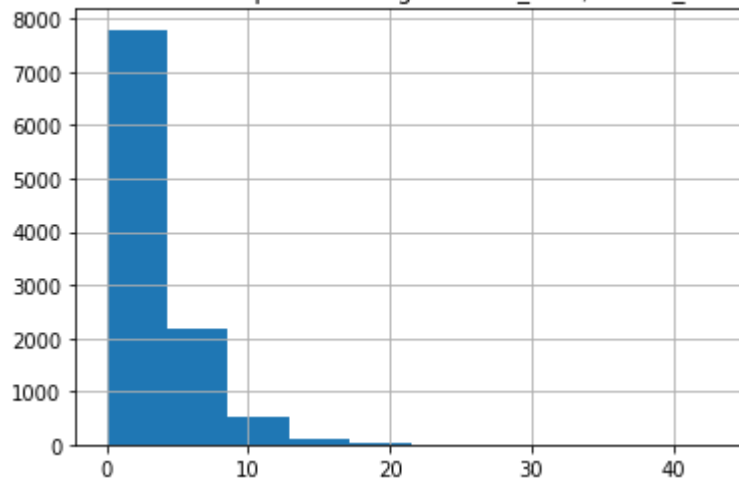
```
In [47]: #Se crea una variable que indique el número total de productos en el SF, ya que si se tiene más productos es más probable que haya compra de cartera
datos['NPROD']=datos.apply(lambda row: row['NUM_PROD_P1']+row['NUM_PROD_P2']+row['NUM_PROD_P3']+row['NUM_PROD_P4'],axis=1)
```

```
In [48]: #Se gráfica el histograma de las nuevas variables creadas, para observar su comportamiento y consistencia.  
datos['CUPO_MAX/VALOR_INGRESOS'].hist().set_title('Distribución de compradores segun CUPO_MAX/VALOR_INGRESOS')  
plt.show()  
datos['NPROD'].hist().set_title('Distribución de compradores segun CUPO_MAX/VALOR_INGRESOS')  
plt.show()
```

Distribución de compradores segun CUPO_MAX/VALOR_INGRESOS



Distribución de compradores segun CUPO_MAX/VALOR_INGRESOS



```
In [49]: #Se muestra el coeficiente de asimetría de cada variable ya que es conveniente
         #que los datos estén centrados
         #se observa fuertes asimetrías positivas, no obstante se procede a trabajar si
         #n transformar las variables, dado a
         #que se realizaron ambos casos y se obtuvieron mejores resultados la variable sin t
         #ransformar
         datos.skew()
```

```
Out[49]: CONSECUTIVO          0.000000
          COMPRA_CARTERA      0.252467
          EDAD                0.378960
          ACIERTA             -0.950878
          QUANTO              1.229519
          ANT_DAV             1.569365
          SALDO_DAV_ANT       1.632846
          SALDO_DAV_ACT       1.911312
          CUPO_DAV            1.702533
          ANT_SF              0.897903
          SALDO_SF_ANT        1.912897
          SALDO_SF_ACT        1.779947
          CUPO_SF             1.702533
          NUM_PROD_P1         3.500598
          NUM_PROD_P2         4.206536
          NUM_PROD_P3         1.246058
          NUM_PROD_P4         4.858025
          MORA_DAV|zero       6.507209
          MORA_DAV|one        4.756929
          MORA_DAV|two        6.821899
          MORA_DAV|three      5.453457
          MORA_SF|zero        4.279363
          MORA_SF|one         4.455448
          MORA_SF|two         4.510749
          MORA_SF|three       4.693775
          NUM_CONS|zero       1.590032
          NUM_CONS|one        1.559129
          NUM_CONS|two        1.514326
          NUM_CONS|three      2.178113
          en_Mora_Dav         3.900905
          en_Mora_SF          3.757722
          NUM_CONS            1.524398
          CUPO_MAX/VALOR_INGRESOS 1.567319
          NPROD               2.476550
          dtype: float64
```

```
In [52]: #Se convierten en dummies todas las variables discretas, es decir se crean nue
         #vs columnas con la variable y la categoría indicando
         #1 si ocurre y 0 si no.
         categoricasausar=['EDAD', 'ACT_LAB', 'en_Mora_Dav', 'en_Mora_SF']
         dummiesausar=pd.get_dummies(datos, columns=categoricasausar)
```

Después de analizar cada una de las variables, las que se decidieron incluir fueron:

-ACIERTA -> El score del individuo parece estar relacionado directamente con la variable compra cartera, además tiene sentido que un mayor score el inversionista sea más informado y prefiera las menores tasas del mercado sin importar la fidelización. -SALDO_DAV_ACTUAL, SALDO_SF_ACT -> Se seleccionaron las deudas del individuo como un determinante en la compra de cartera, únicamente se dejaron las actuales ya que las anteriores se encontraron fuertemente correlacionadas con las actuales. -ANT_DAV -> Se selecciona la variable de antigüedad únicamente en Davivienda ya que intuitivamente se considera que entre más años en el banco mayor fidelización. -NUM_CONS, N_PROD -> El número de consultas total en los 3 meses de información se consideró ya que permite dar mayor información del interés y movimientos del cliente en el sistema financiero. El número de productos también se consideró como total independientemente de la entidad, ya que no se existe razón para pensar que los números en cierta entidad tengan mayor influencia en la variable explicativa que los de otra entidad. -CUPO_MAX/VALOR_INGRESOS -> Se calculó la relación entre el cupo máximo y el valor de los ingresos, ya que se considera que entre menor sea el cupo en relación a sus ingresos, mayor probabilidad hay de compra de cartera.

Variables dummies para EDAD, Actividad Laboral, En Mora Davivienda, En mora Sector financiero -> Se transformaron las variables categóricas anteriores, a dummies en donde cada categoría es una dummy con 1 si se cumple y 0 si no. Se seleccionaron estas variables ya que se encontraron significativas intuitivamente y en el análisis de la información. Las variables En mora Davivienda y en mora Sector financiero, presentan un valor de 1 si hubo mora independientemente del mes, ya que todos los lags estaban correlacionados.

```
In [53]: #Se seleccionan las variables a usar
columnasFinales=['ACIERTA', 'SALDO_DAV_ACT', 'SALDO_SF_ACT', 'ANT_DAV', 'NUM_CONS',
,
               'NPROD', 'CUPO_MAX/VALOR_INGRESOS', 'EDAD_20.0', 'EDAD_24.0', 'EDA
D_32.0', 'EDAD_40.0', 'EDAD_50.0', 'EDAD_60.0', 'EDAD_70.0',
               'ACT_LAB_E', 'ACT_LAB_I', 'ACT_LAB_P', 'en_Mora_Dav_True', 'en_Mor
a_SF_True']
datospreprocesados=dummiesausar.loc[:,columnasFinales]
```

```
In [54]: #Se selecciona la variable resultado COMPRA_CARTERA
datospreprocesados.head()
resultado=dummiesausar.loc[:, 'COMPRA_CARTERA']
```

Se procede a dividir los datos obtenidos en entrenamiento y prueba, dado el volumen suficiente de la información y las recomendaciones de la literatura, se seleccionara 20% como datos de prueba y 80% como datos de entrenamiento.

Usando la funcion model_selection de sklearn se realiza la partición de los datos en X_train, X_test, y_train, y_test

```
In [55]: from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(datospreprocesados,resulta
do , test_size=0.2)
print (X_train.shape, y_train.shape)
print (X_test.shape, y_test.shape)

(8554, 19) (8554,)
(2139, 19) (2139,)
```

```
In [56]: #Se separan las variables entre continuas y discretas
trainnumericas=X_train.loc[:, 'ACIERTA': 'CUPO_MAX/VALOR_INGRESOS']
traincategoricas=X_train.loc[:, 'EDAD_20.0': 'en_Mora_SF_True']
testnumericas=X_test.loc[:, 'ACIERTA': 'CUPO_MAX/VALOR_INGRESOS']
testcategoricas=X_test.loc[:, 'EDAD_20.0': 'en_Mora_SF_True']
```

```
In [57]: #Se estandarizan las variables continuas, restandole la media y dividiendo sob
re la desviación-
from sklearn import preprocessing
scaler = preprocessing.StandardScaler().fit(trainnumericas)
trainnumt=scaler.transform(trainnumericas)
testnumt=scaler.transform(testnumericas)
```

```
In [58]: #Se transforman los dataframes en arreglos
traincategoricasA=traincategoricas.as_matrix()

C:\Users\anmam\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: FutureWar
ning: Method .as_matrix will be removed in a future version. Use .values inst
ead.
    """Entry point for launching an IPython kernel.
```

```
In [59]: #Se concatenan las variables continuas estandarizadas y las variables discreta
s de los datos de entrenamiento
traindata2=np.concatenate((trainnumt,traincategoricasA),axis=1)
```

```
In [60]: #Se concatenan las variables continuas estandarizadas y las variables discreta
s de los datos de prueba
testcategoricasA=testcategoricas.as_matrix()
testdata2=np.concatenate((testnumt,testcategoricasA),axis=1)

C:\Users\anmam\Anaconda3\lib\site-packages\ipykernel_launcher.py:1: FutureWar
ning: Method .as_matrix will be removed in a future version. Use .values inst
ead.
    """Entry point for launching an IPython kernel.
```

```
In [61]: #Se realiza reducción de las variables por medio de componentes principales, de manera que se logre explicar al menos el 90%
#de la variabilidad, se seleccionan 9 variables que explican el 92% de la variación
from sklearn.decomposition import PCA

pca = PCA(n_components = 9)

X_train = pca.fit_transform(traindata2)
X_test = pca.transform(testdata2)

explained_variance = pca.explained_variance_ratio_
```

```
In [62]: sum(explained_variance)
```

```
Out[62]: 0.9240513217904586
```

A continuación se realizarán diferentes algoritmos de Machine Learning que permitan determinar la probabilidad de que un cliente pueda comprar cartera con base en las variables seleccionadas. Para realizar este procedimiento se tomaron en cuenta 3 algoritmos: Support Vector Machines, Redes Neuronales con capas ocultas y Adaboost con árboles de decisión como clasificador débil.

El alcance del proyecto únicamente se limitó a estos 3 métodos, dada los buenos resultados que los mismos han obtenido en la literatura, y por falta de tiempo y recursos tecnológicos para realizar otros métodos, no obstante se tuvieron en consideración: Random Forest, otros algoritmos de boosting como el de gradiente estocástico y modelos paramétricos como son el Logit y el Probit.

En todos los modelos mostrados en este trabajo se realizó validación cruzada de k iteraciones que consiste en dividir los datos de entrenamiento en k muestras, tomar k-1 para entrenar el modelo y 1 para validarlo, y rotar los sets de elementos usados en cada tarea. Dadas las disposiciones tecnológicas y el tiempo, únicamente se tuvieron en cuenta 5 divisiones para la validación cruzada k=5. Para la validación cruzada en todos los métodos se utilizó la función `cross_val_score`.

El primer modelo que se tomó como referencia fue Support Vector Machines, aunque inicialmente la idea era probar el algoritmo con diferentes tipos de kernel (lineal, polinómico, gaussiano), por falta de tiempo únicamente se utilizó el kernel "Radial Basis Function", el cual tiene un hiperparámetro adicional gamma.

A continuación se presenta el modelo de entrenamiento de SVM, para calcular los hiperparámetros C (el factor de regularización) y gamma, se realizó una pequeña Grid Search en una escala logarítmica para ambos parámetros, para gamma se tomaron 6 valores entre $10e-2$ y $10e3$, y para C entre $10e-2$ y $10e8$. Se escogieron estos rangos dado a que se prefiere la simplicidad en los modelos y el algoritmo tarda bastante en su entrenamiento con la tecnología actual. Se limitó el número máximo de iteraciones a 1000 para poder realizar el entrenamiento y el grid search rápidamente.

Los resultados del nivel de clasificación por cada hiperparámetro se guarda en la variable lista

```
In [63]: #Se crean valores posibles de gamma y C
gamma_range = np.logspace(-2, 3, 6)
C_range = np.logspace(-2, 8, 6)
```



```
In [64]: #Se realiza SVM con validación cruzada variando los datos de gamma y C  
from sklearn.model_selection import cross_val_score  
from sklearn import svm  
lista=[]  
for c in C_range:  
    for gamma in gamma_range:  
        clf = svm.SVC(kernel='rbf', C=c, gamma=gamma, max_iter=1000).fit(X_train,  
y_train)  
        scores = cross_val_score(clf, X_train, y_train, cv=5)  
        lista.append((np.mean(scores),c,gamma))
```

```
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
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your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
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your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
```

```
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing  
your data with StandardScaler or MinMaxScaler.  
% self.max_iter, ConvergenceWarning)  
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen  
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing  
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C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen  
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing  
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[illegible]

[illegible]

[illegible]

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[illegible]

[illegible]

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```
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```

[illegible]

[illegible]


```

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% self.max_iter, ConvergenceWarning)

```

In [65]: lista

```

Out[65]: [(0.5238488486948913, 0.01, 0.01),
(0.5941098704290436, 0.01, 0.1),
(0.5238476182663947, 0.01, 1.0),
(0.5707266022058849, 0.01, 10.0),
(0.6129382290716076, 0.01, 100.0),
(0.584169101889733, 0.01, 1000.0),
(0.4978953520563536, 1.0, 0.01),
(0.5831233060246565, 1.0, 0.1),
(0.6953489119252446, 1.0, 1.0),
(0.6100089206066013, 1.0, 10.0),
(0.6264972093198123, 1.0, 100.0),
(0.5845198423684381, 1.0, 1000.0),
(0.4408421599488689, 100.0, 0.01),
(0.5781018589723872, 100.0, 0.1),
(0.6301170616000354, 100.0, 1.0),
(0.5755167970579087, 100.0, 10.0),
(0.4486788274016426, 100.0, 100.0),
(0.562076279731083, 100.0, 1000.0),
(0.49251749088286656, 10000.0, 0.01),
(0.5659442000676735, 10000.0, 0.1),
(0.6304667083645212, 10000.0, 1.0),
(0.5755167970579087, 10000.0, 10.0),
(0.4486788274016426, 10000.0, 100.0),
(0.562076279731083, 10000.0, 1000.0),
(0.49251749088286656, 1000000.0, 0.01),
(0.5659442000676735, 1000000.0, 0.1),
(0.6304667083645212, 1000000.0, 1.0),
(0.5755167970579087, 1000000.0, 10.0),
(0.4486788274016426, 1000000.0, 100.0),
(0.562076279731083, 1000000.0, 1000.0),
(0.49251749088286656, 100000000.0, 0.01),
(0.5659442000676735, 100000000.0, 0.1),
(0.6304667083645212, 100000000.0, 1.0),
(0.5755167970579087, 100000000.0, 10.0),
(0.4486788274016426, 100000000.0, 100.0),
(0.562076279731083, 100000000.0, 1000.0)]

```

```
In [87]: #Se crea un grid search más pequeño para ajustar los resultados de SVM
gamma_range = np.linspace(0.5,1.5 , 5)
from sklearn.model_selection import cross_val_score
from sklearn import svm
lista=[]

for gamma in gamma_range:
    clf = svm.SVC(kernel='rbf', C=1, gamma=gamma, max_iter=1000).fit(X_train, y_train)
    scores = cross_val_score(clf, X_train, y_train, cv=5)
    lista.append((np.mean(scores),1,gamma))
```

```
C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=1000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
  % self.max_iter, ConvergenceWarning)
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C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
```

[illegible]

```

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your data with StandardScaler or MinMaxScaler.
% self.max_iter, ConvergenceWarning)

```

```

In [88]: #Se muestran los porcentajes de acierto en los datos de validación y sus param
etros
lista

```

```

Out[88]: [(0.7169724623266719, 1, 0.5),
(0.7180274180483354, 1, 0.75),
(0.6953489119252446, 1, 1.0),
(0.7023622176422939, 1, 1.25),
(0.6873995919078819, 1, 1.5)]

```

```

In [89]: #Se entrena el algoritmo con los mejores hiperparámetros encontrados
#se usa el modelo para predecir las etiquetas de los datos de prueba y se guar
da en y_res
clf = svm.SVC(kernel='rbf', C=1, gamma=0.75, max_iter=8000).fit(X_train, y_tra
in)
yres=clf.predict(X_test)

```

```

C:\Users\anmam\Anaconda3\lib\site-packages\sklearn\svm\base.py:244: Convergen
ceWarning: Solver terminated early (max_iter=8000). Consider pre-processing
your data with StandardScaler or MinMaxScaler.
% self.max_iter, ConvergenceWarning)

```

```

In [90]: #Se calcula el porcentaje de éxito del algoritmo en los datos de prueba con y_
test y yres
from sklearn.metrics import accuracy_score
resultado=accuracy_score(y_test,yres)
resultado

```

```

Out[90]: 0.7713884992987378

```

Se observa que el mejor resultado se obtiene cuando gamma es 0.75 y c tiene un valor de 1, con estos resultados podría realizarse nuevamente grid_search para ajustar de mejor manera el valor de los hiperparametros, pero dado al tiempo y tecnología disponibles, esto se saldrá del alcance de este ejercicio. Cabe resaltar que estos resultados pueden estar equivocados dada la limitación del máximo número de iteraciones. El éxito en los datos de prueba fue 77.14%

El segundo modelo que se utilizó fue el modelo de redes neuronales con capas ocultas, para este caso únicamente se consideró hasta dos capas ocultas, ya que entre más complejo sea el modelo, más difícil la estimación y menos deseable para el análisis, además que se contaba con poco tiempo. El número de neuronas escogida como hiperparametro para cada una de las capas se encontró por medio de una pequeña grid search, en donde se tomaron valores entre 1 y 21 neuronas para la primera capa y entre 0 y 20 para la segunda, se limitó nuevamente el número máximo de iteraciones hasta 150. El numero de particiones para la validación cruzada continúa siendo 5.

Los resultados de el nivel de clasificación en los datos de prueba con cada par de hiperparametros se guardan en la variable listarn.

```
In [70]: #Se corre el algoritmo de redes neuronales variando el numero de neuronas en l  
a capa 1 y en la capa 2, y realizando validación cruzada  
from sklearn.neural_network import MLPClassifier  
  
capa1 = np.linspace(1, 21, 5)  
capa2 = np.linspace(0, 20, 5)  
listarn=[]  
for c1 in capa1:  
    for c2 in capa2:  
        c1=int(c1)  
        c2=int(c2)  
        if c2==0:  
            mlp = MLPClassifier(hidden_layer_sizes=(c1,), max_iter=150, alpha=  
1e-4,  
                                solver='sgd', verbose=10, tol=1e-3, random_state=1,  
                                learning_rate_init=.1)  
        else:  
            mlp = MLPClassifier(hidden_layer_sizes=(c1,c2), max_iter=150, alph  
a=1e-4,  
                                solver='sgd', verbose=10, tol=1e-3, random_state=1,  
                                learning_rate_init=.1)  
            mlp.fit(X_train, y_train)  
            scores = cross_val_score(mlp, X_train, y_train, cv=5)  
            listarn.append((np.mean(scores),c1,c2))
```

Iteration 1, loss = 0.61028912
Iteration 2, loss = 0.50443676
Iteration 3, loss = 0.50165571
Iteration 4, loss = 0.50273157
Iteration 5, loss = 0.50127114
Iteration 6, loss = 0.50199125
Iteration 7, loss = 0.50162579
Iteration 8, loss = 0.50123453
Iteration 9, loss = 0.50114427
Iteration 10, loss = 0.50153242
Iteration 11, loss = 0.50104600
Iteration 12, loss = 0.50147303
Iteration 13, loss = 0.50111286
Iteration 14, loss = 0.50144349

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.63403527
Iteration 2, loss = 0.50879972
Iteration 3, loss = 0.50020227
Iteration 4, loss = 0.49954611
Iteration 5, loss = 0.49984027
Iteration 6, loss = 0.50115327
Iteration 7, loss = 0.49914018
Iteration 8, loss = 0.49954055
Iteration 9, loss = 0.49985188
Iteration 10, loss = 0.49964148
Iteration 11, loss = 0.49941229
Iteration 12, loss = 0.49949026
Iteration 13, loss = 0.49937157
Iteration 14, loss = 0.49926574

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.63161562
Iteration 2, loss = 0.51028985
Iteration 3, loss = 0.50304528
Iteration 4, loss = 0.50238630
Iteration 5, loss = 0.50237730
Iteration 6, loss = 0.50358486
Iteration 7, loss = 0.50134906
Iteration 8, loss = 0.50136084
Iteration 9, loss = 0.50212194
Iteration 10, loss = 0.50196960
Iteration 11, loss = 0.50206009
Iteration 12, loss = 0.50218693
Iteration 13, loss = 0.50191741
Iteration 14, loss = 0.50164973
Iteration 15, loss = 0.50305003
Iteration 16, loss = 0.50157835
Iteration 17, loss = 0.50150645
Iteration 18, loss = 0.50174691

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.63417741
Iteration 2, loss = 0.51065465
Iteration 3, loss = 0.50329382
Iteration 4, loss = 0.50359152
Iteration 5, loss = 0.50307945

Iteration 6, loss = 0.50280035
Iteration 7, loss = 0.50294130
Iteration 8, loss = 0.50231024
Iteration 9, loss = 0.50313955
Iteration 10, loss = 0.50249760
Iteration 11, loss = 0.50266456
Iteration 12, loss = 0.50263795
Iteration 13, loss = 0.50274545
Iteration 14, loss = 0.50195469
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.63112897
Iteration 2, loss = 0.50867291
Iteration 3, loss = 0.50080488
Iteration 4, loss = 0.50138644
Iteration 5, loss = 0.50053802
Iteration 6, loss = 0.50087237
Iteration 7, loss = 0.50085712
Iteration 8, loss = 0.50073177
Iteration 9, loss = 0.50087585
Iteration 10, loss = 0.50114759
Iteration 11, loss = 0.50046727
Iteration 12, loss = 0.50096021
Iteration 13, loss = 0.50119732
Iteration 14, loss = 0.50114369
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.63475269
Iteration 2, loss = 0.51075217
Iteration 3, loss = 0.50302936
Iteration 4, loss = 0.50217736
Iteration 5, loss = 0.50100854
Iteration 6, loss = 0.50161426
Iteration 7, loss = 0.50196673
Iteration 8, loss = 0.50160299
Iteration 9, loss = 0.50156936
Iteration 10, loss = 0.50150026
Iteration 11, loss = 0.50222469
Iteration 12, loss = 0.50137761
Iteration 13, loss = 0.50148686
Iteration 14, loss = 0.50192012
Iteration 15, loss = 0.50172931
Iteration 16, loss = 0.50151600
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.70585960
Iteration 2, loss = 0.61894837
Iteration 3, loss = 0.52126549
Iteration 4, loss = 0.50828222
Iteration 5, loss = 0.50716456
Iteration 6, loss = 0.50469390
Iteration 7, loss = 0.50234533
Iteration 8, loss = 0.50243144
Iteration 9, loss = 0.50177857
Iteration 10, loss = 0.50228747
Iteration 11, loss = 0.50301908
Iteration 12, loss = 0.50124768

Iteration 13, loss = 0.50122450
Iteration 14, loss = 0.50235577
Iteration 15, loss = 0.50107340
Iteration 16, loss = 0.50167143
Iteration 17, loss = 0.50209897
Iteration 18, loss = 0.50089997
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.71168098
Iteration 2, loss = 0.65713889
Iteration 3, loss = 0.55761639
Iteration 4, loss = 0.50771876
Iteration 5, loss = 0.50416322
Iteration 6, loss = 0.50169011
Iteration 7, loss = 0.50096545
Iteration 8, loss = 0.50109223
Iteration 9, loss = 0.50104202
Iteration 10, loss = 0.49953904
Iteration 11, loss = 0.49983844
Iteration 12, loss = 0.49979066
Iteration 13, loss = 0.49908645
Iteration 14, loss = 0.49997350
Iteration 15, loss = 0.50004041
Iteration 16, loss = 0.49906101
Iteration 17, loss = 0.50050292
Iteration 18, loss = 0.49822036
Iteration 19, loss = 0.49922769
Iteration 20, loss = 0.49837381
Iteration 21, loss = 0.49907621

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.70772933
Iteration 2, loss = 0.64941461
Iteration 3, loss = 0.55313579
Iteration 4, loss = 0.51181639
Iteration 5, loss = 0.50835728
Iteration 6, loss = 0.50494268
Iteration 7, loss = 0.50525202
Iteration 8, loss = 0.50472264
Iteration 9, loss = 0.50397772
Iteration 10, loss = 0.50283669
Iteration 11, loss = 0.50207798
Iteration 12, loss = 0.50295963
Iteration 13, loss = 0.50162907
Iteration 14, loss = 0.50332386
Iteration 15, loss = 0.50290600
Iteration 16, loss = 0.50269541
Iteration 17, loss = 0.50249402
Iteration 18, loss = 0.50117291
Iteration 19, loss = 0.50359763
Iteration 20, loss = 0.50220038
Iteration 21, loss = 0.50252604

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.70779769
Iteration 2, loss = 0.65077273
Iteration 3, loss = 0.55261806

Iteration 4, loss = 0.51090080
Iteration 5, loss = 0.50757053
Iteration 6, loss = 0.50556697
Iteration 7, loss = 0.50518053
Iteration 8, loss = 0.50511283
Iteration 9, loss = 0.50350414
Iteration 10, loss = 0.50292572
Iteration 11, loss = 0.50282410
Iteration 12, loss = 0.50345602
Iteration 13, loss = 0.50265621
Iteration 14, loss = 0.50300058
Iteration 15, loss = 0.50317482
Iteration 16, loss = 0.50347752
Iteration 17, loss = 0.50290921
Iteration 18, loss = 0.50131679
Iteration 19, loss = 0.50498951
Iteration 20, loss = 0.50304987
Iteration 21, loss = 0.50225219
Iteration 22, loss = 0.50253038
Iteration 23, loss = 0.50205735
Iteration 24, loss = 0.50571283
Iteration 25, loss = 0.50188182
Iteration 26, loss = 0.50316758
Iteration 27, loss = 0.50236579
Iteration 28, loss = 0.50204265
Iteration 29, loss = 0.50244670

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.70742356
Iteration 2, loss = 0.65352304
Iteration 3, loss = 0.55567052
Iteration 4, loss = 0.51232013
Iteration 5, loss = 0.50630557
Iteration 6, loss = 0.50510927
Iteration 7, loss = 0.50406567
Iteration 8, loss = 0.50410260
Iteration 9, loss = 0.50231073
Iteration 10, loss = 0.50124378
Iteration 11, loss = 0.50122899
Iteration 12, loss = 0.50279956
Iteration 13, loss = 0.50115032
Iteration 14, loss = 0.50257602
Iteration 15, loss = 0.50176591
Iteration 16, loss = 0.50087396
Iteration 17, loss = 0.50397120
Iteration 18, loss = 0.50041604
Iteration 19, loss = 0.50274299
Iteration 20, loss = 0.50071701
Iteration 21, loss = 0.50030566

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.70775616
Iteration 2, loss = 0.63922611
Iteration 3, loss = 0.54441939
Iteration 4, loss = 0.51309603
Iteration 5, loss = 0.51052399
Iteration 6, loss = 0.50836122

Iteration 7, loss = 0.50673579
Iteration 8, loss = 0.50590581
Iteration 9, loss = 0.50482803
Iteration 10, loss = 0.50340240
Iteration 11, loss = 0.50492133
Iteration 12, loss = 0.50404424
Iteration 13, loss = 0.50255063
Iteration 14, loss = 0.50461381
Iteration 15, loss = 0.50368244
Iteration 16, loss = 0.50308948
Iteration 17, loss = 0.50242787
Iteration 18, loss = 0.50274644
Iteration 19, loss = 0.50180357
Iteration 20, loss = 0.50538114
Iteration 21, loss = 0.50275991
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.61066625
Iteration 2, loss = 0.50582079
Iteration 3, loss = 0.50276942
Iteration 4, loss = 0.50244628
Iteration 5, loss = 0.50247485
Iteration 6, loss = 0.50136113
Iteration 7, loss = 0.50116623
Iteration 8, loss = 0.50151325
Iteration 9, loss = 0.50123362
Iteration 10, loss = 0.50106951
Iteration 11, loss = 0.50057826
Iteration 12, loss = 0.50046842
Iteration 13, loss = 0.50075043
Iteration 14, loss = 0.50064877
Iteration 15, loss = 0.50040647
Iteration 16, loss = 0.50101905
Iteration 17, loss = 0.50144995
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.63512750
Iteration 2, loss = 0.50681776
Iteration 3, loss = 0.50156034
Iteration 4, loss = 0.50026139
Iteration 5, loss = 0.50150692
Iteration 6, loss = 0.49974360
Iteration 7, loss = 0.50032630
Iteration 8, loss = 0.50067812
Iteration 9, loss = 0.49910078
Iteration 10, loss = 0.49871837
Iteration 11, loss = 0.49914157
Iteration 12, loss = 0.49925019
Iteration 13, loss = 0.49968613
Iteration 14, loss = 0.50110070
Iteration 15, loss = 0.49976375
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.63299425
Iteration 2, loss = 0.50919691
Iteration 3, loss = 0.50371650
Iteration 4, loss = 0.50286325

Iteration 5, loss = 0.50404494
Iteration 6, loss = 0.50255111
Iteration 7, loss = 0.50321803
Iteration 8, loss = 0.50230818
Iteration 9, loss = 0.50160782
Iteration 10, loss = 0.50119898
Iteration 11, loss = 0.50159254
Iteration 12, loss = 0.50093026
Iteration 13, loss = 0.50153254
Iteration 14, loss = 0.50273203

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.63543955
Iteration 2, loss = 0.50795469
Iteration 3, loss = 0.50321455
Iteration 4, loss = 0.50240765
Iteration 5, loss = 0.50283437
Iteration 6, loss = 0.50224961
Iteration 7, loss = 0.50257533
Iteration 8, loss = 0.50267603
Iteration 9, loss = 0.50203141
Iteration 10, loss = 0.50288150
Iteration 11, loss = 0.50235898
Iteration 12, loss = 0.50197790
Iteration 13, loss = 0.50235166
Iteration 14, loss = 0.50405658

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.63279071
Iteration 2, loss = 0.50763406
Iteration 3, loss = 0.50185090
Iteration 4, loss = 0.50071269
Iteration 5, loss = 0.50062211
Iteration 6, loss = 0.50100233
Iteration 7, loss = 0.50046898
Iteration 8, loss = 0.50143491
Iteration 9, loss = 0.50028807
Iteration 10, loss = 0.50100941
Iteration 11, loss = 0.50095243
Iteration 12, loss = 0.50105527
Iteration 13, loss = 0.49991466
Iteration 14, loss = 0.50155578
Iteration 15, loss = 0.49995707

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.64013056
Iteration 2, loss = 0.50965999
Iteration 3, loss = 0.50237971
Iteration 4, loss = 0.50175330
Iteration 5, loss = 0.50231730
Iteration 6, loss = 0.50248797
Iteration 7, loss = 0.50177256
Iteration 8, loss = 0.50275378
Iteration 9, loss = 0.50165698
Iteration 10, loss = 0.50237898
Iteration 11, loss = 0.50152607
Iteration 12, loss = 0.50133517

Iteration 13, loss = 0.50218011
Iteration 14, loss = 0.50211446
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.67955204
Iteration 2, loss = 0.57140932
Iteration 3, loss = 0.50916256
Iteration 4, loss = 0.50638917
Iteration 5, loss = 0.50308806
Iteration 6, loss = 0.50277865
Iteration 7, loss = 0.50257037
Iteration 8, loss = 0.50104508
Iteration 9, loss = 0.50172037
Iteration 10, loss = 0.50182775
Iteration 11, loss = 0.50088886
Iteration 12, loss = 0.50189308
Iteration 13, loss = 0.50257143
Iteration 14, loss = 0.50150106
Iteration 15, loss = 0.50296845
Iteration 16, loss = 0.50179903
Iteration 17, loss = 0.50167340
Iteration 18, loss = 0.50220892
Iteration 19, loss = 0.50195052
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.68172447
Iteration 2, loss = 0.58116760
Iteration 3, loss = 0.51247819
Iteration 4, loss = 0.50619542
Iteration 5, loss = 0.50256160
Iteration 6, loss = 0.50283645
Iteration 7, loss = 0.50071065
Iteration 8, loss = 0.50065675
Iteration 9, loss = 0.50066560
Iteration 10, loss = 0.49952423
Iteration 11, loss = 0.49930476
Iteration 12, loss = 0.49948601
Iteration 13, loss = 0.49868093
Iteration 14, loss = 0.50075554
Iteration 15, loss = 0.49904214
Iteration 16, loss = 0.49924945
Iteration 17, loss = 0.49898750
Iteration 18, loss = 0.49927212
Iteration 19, loss = 0.49945500
Iteration 20, loss = 0.49834953
Iteration 21, loss = 0.49893105
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.68620613
Iteration 2, loss = 0.59385527
Iteration 3, loss = 0.51850536
Iteration 4, loss = 0.50902886
Iteration 5, loss = 0.50622315
Iteration 6, loss = 0.50568041
Iteration 7, loss = 0.50420114
Iteration 8, loss = 0.50630765
Iteration 9, loss = 0.50306180

Iteration 10, loss = 0.50313486
Iteration 11, loss = 0.50253652
Iteration 12, loss = 0.50346223
Iteration 13, loss = 0.50329197
Iteration 14, loss = 0.50365647
Iteration 15, loss = 0.50192117
Iteration 16, loss = 0.50126319
Iteration 17, loss = 0.50319894
Iteration 18, loss = 0.50312435
Iteration 19, loss = 0.50258329
Iteration 20, loss = 0.50337276

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.68612761
Iteration 2, loss = 0.59973451
Iteration 3, loss = 0.51740792
Iteration 4, loss = 0.50758219
Iteration 5, loss = 0.50688143
Iteration 6, loss = 0.50560600
Iteration 7, loss = 0.50453257
Iteration 8, loss = 0.50572704
Iteration 9, loss = 0.50306160
Iteration 10, loss = 0.50334751
Iteration 11, loss = 0.50299359
Iteration 12, loss = 0.50315544
Iteration 13, loss = 0.50321042
Iteration 14, loss = 0.50380798
Iteration 15, loss = 0.50167202
Iteration 16, loss = 0.50224154
Iteration 17, loss = 0.50249084
Iteration 18, loss = 0.50187721
Iteration 19, loss = 0.50221630
Iteration 20, loss = 0.50413969
Iteration 21, loss = 0.50423023
Iteration 22, loss = 0.50266051
Iteration 23, loss = 0.50240951
Iteration 24, loss = 0.50278923
Iteration 25, loss = 0.50185966
Iteration 26, loss = 0.50215191

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.68547514
Iteration 2, loss = 0.60409725
Iteration 3, loss = 0.52087975
Iteration 4, loss = 0.50824380
Iteration 5, loss = 0.50760712
Iteration 6, loss = 0.50377065
Iteration 7, loss = 0.50453751
Iteration 8, loss = 0.50456567
Iteration 9, loss = 0.50077465
Iteration 10, loss = 0.50209261
Iteration 11, loss = 0.50304236
Iteration 12, loss = 0.50305237
Iteration 13, loss = 0.50224459
Iteration 14, loss = 0.50183384
Iteration 15, loss = 0.50115412
Iteration 16, loss = 0.50143789

Iteration 17, loss = 0.50167969

Iteration 18, loss = 0.50197523

Iteration 19, loss = 0.50021864

Iteration 20, loss = 0.50162834

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.68303999

Iteration 2, loss = 0.59234994

Iteration 3, loss = 0.51972965

Iteration 4, loss = 0.51059373

Iteration 5, loss = 0.50702398

Iteration 6, loss = 0.50547603

Iteration 7, loss = 0.50376351

Iteration 8, loss = 0.50424958

Iteration 9, loss = 0.50376722

Iteration 10, loss = 0.50390660

Iteration 11, loss = 0.50432267

Iteration 12, loss = 0.50236230

Iteration 13, loss = 0.50473304

Iteration 14, loss = 0.50182395

Iteration 15, loss = 0.50332541

Iteration 16, loss = 0.50527837

Iteration 17, loss = 0.50244398

Iteration 18, loss = 0.50471501

Iteration 19, loss = 0.50257505

Iteration 20, loss = 0.50334449

Iteration 21, loss = 0.50213283

Iteration 22, loss = 0.50485404

Iteration 23, loss = 0.50229208

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.59729382

Iteration 2, loss = 0.50655262

Iteration 3, loss = 0.50234862

Iteration 4, loss = 0.50123116

Iteration 5, loss = 0.50131893

Iteration 6, loss = 0.50114922

Iteration 7, loss = 0.50204021

Iteration 8, loss = 0.50070953

Iteration 9, loss = 0.50085785

Iteration 10, loss = 0.50111577

Iteration 11, loss = 0.50142140

Iteration 12, loss = 0.50046573

Iteration 13, loss = 0.50109081

Iteration 14, loss = 0.50057737

Iteration 15, loss = 0.50055303

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.62792857

Iteration 2, loss = 0.50812098

Iteration 3, loss = 0.50017567

Iteration 4, loss = 0.49970305

Iteration 5, loss = 0.49973871

Iteration 6, loss = 0.50021939

Iteration 7, loss = 0.49876940

Iteration 8, loss = 0.49955486

Iteration 9, loss = 0.49932809

Iteration 10, loss = 0.49938701
Iteration 11, loss = 0.49903811
Iteration 12, loss = 0.49873249
Iteration 13, loss = 0.49955825
Iteration 14, loss = 0.49898036
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.62635363
Iteration 2, loss = 0.50922085
Iteration 3, loss = 0.50326405
Iteration 4, loss = 0.50170018
Iteration 5, loss = 0.50160657
Iteration 6, loss = 0.50297571
Iteration 7, loss = 0.50115220
Iteration 8, loss = 0.50123138
Iteration 9, loss = 0.50192429
Iteration 10, loss = 0.50220048
Iteration 11, loss = 0.50186073
Iteration 12, loss = 0.50086058
Iteration 13, loss = 0.50255944
Iteration 14, loss = 0.50219401
Iteration 15, loss = 0.50161986
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.62832445
Iteration 2, loss = 0.51049095
Iteration 3, loss = 0.50326623
Iteration 4, loss = 0.50228817
Iteration 5, loss = 0.50232492
Iteration 6, loss = 0.50377157
Iteration 7, loss = 0.50309845
Iteration 8, loss = 0.50227849
Iteration 9, loss = 0.50254025
Iteration 10, loss = 0.50206560
Iteration 11, loss = 0.50235970
Iteration 12, loss = 0.50203417
Iteration 13, loss = 0.50229375
Iteration 14, loss = 0.50216252
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.62179817
Iteration 2, loss = 0.50760040
Iteration 3, loss = 0.50194858
Iteration 4, loss = 0.50062331
Iteration 5, loss = 0.50044220
Iteration 6, loss = 0.50069780
Iteration 7, loss = 0.50123213
Iteration 8, loss = 0.50068284
Iteration 9, loss = 0.50088579
Iteration 10, loss = 0.50044868
Iteration 11, loss = 0.50063599
Iteration 12, loss = 0.50096339
Iteration 13, loss = 0.50046583
Iteration 14, loss = 0.49928975
Iteration 15, loss = 0.49996016
Iteration 16, loss = 0.50250852
Iteration 17, loss = 0.49993143

Iteration 18, loss = 0.50021877
Iteration 19, loss = 0.50008156
Iteration 20, loss = 0.49985097
Iteration 21, loss = 0.49962657
Iteration 22, loss = 0.49992158
Iteration 23, loss = 0.50048040
Iteration 24, loss = 0.49945351
Iteration 25, loss = 0.49999628

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.62598174
Iteration 2, loss = 0.51096462
Iteration 3, loss = 0.50295153
Iteration 4, loss = 0.50262761
Iteration 5, loss = 0.50299480
Iteration 6, loss = 0.50157078
Iteration 7, loss = 0.50202298
Iteration 8, loss = 0.50225384
Iteration 9, loss = 0.50320116
Iteration 10, loss = 0.50220508
Iteration 11, loss = 0.50226630
Iteration 12, loss = 0.50108794
Iteration 13, loss = 0.50210658
Iteration 14, loss = 0.50124911
Iteration 15, loss = 0.50092706
Iteration 16, loss = 0.50154272
Iteration 17, loss = 0.50184063

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54594774
Iteration 2, loss = 0.49633445
Iteration 3, loss = 0.48906918
Iteration 4, loss = 0.48032023
Iteration 5, loss = 0.47450419
Iteration 6, loss = 0.47049920
Iteration 7, loss = 0.46727629
Iteration 8, loss = 0.46411199
Iteration 9, loss = 0.46014972
Iteration 10, loss = 0.45838275
Iteration 11, loss = 0.45638216
Iteration 12, loss = 0.45366673
Iteration 13, loss = 0.45283856
Iteration 14, loss = 0.45341158
Iteration 15, loss = 0.45180704
Iteration 16, loss = 0.45321587
Iteration 17, loss = 0.45148864
Iteration 18, loss = 0.45209318
Iteration 19, loss = 0.45187300
Iteration 20, loss = 0.45116830
Iteration 21, loss = 0.45202982
Iteration 22, loss = 0.45242668
Iteration 23, loss = 0.45087592
Iteration 24, loss = 0.45160762
Iteration 25, loss = 0.44897967
Iteration 26, loss = 0.44892578
Iteration 27, loss = 0.44840041
Iteration 28, loss = 0.44809076

Iteration 29, loss = 0.44847205
Iteration 30, loss = 0.44832752
Iteration 31, loss = 0.44698445
Iteration 32, loss = 0.44731602
Iteration 33, loss = 0.44858174
Iteration 34, loss = 0.44719010
Iteration 35, loss = 0.44700943
Iteration 36, loss = 0.44507876
Iteration 37, loss = 0.44597573
Iteration 38, loss = 0.44511880
Iteration 39, loss = 0.44438441
Iteration 40, loss = 0.44459331
Iteration 41, loss = 0.44377819
Iteration 42, loss = 0.44324713
Iteration 43, loss = 0.44404113
Iteration 44, loss = 0.44208655
Iteration 45, loss = 0.44470908
Iteration 46, loss = 0.44316971
Iteration 47, loss = 0.44310151
Iteration 48, loss = 0.44292495
Iteration 49, loss = 0.44218220
Iteration 50, loss = 0.44292219
Iteration 51, loss = 0.44245825
Iteration 52, loss = 0.44296527
Iteration 53, loss = 0.44319217
Iteration 54, loss = 0.44395408
Iteration 55, loss = 0.44262851

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.55443564
Iteration 2, loss = 0.49601736
Iteration 3, loss = 0.48841357
Iteration 4, loss = 0.48243781
Iteration 5, loss = 0.47504902
Iteration 6, loss = 0.47246354
Iteration 7, loss = 0.46812187
Iteration 8, loss = 0.46500745
Iteration 9, loss = 0.46596073
Iteration 10, loss = 0.46152869
Iteration 11, loss = 0.45858804
Iteration 12, loss = 0.45608034
Iteration 13, loss = 0.45489372
Iteration 14, loss = 0.45442227
Iteration 15, loss = 0.45358702
Iteration 16, loss = 0.45177181
Iteration 17, loss = 0.45229221
Iteration 18, loss = 0.45310738
Iteration 19, loss = 0.45087801
Iteration 20, loss = 0.45074841
Iteration 21, loss = 0.45053834
Iteration 22, loss = 0.45022420
Iteration 23, loss = 0.45170397
Iteration 24, loss = 0.44964608
Iteration 25, loss = 0.45140182
Iteration 26, loss = 0.44875184
Iteration 27, loss = 0.44878712

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch

s. Stopping.

Iteration 1, loss = 0.55349691
Iteration 2, loss = 0.49891490
Iteration 3, loss = 0.49279228
Iteration 4, loss = 0.48604996
Iteration 5, loss = 0.47877748
Iteration 6, loss = 0.47547490
Iteration 7, loss = 0.46950923
Iteration 8, loss = 0.46611106
Iteration 9, loss = 0.46548494
Iteration 10, loss = 0.46116617
Iteration 11, loss = 0.45766487
Iteration 12, loss = 0.45513855
Iteration 13, loss = 0.45544936
Iteration 14, loss = 0.45369221
Iteration 15, loss = 0.45365126
Iteration 16, loss = 0.45238198
Iteration 17, loss = 0.45353677
Iteration 18, loss = 0.45445377
Iteration 19, loss = 0.45072822
Iteration 20, loss = 0.45218348
Iteration 21, loss = 0.45231063
Iteration 22, loss = 0.44962293
Iteration 23, loss = 0.45153275
Iteration 24, loss = 0.44991501
Iteration 25, loss = 0.45047496
Iteration 26, loss = 0.44841797
Iteration 27, loss = 0.44877746
Iteration 28, loss = 0.44746187
Iteration 29, loss = 0.44753035
Iteration 30, loss = 0.44782761
Iteration 31, loss = 0.44895708
Iteration 32, loss = 0.44845388
Iteration 33, loss = 0.44707291
Iteration 34, loss = 0.44615969
Iteration 35, loss = 0.44625797
Iteration 36, loss = 0.44761147
Iteration 37, loss = 0.44765191

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch

s. Stopping.

Iteration 1, loss = 0.55217210
Iteration 2, loss = 0.49874371
Iteration 3, loss = 0.49240655
Iteration 4, loss = 0.48521164
Iteration 5, loss = 0.47916094
Iteration 6, loss = 0.47577083
Iteration 7, loss = 0.47140726
Iteration 8, loss = 0.46791961
Iteration 9, loss = 0.46885236
Iteration 10, loss = 0.46507515
Iteration 11, loss = 0.46312404
Iteration 12, loss = 0.46070990
Iteration 13, loss = 0.45979372
Iteration 14, loss = 0.45908252
Iteration 15, loss = 0.45696650
Iteration 16, loss = 0.45620925
Iteration 17, loss = 0.45719470

Iteration 18, loss = 0.45881996
Iteration 19, loss = 0.45568048
Iteration 20, loss = 0.45657104
Iteration 21, loss = 0.45522445
Iteration 22, loss = 0.45426509
Iteration 23, loss = 0.45588133
Iteration 24, loss = 0.45377342
Iteration 25, loss = 0.45477738
Iteration 26, loss = 0.45472106

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55448737
Iteration 2, loss = 0.49845017
Iteration 3, loss = 0.49038024
Iteration 4, loss = 0.48301324
Iteration 5, loss = 0.47607759
Iteration 6, loss = 0.47054046
Iteration 7, loss = 0.46581539
Iteration 8, loss = 0.46430881
Iteration 9, loss = 0.46095676
Iteration 10, loss = 0.45869502
Iteration 11, loss = 0.45684980
Iteration 12, loss = 0.45367393
Iteration 13, loss = 0.45259487
Iteration 14, loss = 0.45164143
Iteration 15, loss = 0.45092867
Iteration 16, loss = 0.44888659
Iteration 17, loss = 0.45010461
Iteration 18, loss = 0.44942863
Iteration 19, loss = 0.44968977
Iteration 20, loss = 0.44930386
Iteration 21, loss = 0.44832289
Iteration 22, loss = 0.44800211
Iteration 23, loss = 0.44937724
Iteration 24, loss = 0.44726694
Iteration 25, loss = 0.44832862
Iteration 26, loss = 0.44802527
Iteration 27, loss = 0.44793908

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55317925
Iteration 2, loss = 0.49869093
Iteration 3, loss = 0.49323416
Iteration 4, loss = 0.48751173
Iteration 5, loss = 0.48201437
Iteration 6, loss = 0.47580836
Iteration 7, loss = 0.47265395
Iteration 8, loss = 0.47110516
Iteration 9, loss = 0.46758697
Iteration 10, loss = 0.46653108
Iteration 11, loss = 0.46443732
Iteration 12, loss = 0.46075476
Iteration 13, loss = 0.46050707
Iteration 14, loss = 0.45762618
Iteration 15, loss = 0.45715959
Iteration 16, loss = 0.45453906
Iteration 17, loss = 0.45691071

Iteration 18, loss = 0.45345552
Iteration 19, loss = 0.45311670
Iteration 20, loss = 0.45267967
Iteration 21, loss = 0.45509166
Iteration 22, loss = 0.45334579
Iteration 23, loss = 0.45332284
Iteration 24, loss = 0.45060782
Iteration 25, loss = 0.45083633
Iteration 26, loss = 0.45117003
Iteration 27, loss = 0.45098528
Iteration 28, loss = 0.45139353
Iteration 29, loss = 0.45077092
Iteration 30, loss = 0.45252950
Iteration 31, loss = 0.45031668
Iteration 32, loss = 0.45007008
Iteration 33, loss = 0.44980929
Iteration 34, loss = 0.45005127
Iteration 35, loss = 0.44972227

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54015912
Iteration 2, loss = 0.49823003
Iteration 3, loss = 0.49070560
Iteration 4, loss = 0.47964180
Iteration 5, loss = 0.47014104
Iteration 6, loss = 0.46477975
Iteration 7, loss = 0.46092412
Iteration 8, loss = 0.45845097
Iteration 9, loss = 0.45634110
Iteration 10, loss = 0.45579042
Iteration 11, loss = 0.45289466
Iteration 12, loss = 0.45146359
Iteration 13, loss = 0.45088359
Iteration 14, loss = 0.44881235
Iteration 15, loss = 0.44776524
Iteration 16, loss = 0.44655949
Iteration 17, loss = 0.44664172
Iteration 18, loss = 0.44563040
Iteration 19, loss = 0.44472620
Iteration 20, loss = 0.44593801
Iteration 21, loss = 0.44467829
Iteration 22, loss = 0.44317005
Iteration 23, loss = 0.44700413
Iteration 24, loss = 0.44332530
Iteration 25, loss = 0.44316777
Iteration 26, loss = 0.44344234
Iteration 27, loss = 0.44333136
Iteration 28, loss = 0.44328889
Iteration 29, loss = 0.44259131
Iteration 30, loss = 0.44287689
Iteration 31, loss = 0.44184461
Iteration 32, loss = 0.44228431
Iteration 33, loss = 0.44153510

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54842283
Iteration 2, loss = 0.50058348

Iteration 3, loss = 0.49271327
Iteration 4, loss = 0.48676232
Iteration 5, loss = 0.47979833
Iteration 6, loss = 0.47195310
Iteration 7, loss = 0.46754938
Iteration 8, loss = 0.46338772
Iteration 9, loss = 0.45990955
Iteration 10, loss = 0.45286755
Iteration 11, loss = 0.45387338
Iteration 12, loss = 0.44749863
Iteration 13, loss = 0.44741454
Iteration 14, loss = 0.44725295
Iteration 15, loss = 0.44693988
Iteration 16, loss = 0.44508453
Iteration 17, loss = 0.44430122
Iteration 18, loss = 0.44284982
Iteration 19, loss = 0.44497865
Iteration 20, loss = 0.44362776
Iteration 21, loss = 0.44157155
Iteration 22, loss = 0.44119575
Iteration 23, loss = 0.44434271
Iteration 24, loss = 0.44112174
Iteration 25, loss = 0.44256752
Iteration 26, loss = 0.44000000
Iteration 27, loss = 0.44160678
Iteration 28, loss = 0.44125997
Iteration 29, loss = 0.44077848
Iteration 30, loss = 0.44024133
Iteration 31, loss = 0.43930884
Iteration 32, loss = 0.43858337
Iteration 33, loss = 0.43790381
Iteration 34, loss = 0.43958753
Iteration 35, loss = 0.43798221
Iteration 36, loss = 0.43773666
Iteration 37, loss = 0.44023214

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55020694
Iteration 2, loss = 0.50115470
Iteration 3, loss = 0.49503043
Iteration 4, loss = 0.48976935
Iteration 5, loss = 0.48194666
Iteration 6, loss = 0.47334191
Iteration 7, loss = 0.46830117
Iteration 8, loss = 0.46312220
Iteration 9, loss = 0.46023717
Iteration 10, loss = 0.45851386
Iteration 11, loss = 0.45758791
Iteration 12, loss = 0.45524369
Iteration 13, loss = 0.45372881
Iteration 14, loss = 0.45503087
Iteration 15, loss = 0.45729775
Iteration 16, loss = 0.45508175
Iteration 17, loss = 0.45222966
Iteration 18, loss = 0.45146540
Iteration 19, loss = 0.45544287
Iteration 20, loss = 0.45235153

Iteration 21, loss = 0.45194857
Iteration 22, loss = 0.45155065
Iteration 23, loss = 0.45280310
Iteration 24, loss = 0.45067286
Iteration 25, loss = 0.45036386
Iteration 26, loss = 0.45020049
Iteration 27, loss = 0.45336847
Iteration 28, loss = 0.45237783

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55328576
Iteration 2, loss = 0.50179837
Iteration 3, loss = 0.49584500
Iteration 4, loss = 0.49310633
Iteration 5, loss = 0.48314968
Iteration 6, loss = 0.47500902
Iteration 7, loss = 0.46959342
Iteration 8, loss = 0.46545570
Iteration 9, loss = 0.46113605
Iteration 10, loss = 0.45431014
Iteration 11, loss = 0.45481971
Iteration 12, loss = 0.45351696
Iteration 13, loss = 0.45139790
Iteration 14, loss = 0.45084932
Iteration 15, loss = 0.45193453
Iteration 16, loss = 0.45136668
Iteration 17, loss = 0.44982909
Iteration 18, loss = 0.44911390
Iteration 19, loss = 0.45073681
Iteration 20, loss = 0.44794374
Iteration 21, loss = 0.44844454
Iteration 22, loss = 0.45044336
Iteration 23, loss = 0.44871417
Iteration 24, loss = 0.44694297
Iteration 25, loss = 0.44693626
Iteration 26, loss = 0.44861972
Iteration 27, loss = 0.44710098
Iteration 28, loss = 0.44731290
Iteration 29, loss = 0.44543119
Iteration 30, loss = 0.44652411
Iteration 31, loss = 0.44668922
Iteration 32, loss = 0.44606405
Iteration 33, loss = 0.44571824
Iteration 34, loss = 0.44513203
Iteration 35, loss = 0.44408243
Iteration 36, loss = 0.44438303
Iteration 37, loss = 0.44373019
Iteration 38, loss = 0.44287956
Iteration 39, loss = 0.44349575
Iteration 40, loss = 0.44201345
Iteration 41, loss = 0.44345188
Iteration 42, loss = 0.44646461
Iteration 43, loss = 0.44233272
Iteration 44, loss = 0.44252504
Iteration 45, loss = 0.44256648
Iteration 46, loss = 0.44147583

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs

s. Stopping.

Iteration 1, loss = 0.55097886
Iteration 2, loss = 0.49970011
Iteration 3, loss = 0.49470646
Iteration 4, loss = 0.48757537
Iteration 5, loss = 0.47831704
Iteration 6, loss = 0.46964929
Iteration 7, loss = 0.46790688
Iteration 8, loss = 0.46234610
Iteration 9, loss = 0.45993422
Iteration 10, loss = 0.45537013
Iteration 11, loss = 0.45214600
Iteration 12, loss = 0.44927730
Iteration 13, loss = 0.44813383
Iteration 14, loss = 0.44633705
Iteration 15, loss = 0.44608358
Iteration 16, loss = 0.44457896
Iteration 17, loss = 0.44539826
Iteration 18, loss = 0.44275477
Iteration 19, loss = 0.44308078
Iteration 20, loss = 0.44183673
Iteration 21, loss = 0.44372788
Iteration 22, loss = 0.44345649
Iteration 23, loss = 0.44136155
Iteration 24, loss = 0.44095581
Iteration 25, loss = 0.44055054
Iteration 26, loss = 0.44315505
Iteration 27, loss = 0.43998071
Iteration 28, loss = 0.44073294
Iteration 29, loss = 0.44109830

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch

s. Stopping.

Iteration 1, loss = 0.55363797
Iteration 2, loss = 0.49964370
Iteration 3, loss = 0.49638412
Iteration 4, loss = 0.49079897
Iteration 5, loss = 0.48281473
Iteration 6, loss = 0.47642143
Iteration 7, loss = 0.46967688
Iteration 8, loss = 0.46752766
Iteration 9, loss = 0.46163321
Iteration 10, loss = 0.45999874
Iteration 11, loss = 0.45930479
Iteration 12, loss = 0.45584592
Iteration 13, loss = 0.45464365
Iteration 14, loss = 0.45300831
Iteration 15, loss = 0.45114207
Iteration 16, loss = 0.44854880
Iteration 17, loss = 0.44873829
Iteration 18, loss = 0.44576452
Iteration 19, loss = 0.44678706
Iteration 20, loss = 0.44476369
Iteration 21, loss = 0.44380719
Iteration 22, loss = 0.44515512
Iteration 23, loss = 0.44620765
Iteration 24, loss = 0.44481205
Iteration 25, loss = 0.44532710

Iteration 26, loss = 0.44525381
Iteration 27, loss = 0.44329277
Iteration 28, loss = 0.44540165
Iteration 29, loss = 0.44346550
Iteration 30, loss = 0.44398681
Iteration 31, loss = 0.44426573

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54938511
Iteration 2, loss = 0.49584359
Iteration 3, loss = 0.49117657
Iteration 4, loss = 0.48579339
Iteration 5, loss = 0.47965110
Iteration 6, loss = 0.47581963
Iteration 7, loss = 0.47504045
Iteration 8, loss = 0.47141448
Iteration 9, loss = 0.46765151
Iteration 10, loss = 0.46682840
Iteration 11, loss = 0.46338556
Iteration 12, loss = 0.45924340
Iteration 13, loss = 0.45368495
Iteration 14, loss = 0.45052635
Iteration 15, loss = 0.45019391
Iteration 16, loss = 0.44869961
Iteration 17, loss = 0.44861511
Iteration 18, loss = 0.44658293
Iteration 19, loss = 0.44431244
Iteration 20, loss = 0.44357544
Iteration 21, loss = 0.44390837
Iteration 22, loss = 0.44471616
Iteration 23, loss = 0.44272937
Iteration 24, loss = 0.44249326
Iteration 25, loss = 0.44369611
Iteration 26, loss = 0.44285854
Iteration 27, loss = 0.44176267
Iteration 28, loss = 0.44021596
Iteration 29, loss = 0.44307879
Iteration 30, loss = 0.44201762
Iteration 31, loss = 0.44170642
Iteration 32, loss = 0.44012079
Iteration 33, loss = 0.43939392
Iteration 34, loss = 0.44082749
Iteration 35, loss = 0.44012381
Iteration 36, loss = 0.43960178
Iteration 37, loss = 0.43987353
Iteration 38, loss = 0.43784584
Iteration 39, loss = 0.43866624
Iteration 40, loss = 0.43730696
Iteration 41, loss = 0.43944874
Iteration 42, loss = 0.43924885
Iteration 43, loss = 0.43745726
Iteration 44, loss = 0.43790028
Iteration 45, loss = 0.43933009
Iteration 46, loss = 0.43671126
Iteration 47, loss = 0.43722996
Iteration 48, loss = 0.43741141
Iteration 49, loss = 0.43610921

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56069960
Iteration 2, loss = 0.49858019
Iteration 3, loss = 0.49226753
Iteration 4, loss = 0.48819354
Iteration 5, loss = 0.48243818
Iteration 6, loss = 0.47719994
Iteration 7, loss = 0.47499431
Iteration 8, loss = 0.47084367
Iteration 9, loss = 0.47092620
Iteration 10, loss = 0.46915016
Iteration 11, loss = 0.46675602
Iteration 12, loss = 0.46719158
Iteration 13, loss = 0.46682615
Iteration 14, loss = 0.46350956
Iteration 15, loss = 0.46135225
Iteration 16, loss = 0.45593606
Iteration 17, loss = 0.45401555
Iteration 18, loss = 0.45074924
Iteration 19, loss = 0.44998693
Iteration 20, loss = 0.44798747
Iteration 21, loss = 0.44841525
Iteration 22, loss = 0.44491634
Iteration 23, loss = 0.44470444
Iteration 24, loss = 0.44618014
Iteration 25, loss = 0.44561271
Iteration 26, loss = 0.44521376
Iteration 27, loss = 0.44490278
Iteration 28, loss = 0.44369183
Iteration 29, loss = 0.44347112
Iteration 30, loss = 0.44444116
Iteration 31, loss = 0.44318147
Iteration 32, loss = 0.44217080
Iteration 33, loss = 0.44229423
Iteration 34, loss = 0.44324491
Iteration 35, loss = 0.44571626
Iteration 36, loss = 0.44314318
Iteration 37, loss = 0.44197963
Iteration 38, loss = 0.44214233
Iteration 39, loss = 0.44015405
Iteration 40, loss = 0.44021483
Iteration 41, loss = 0.44034683
Iteration 42, loss = 0.44052526
Iteration 43, loss = 0.44053562
Iteration 44, loss = 0.44210206
Iteration 45, loss = 0.43838870
Iteration 46, loss = 0.43958497
Iteration 47, loss = 0.43855495
Iteration 48, loss = 0.43974037
Iteration 49, loss = 0.43726333
Iteration 50, loss = 0.43971834
Iteration 51, loss = 0.43868664
Iteration 52, loss = 0.43622357
Iteration 53, loss = 0.43921653
Iteration 54, loss = 0.43652586
Iteration 55, loss = 0.43754126

Iteration 56, loss = 0.44015186
Iteration 57, loss = 0.43750814
Iteration 58, loss = 0.43713516
Iteration 59, loss = 0.44099498
Iteration 60, loss = 0.43682887
Iteration 61, loss = 0.43491965
Iteration 62, loss = 0.43536864
Iteration 63, loss = 0.43696026
Iteration 64, loss = 0.43425697
Iteration 65, loss = 0.43671854
Iteration 66, loss = 0.43461065
Iteration 67, loss = 0.43687488
Iteration 68, loss = 0.43330744
Iteration 69, loss = 0.43313084
Iteration 70, loss = 0.43438012
Iteration 71, loss = 0.43402820
Iteration 72, loss = 0.43299617

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56092451
Iteration 2, loss = 0.49916281
Iteration 3, loss = 0.49317755
Iteration 4, loss = 0.48859872
Iteration 5, loss = 0.48511692
Iteration 6, loss = 0.48067799
Iteration 7, loss = 0.47866340
Iteration 8, loss = 0.47362159
Iteration 9, loss = 0.47204991
Iteration 10, loss = 0.46975880
Iteration 11, loss = 0.46790254
Iteration 12, loss = 0.46518484
Iteration 13, loss = 0.45994381
Iteration 14, loss = 0.45766996
Iteration 15, loss = 0.45433447
Iteration 16, loss = 0.45069607
Iteration 17, loss = 0.44764222
Iteration 18, loss = 0.44697781
Iteration 19, loss = 0.44804906
Iteration 20, loss = 0.44607609
Iteration 21, loss = 0.44959830
Iteration 22, loss = 0.44544574
Iteration 23, loss = 0.44601311
Iteration 24, loss = 0.44453952
Iteration 25, loss = 0.44675739
Iteration 26, loss = 0.44516804
Iteration 27, loss = 0.44507608
Iteration 28, loss = 0.44542599

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56301201
Iteration 2, loss = 0.49963806
Iteration 3, loss = 0.49410445
Iteration 4, loss = 0.48824957
Iteration 5, loss = 0.48393922
Iteration 6, loss = 0.48022734
Iteration 7, loss = 0.47847887
Iteration 8, loss = 0.47444833

Iteration 9, loss = 0.47216601
Iteration 10, loss = 0.46789536
Iteration 11, loss = 0.47010147
Iteration 12, loss = 0.46609876
Iteration 13, loss = 0.46109925
Iteration 14, loss = 0.45883218
Iteration 15, loss = 0.45588791
Iteration 16, loss = 0.45472392
Iteration 17, loss = 0.45346041
Iteration 18, loss = 0.45085095
Iteration 19, loss = 0.45139868
Iteration 20, loss = 0.45294624
Iteration 21, loss = 0.44908903
Iteration 22, loss = 0.45042684
Iteration 23, loss = 0.44799172
Iteration 24, loss = 0.44631914
Iteration 25, loss = 0.44784388
Iteration 26, loss = 0.44677282
Iteration 27, loss = 0.44805627
Iteration 28, loss = 0.44778026
Iteration 29, loss = 0.44742967
Iteration 30, loss = 0.44666826
Iteration 31, loss = 0.44401818
Iteration 32, loss = 0.44284577
Iteration 33, loss = 0.44445902
Iteration 34, loss = 0.44315914
Iteration 35, loss = 0.44260113
Iteration 36, loss = 0.44230989
Iteration 37, loss = 0.44444344
Iteration 38, loss = 0.44410991
Iteration 39, loss = 0.44254339
Iteration 40, loss = 0.44476992
Iteration 41, loss = 0.44502038
Iteration 42, loss = 0.44139501
Iteration 43, loss = 0.44344790
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56048934
Iteration 2, loss = 0.49840265
Iteration 3, loss = 0.49406716
Iteration 4, loss = 0.48942133
Iteration 5, loss = 0.48261066
Iteration 6, loss = 0.47822882
Iteration 7, loss = 0.47678760
Iteration 8, loss = 0.47273982
Iteration 9, loss = 0.47037836
Iteration 10, loss = 0.46617230
Iteration 11, loss = 0.46747295
Iteration 12, loss = 0.46383798
Iteration 13, loss = 0.46231962
Iteration 14, loss = 0.45790075
Iteration 15, loss = 0.45252707
Iteration 16, loss = 0.45023160
Iteration 17, loss = 0.44760054
Iteration 18, loss = 0.44215166
Iteration 19, loss = 0.44691653
Iteration 20, loss = 0.44425171

Iteration 21, loss = 0.44082818
Iteration 22, loss = 0.44652581
Iteration 23, loss = 0.43983487
Iteration 24, loss = 0.43938773
Iteration 25, loss = 0.44298094
Iteration 26, loss = 0.43943518
Iteration 27, loss = 0.44100238
Iteration 28, loss = 0.44029894
Iteration 29, loss = 0.43904773
Iteration 30, loss = 0.43899562
Iteration 31, loss = 0.43831856
Iteration 32, loss = 0.43717921
Iteration 33, loss = 0.43630011
Iteration 34, loss = 0.43626278
Iteration 35, loss = 0.43628865
Iteration 36, loss = 0.43609736
Iteration 37, loss = 0.43636661
Iteration 38, loss = 0.43849136
Iteration 39, loss = 0.43595555
Iteration 40, loss = 0.43564642
Iteration 41, loss = 0.43688448
Iteration 42, loss = 0.43772126
Iteration 43, loss = 0.43763333

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56137541
Iteration 2, loss = 0.49747507
Iteration 3, loss = 0.49397434
Iteration 4, loss = 0.48901644
Iteration 5, loss = 0.48428690
Iteration 6, loss = 0.47968178
Iteration 7, loss = 0.47562452
Iteration 8, loss = 0.47494343
Iteration 9, loss = 0.47260102
Iteration 10, loss = 0.47275970
Iteration 11, loss = 0.46924120
Iteration 12, loss = 0.47047832
Iteration 13, loss = 0.46803799
Iteration 14, loss = 0.46843640
Iteration 15, loss = 0.46546055
Iteration 16, loss = 0.46331033
Iteration 17, loss = 0.46347022
Iteration 18, loss = 0.46265944
Iteration 19, loss = 0.46092433
Iteration 20, loss = 0.46405247
Iteration 21, loss = 0.45966456
Iteration 22, loss = 0.45998174
Iteration 23, loss = 0.45844976
Iteration 24, loss = 0.45514301
Iteration 25, loss = 0.45521392
Iteration 26, loss = 0.45565151
Iteration 27, loss = 0.45235636
Iteration 28, loss = 0.45193443
Iteration 29, loss = 0.45214834
Iteration 30, loss = 0.45172920
Iteration 31, loss = 0.45250431
Iteration 32, loss = 0.45130628

Iteration 33, loss = 0.45010958
Iteration 34, loss = 0.44845792
Iteration 35, loss = 0.44804439
Iteration 36, loss = 0.44948368
Iteration 37, loss = 0.44705246
Iteration 38, loss = 0.44830867
Iteration 39, loss = 0.44776334
Iteration 40, loss = 0.44647499
Iteration 41, loss = 0.44729479
Iteration 42, loss = 0.44480817
Iteration 43, loss = 0.44613949
Iteration 44, loss = 0.44347566
Iteration 45, loss = 0.44547516
Iteration 46, loss = 0.44356359
Iteration 47, loss = 0.44105735
Iteration 48, loss = 0.44175271
Iteration 49, loss = 0.44266507
Iteration 50, loss = 0.44138872
Iteration 51, loss = 0.44032829
Iteration 52, loss = 0.43980105
Iteration 53, loss = 0.43884494
Iteration 54, loss = 0.43798912
Iteration 55, loss = 0.44106999
Iteration 56, loss = 0.43978821
Iteration 57, loss = 0.43888422
Iteration 58, loss = 0.43824047

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55768353
Iteration 2, loss = 0.49954701
Iteration 3, loss = 0.49196745
Iteration 4, loss = 0.48287704
Iteration 5, loss = 0.47566392
Iteration 6, loss = 0.47199541
Iteration 7, loss = 0.47000533
Iteration 8, loss = 0.46756740
Iteration 9, loss = 0.46563257
Iteration 10, loss = 0.46455297
Iteration 11, loss = 0.46410028
Iteration 12, loss = 0.46162815
Iteration 13, loss = 0.46141747
Iteration 14, loss = 0.45747243
Iteration 15, loss = 0.45827073
Iteration 16, loss = 0.45727048
Iteration 17, loss = 0.45795349
Iteration 18, loss = 0.45336096
Iteration 19, loss = 0.45260449
Iteration 20, loss = 0.45229427
Iteration 21, loss = 0.45045498
Iteration 22, loss = 0.44816742
Iteration 23, loss = 0.44605612
Iteration 24, loss = 0.44681224
Iteration 25, loss = 0.44560471
Iteration 26, loss = 0.44521520
Iteration 27, loss = 0.44562083
Iteration 28, loss = 0.44485347
Iteration 29, loss = 0.44520877

Iteration 30, loss = 0.44322138
Iteration 31, loss = 0.44395666
Iteration 32, loss = 0.44216490
Iteration 33, loss = 0.44331402
Iteration 34, loss = 0.44192046
Iteration 35, loss = 0.44042658
Iteration 36, loss = 0.43940744
Iteration 37, loss = 0.43926179
Iteration 38, loss = 0.43873581
Iteration 39, loss = 0.43853390
Iteration 40, loss = 0.43727099
Iteration 41, loss = 0.43831139
Iteration 42, loss = 0.43687087
Iteration 43, loss = 0.43521261
Iteration 44, loss = 0.43363566
Iteration 45, loss = 0.43252500
Iteration 46, loss = 0.43100538
Iteration 47, loss = 0.42628623
Iteration 48, loss = 0.42327704
Iteration 49, loss = 0.42000973
Iteration 50, loss = 0.41843425
Iteration 51, loss = 0.41500423
Iteration 52, loss = 0.41226795
Iteration 53, loss = 0.41025282
Iteration 54, loss = 0.40865493
Iteration 55, loss = 0.40815655
Iteration 56, loss = 0.40660540
Iteration 57, loss = 0.40534610
Iteration 58, loss = 0.40653956
Iteration 59, loss = 0.40521721
Iteration 60, loss = 0.40498342
Iteration 61, loss = 0.40385688
Iteration 62, loss = 0.40513823
Iteration 63, loss = 0.40251931
Iteration 64, loss = 0.40456209
Iteration 65, loss = 0.40358532
Iteration 66, loss = 0.40217893
Iteration 67, loss = 0.40172276
Iteration 68, loss = 0.40059292
Iteration 69, loss = 0.40137599
Iteration 70, loss = 0.39992542
Iteration 71, loss = 0.40089238
Iteration 72, loss = 0.40065432
Iteration 73, loss = 0.39860223
Iteration 74, loss = 0.40128369
Iteration 75, loss = 0.40026357
Iteration 76, loss = 0.40024576
Iteration 77, loss = 0.40087896
Iteration 78, loss = 0.39891874
Iteration 79, loss = 0.39898464
Iteration 80, loss = 0.39967169
Iteration 81, loss = 0.39974971
Iteration 82, loss = 0.39986355
Iteration 83, loss = 0.39778170
Iteration 84, loss = 0.39817124
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56738176
Iteration 2, loss = 0.50008807
Iteration 3, loss = 0.49442577
Iteration 4, loss = 0.48838117
Iteration 5, loss = 0.48171433
Iteration 6, loss = 0.47676761
Iteration 7, loss = 0.47091522
Iteration 8, loss = 0.46975480
Iteration 9, loss = 0.46879546
Iteration 10, loss = 0.46489964
Iteration 11, loss = 0.46471958
Iteration 12, loss = 0.46120603
Iteration 13, loss = 0.46241227
Iteration 14, loss = 0.45969051
Iteration 15, loss = 0.45573229
Iteration 16, loss = 0.45614874
Iteration 17, loss = 0.45289605
Iteration 18, loss = 0.45248058
Iteration 19, loss = 0.45297548
Iteration 20, loss = 0.45316463
Iteration 21, loss = 0.45176424
Iteration 22, loss = 0.45044788
Iteration 23, loss = 0.44837612
Iteration 24, loss = 0.44863570
Iteration 25, loss = 0.44855675
Iteration 26, loss = 0.44633902
Iteration 27, loss = 0.44695038
Iteration 28, loss = 0.44709698
Iteration 29, loss = 0.44711663
Iteration 30, loss = 0.44409584
Iteration 31, loss = 0.44477597
Iteration 32, loss = 0.44276431
Iteration 33, loss = 0.44368395
Iteration 34, loss = 0.44211485
Iteration 35, loss = 0.44120891
Iteration 36, loss = 0.44002665
Iteration 37, loss = 0.43982748
Iteration 38, loss = 0.44117873
Iteration 39, loss = 0.44169976
Iteration 40, loss = 0.44100143
Iteration 41, loss = 0.44012495
Iteration 42, loss = 0.43938742
Iteration 43, loss = 0.43996213
Iteration 44, loss = 0.43897225
Iteration 45, loss = 0.43826034
Iteration 46, loss = 0.43788794
Iteration 47, loss = 0.43673589
Iteration 48, loss = 0.43763514
Iteration 49, loss = 0.43729043
Iteration 50, loss = 0.43877489
Iteration 51, loss = 0.43716203
Iteration 52, loss = 0.43679325
Iteration 53, loss = 0.43685109
Iteration 54, loss = 0.43685170
Iteration 55, loss = 0.43603302
Iteration 56, loss = 0.43628959
Iteration 57, loss = 0.43567148

Iteration 58, loss = 0.43388647
Iteration 59, loss = 0.43450359
Iteration 60, loss = 0.43476491
Iteration 61, loss = 0.43395285
Iteration 62, loss = 0.43364070
Iteration 63, loss = 0.43436531
Iteration 64, loss = 0.43425428
Iteration 65, loss = 0.43358450
Iteration 66, loss = 0.43122240
Iteration 67, loss = 0.43495474
Iteration 68, loss = 0.43158986
Iteration 69, loss = 0.43128261
Iteration 70, loss = 0.43138613
Iteration 71, loss = 0.42994426
Iteration 72, loss = 0.42977426
Iteration 73, loss = 0.42773789
Iteration 74, loss = 0.43128451
Iteration 75, loss = 0.42949515
Iteration 76, loss = 0.42765227
Iteration 77, loss = 0.42938335
Iteration 78, loss = 0.42832368
Iteration 79, loss = 0.42975665
Iteration 80, loss = 0.42498153
Iteration 81, loss = 0.42652193
Iteration 82, loss = 0.42454206
Iteration 83, loss = 0.42433195
Iteration 84, loss = 0.42345048
Iteration 85, loss = 0.42218443
Iteration 86, loss = 0.42219228
Iteration 87, loss = 0.42113002
Iteration 88, loss = 0.41904255
Iteration 89, loss = 0.41958375
Iteration 90, loss = 0.41743785
Iteration 91, loss = 0.41545489
Iteration 92, loss = 0.41803547
Iteration 93, loss = 0.41357225
Iteration 94, loss = 0.41496371
Iteration 95, loss = 0.41232597
Iteration 96, loss = 0.41341727
Iteration 97, loss = 0.41160221
Iteration 98, loss = 0.41165746
Iteration 99, loss = 0.41041601
Iteration 100, loss = 0.40906446
Iteration 101, loss = 0.40823007
Iteration 102, loss = 0.40612510
Iteration 103, loss = 0.40910086
Iteration 104, loss = 0.40774066
Iteration 105, loss = 0.40710896
Iteration 106, loss = 0.41053329
Iteration 107, loss = 0.40388373
Iteration 108, loss = 0.40702164
Iteration 109, loss = 0.40288682
Iteration 110, loss = 0.40601630
Iteration 111, loss = 0.40150495
Iteration 112, loss = 0.40184810
Iteration 113, loss = 0.39980369
Iteration 114, loss = 0.39789565

Iteration 115, loss = 0.40086334
Iteration 116, loss = 0.40083646
Iteration 117, loss = 0.40213656
Iteration 118, loss = 0.39932663
Iteration 119, loss = 0.39989081
Iteration 120, loss = 0.39822904
Iteration 121, loss = 0.40002245
Iteration 122, loss = 0.39829098
Iteration 123, loss = 0.39599924
Iteration 124, loss = 0.39775545
Iteration 125, loss = 0.39748864
Iteration 126, loss = 0.39825731
Iteration 127, loss = 0.39748074
Iteration 128, loss = 0.39619406
Iteration 129, loss = 0.39757696
Iteration 130, loss = 0.39585883
Iteration 131, loss = 0.39599111
Iteration 132, loss = 0.39791012
Iteration 133, loss = 0.39616123
Iteration 134, loss = 0.39808106

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.57057304
Iteration 2, loss = 0.50320632
Iteration 3, loss = 0.49640566
Iteration 4, loss = 0.48973670
Iteration 5, loss = 0.48081440
Iteration 6, loss = 0.47773739
Iteration 7, loss = 0.47229943
Iteration 8, loss = 0.47174412
Iteration 9, loss = 0.46878525
Iteration 10, loss = 0.46731229
Iteration 11, loss = 0.46596125
Iteration 12, loss = 0.46242350
Iteration 13, loss = 0.46723629
Iteration 14, loss = 0.46144254
Iteration 15, loss = 0.45865626
Iteration 16, loss = 0.45708876
Iteration 17, loss = 0.45623646
Iteration 18, loss = 0.45632469
Iteration 19, loss = 0.45471932
Iteration 20, loss = 0.45474231
Iteration 21, loss = 0.45223620
Iteration 22, loss = 0.45101986
Iteration 23, loss = 0.44769177
Iteration 24, loss = 0.44816372
Iteration 25, loss = 0.44855093
Iteration 26, loss = 0.44667932
Iteration 27, loss = 0.44690006
Iteration 28, loss = 0.44680095
Iteration 29, loss = 0.44555479
Iteration 30, loss = 0.44388346
Iteration 31, loss = 0.44456531
Iteration 32, loss = 0.44293082
Iteration 33, loss = 0.44579527
Iteration 34, loss = 0.44243026
Iteration 35, loss = 0.44327216

Iteration 36, loss = 0.44231406
Iteration 37, loss = 0.44191451
Iteration 38, loss = 0.44141274
Iteration 39, loss = 0.44216022
Iteration 40, loss = 0.44371317
Iteration 41, loss = 0.44079807
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.57237046
Iteration 2, loss = 0.50286872
Iteration 3, loss = 0.49424496
Iteration 4, loss = 0.48544894
Iteration 5, loss = 0.47881518
Iteration 6, loss = 0.47416540
Iteration 7, loss = 0.47141775
Iteration 8, loss = 0.47029294
Iteration 9, loss = 0.46835386
Iteration 10, loss = 0.46632002
Iteration 11, loss = 0.46379302
Iteration 12, loss = 0.46361742
Iteration 13, loss = 0.46456868
Iteration 14, loss = 0.46456363
Iteration 15, loss = 0.46127559
Iteration 16, loss = 0.46222130
Iteration 17, loss = 0.45991080
Iteration 18, loss = 0.45832279
Iteration 19, loss = 0.45644455
Iteration 20, loss = 0.45526246
Iteration 21, loss = 0.45639341
Iteration 22, loss = 0.45371963
Iteration 23, loss = 0.45106799
Iteration 24, loss = 0.45073315
Iteration 25, loss = 0.45013433
Iteration 26, loss = 0.44820938
Iteration 27, loss = 0.44886928
Iteration 28, loss = 0.44989656
Iteration 29, loss = 0.44752711
Iteration 30, loss = 0.44837712
Iteration 31, loss = 0.44748879
Iteration 32, loss = 0.44545561
Iteration 33, loss = 0.44927209
Iteration 34, loss = 0.44410131
Iteration 35, loss = 0.44476858
Iteration 36, loss = 0.44518788
Iteration 37, loss = 0.44460844
Iteration 38, loss = 0.44244230
Iteration 39, loss = 0.44371783
Iteration 40, loss = 0.44586358
Iteration 41, loss = 0.44385236
Iteration 42, loss = 0.44180305
Iteration 43, loss = 0.44414710
Iteration 44, loss = 0.44134083
Iteration 45, loss = 0.44166750
Iteration 46, loss = 0.43972217
Iteration 47, loss = 0.44169122
Iteration 48, loss = 0.44154116
Iteration 49, loss = 0.44203673

Iteration 50, loss = 0.44136458
Iteration 51, loss = 0.44026495
Iteration 52, loss = 0.44002552
Iteration 53, loss = 0.44042184
Iteration 54, loss = 0.43805852
Iteration 55, loss = 0.43857591
Iteration 56, loss = 0.43998324
Iteration 57, loss = 0.43892017
Iteration 58, loss = 0.43974440
Iteration 59, loss = 0.43998290
Iteration 60, loss = 0.43875503
Iteration 61, loss = 0.43816383
Iteration 62, loss = 0.43757043
Iteration 63, loss = 0.43734237
Iteration 64, loss = 0.43709698
Iteration 65, loss = 0.43906080
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.57267398
Iteration 2, loss = 0.50217541
Iteration 3, loss = 0.49220302
Iteration 4, loss = 0.48392318
Iteration 5, loss = 0.47441832
Iteration 6, loss = 0.47016654
Iteration 7, loss = 0.46866291
Iteration 8, loss = 0.46714513
Iteration 9, loss = 0.46316601
Iteration 10, loss = 0.46216622
Iteration 11, loss = 0.45801618
Iteration 12, loss = 0.45694382
Iteration 13, loss = 0.45769400
Iteration 14, loss = 0.45415798
Iteration 15, loss = 0.45214513
Iteration 16, loss = 0.45242239
Iteration 17, loss = 0.45067494
Iteration 18, loss = 0.44874799
Iteration 19, loss = 0.44830377
Iteration 20, loss = 0.44778693
Iteration 21, loss = 0.44707766
Iteration 22, loss = 0.44454230
Iteration 23, loss = 0.44175754
Iteration 24, loss = 0.44127822
Iteration 25, loss = 0.44142007
Iteration 26, loss = 0.43983101
Iteration 27, loss = 0.44054333
Iteration 28, loss = 0.43945970
Iteration 29, loss = 0.43748254
Iteration 30, loss = 0.43789238
Iteration 31, loss = 0.43629830
Iteration 32, loss = 0.43619743
Iteration 33, loss = 0.43639246
Iteration 34, loss = 0.43691729
Iteration 35, loss = 0.43476858
Iteration 36, loss = 0.43645365
Iteration 37, loss = 0.43619672
Iteration 38, loss = 0.43512325
Iteration 39, loss = 0.43446307

Iteration 40, loss = 0.43514698
Iteration 41, loss = 0.43428168
Iteration 42, loss = 0.43324266
Iteration 43, loss = 0.43328807
Iteration 44, loss = 0.43597713
Iteration 45, loss = 0.43390942
Iteration 46, loss = 0.43151393
Iteration 47, loss = 0.43179593
Iteration 48, loss = 0.43379151
Iteration 49, loss = 0.43453421
Iteration 50, loss = 0.43180956
Iteration 51, loss = 0.43248218
Iteration 52, loss = 0.43315635
Iteration 53, loss = 0.43099714
Iteration 54, loss = 0.42941967
Iteration 55, loss = 0.43093836
Iteration 56, loss = 0.43099775
Iteration 57, loss = 0.42977442
Iteration 58, loss = 0.42810848
Iteration 59, loss = 0.43082363
Iteration 60, loss = 0.42875433
Iteration 61, loss = 0.42915057
Iteration 62, loss = 0.42805061
Iteration 63, loss = 0.42839892
Iteration 64, loss = 0.42770307
Iteration 65, loss = 0.42738366
Iteration 66, loss = 0.42595976
Iteration 67, loss = 0.42638152
Iteration 68, loss = 0.42633105
Iteration 69, loss = 0.42656116
Iteration 70, loss = 0.42796300
Iteration 71, loss = 0.42594929
Iteration 72, loss = 0.42452866
Iteration 73, loss = 0.42487139
Iteration 74, loss = 0.42627561
Iteration 75, loss = 0.42219711
Iteration 76, loss = 0.42376300
Iteration 77, loss = 0.42352205
Iteration 78, loss = 0.42264973
Iteration 79, loss = 0.42447027
Iteration 80, loss = 0.42067219
Iteration 81, loss = 0.42288033
Iteration 82, loss = 0.41944877
Iteration 83, loss = 0.42077646
Iteration 84, loss = 0.41983427
Iteration 85, loss = 0.42013646
Iteration 86, loss = 0.41600274
Iteration 87, loss = 0.41546895
Iteration 88, loss = 0.41400771
Iteration 89, loss = 0.41648981
Iteration 90, loss = 0.41326103
Iteration 91, loss = 0.41364355
Iteration 92, loss = 0.41358456
Iteration 93, loss = 0.41267663
Iteration 94, loss = 0.41176220
Iteration 95, loss = 0.41087852
Iteration 96, loss = 0.40953590

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Iteration 97, loss = 0.41074291
Iteration 98, loss = 0.41069068
Iteration 99, loss = 0.40835298
Iteration 100, loss = 0.41049010
Iteration 101, loss = 0.40983593
Iteration 102, loss = 0.40868737
Iteration 103, loss = 0.40692665
Iteration 104, loss = 0.40748266
Iteration 105, loss = 0.40703182
Iteration 106, loss = 0.40868093
Iteration 107, loss = 0.40895892
Iteration 108, loss = 0.40830393
Iteration 109, loss = 0.40720040
Iteration 110, loss = 0.40842091
Iteration 111, loss = 0.40775346
Iteration 112, loss = 0.40714736
Iteration 113, loss = 0.40826369
Iteration 114, loss = 0.40546736
Iteration 115, loss = 0.40750394
Iteration 116, loss = 0.40694085
Iteration 117, loss = 0.40493719
Iteration 118, loss = 0.40215800
Iteration 119, loss = 0.40761689
Iteration 120, loss = 0.40459958
Iteration 121, loss = 0.40588982
Iteration 122, loss = 0.40728282
Iteration 123, loss = 0.40305794
Iteration 124, loss = 0.40291022
Iteration 125, loss = 0.40488991
Iteration 126, loss = 0.40330032
Iteration 127, loss = 0.40270222
Iteration 128, loss = 0.40346221
Iteration 129, loss = 0.40148995
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.57129624
Iteration 2, loss = 0.50320990
Iteration 3, loss = 0.49426300
Iteration 4, loss = 0.48798212
Iteration 5, loss = 0.48429751
Iteration 6, loss = 0.47773290
Iteration 7, loss = 0.47668505
Iteration 8, loss = 0.47262897
Iteration 9, loss = 0.47046791
Iteration 10, loss = 0.46647189
Iteration 11, loss = 0.46598621
Iteration 12, loss = 0.46266285
Iteration 13, loss = 0.46026615
Iteration 14, loss = 0.45952742
Iteration 15, loss = 0.45726164
Iteration 16, loss = 0.45753330
Iteration 17, loss = 0.45407771
Iteration 18, loss = 0.45554804
Iteration 19, loss = 0.45235586
Iteration 20, loss = 0.45168422
Iteration 21, loss = 0.45044213
Iteration 22, loss = 0.44870071
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Iteration 23, loss = 0.44958949
Iteration 24, loss = 0.44843973
Iteration 25, loss = 0.45207245
Iteration 26, loss = 0.44920980
Iteration 27, loss = 0.44819682
Iteration 28, loss = 0.44835282
Iteration 29, loss = 0.44670708
Iteration 30, loss = 0.44649855
Iteration 31, loss = 0.44980518
Iteration 32, loss = 0.44663135
Iteration 33, loss = 0.44650999
Iteration 34, loss = 0.44640402
Iteration 35, loss = 0.44744444
Iteration 36, loss = 0.44843968
Iteration 37, loss = 0.44693485
Iteration 38, loss = 0.44495287
Iteration 39, loss = 0.44575166
Iteration 40, loss = 0.44461453
Iteration 41, loss = 0.44566847
Iteration 42, loss = 0.44533050
Iteration 43, loss = 0.44524781
Iteration 44, loss = 0.44340887
Iteration 45, loss = 0.44462370
Iteration 46, loss = 0.44436094
Iteration 47, loss = 0.44498775
Iteration 48, loss = 0.44366799
Iteration 49, loss = 0.44317230
Iteration 50, loss = 0.44301005
Iteration 51, loss = 0.44566012
Iteration 52, loss = 0.44166915
Iteration 53, loss = 0.44296630
Iteration 54, loss = 0.44259535
Iteration 55, loss = 0.44203744
Iteration 56, loss = 0.44298368
Iteration 57, loss = 0.44279429
Iteration 58, loss = 0.43953704
Iteration 59, loss = 0.44054701
Iteration 60, loss = 0.44230410
Iteration 61, loss = 0.44301941
Iteration 62, loss = 0.44213169
Iteration 63, loss = 0.44050752
Iteration 64, loss = 0.43991556
Iteration 65, loss = 0.44111888
Iteration 66, loss = 0.44010911
Iteration 67, loss = 0.44100452
Iteration 68, loss = 0.44013849
Iteration 69, loss = 0.44193678
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56689246
Iteration 2, loss = 0.49164892
Iteration 3, loss = 0.48430592
Iteration 4, loss = 0.47716634
Iteration 5, loss = 0.47232250
Iteration 6, loss = 0.46926750
Iteration 7, loss = 0.46528188
Iteration 8, loss = 0.46364401
```


Iteration 9, loss = 0.46113567
Iteration 10, loss = 0.45932646
Iteration 11, loss = 0.45857022
Iteration 12, loss = 0.45712861
Iteration 13, loss = 0.45687689
Iteration 14, loss = 0.45613506
Iteration 15, loss = 0.45589938
Iteration 16, loss = 0.45632192
Iteration 17, loss = 0.45415779
Iteration 18, loss = 0.45317570
Iteration 19, loss = 0.45239789
Iteration 20, loss = 0.45281348
Iteration 21, loss = 0.45192800
Iteration 22, loss = 0.45133235
Iteration 23, loss = 0.44928538
Iteration 24, loss = 0.44931580
Iteration 25, loss = 0.44893845
Iteration 26, loss = 0.44793947
Iteration 27, loss = 0.44625918
Iteration 28, loss = 0.44684017
Iteration 29, loss = 0.44653881
Iteration 30, loss = 0.44568642
Iteration 31, loss = 0.44474245
Iteration 32, loss = 0.44477483
Iteration 33, loss = 0.44390010
Iteration 34, loss = 0.44432733
Iteration 35, loss = 0.44329335
Iteration 36, loss = 0.44296231
Iteration 37, loss = 0.44256905
Iteration 38, loss = 0.44234700

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.57907624
Iteration 2, loss = 0.49192848
Iteration 3, loss = 0.48558278
Iteration 4, loss = 0.47797274
Iteration 5, loss = 0.47380991
Iteration 6, loss = 0.46912891
Iteration 7, loss = 0.46635726
Iteration 8, loss = 0.46418811
Iteration 9, loss = 0.46330544
Iteration 10, loss = 0.46120835
Iteration 11, loss = 0.46118443
Iteration 12, loss = 0.45719239
Iteration 13, loss = 0.45700646
Iteration 14, loss = 0.45388320
Iteration 15, loss = 0.45491699
Iteration 16, loss = 0.45516128
Iteration 17, loss = 0.45421832
Iteration 18, loss = 0.45370330
Iteration 19, loss = 0.45101977
Iteration 20, loss = 0.45328351
Iteration 21, loss = 0.45210469
Iteration 22, loss = 0.45451470
Iteration 23, loss = 0.45178953
Iteration 24, loss = 0.45053964
Iteration 25, loss = 0.44915444

Iteration 26, loss = 0.44799773
Iteration 27, loss = 0.44915397
Iteration 28, loss = 0.44831921
Iteration 29, loss = 0.44871474
Iteration 30, loss = 0.44709717
Iteration 31, loss = 0.44657323
Iteration 32, loss = 0.44790173
Iteration 33, loss = 0.44496025
Iteration 34, loss = 0.44396739
Iteration 35, loss = 0.44375135
Iteration 36, loss = 0.44286367
Iteration 37, loss = 0.44051325
Iteration 38, loss = 0.44091743
Iteration 39, loss = 0.43876666
Iteration 40, loss = 0.43813877
Iteration 41, loss = 0.43544386
Iteration 42, loss = 0.43443877
Iteration 43, loss = 0.43558097
Iteration 44, loss = 0.43187083
Iteration 45, loss = 0.42982940
Iteration 46, loss = 0.43113768
Iteration 47, loss = 0.42996072
Iteration 48, loss = 0.43100940
Iteration 49, loss = 0.42615020
Iteration 50, loss = 0.42725105
Iteration 51, loss = 0.42845925
Iteration 52, loss = 0.42419807
Iteration 53, loss = 0.42295739
Iteration 54, loss = 0.42228374
Iteration 55, loss = 0.42135072
Iteration 56, loss = 0.42126331
Iteration 57, loss = 0.41918533
Iteration 58, loss = 0.41939412
Iteration 59, loss = 0.41776699
Iteration 60, loss = 0.41686245
Iteration 61, loss = 0.41699528
Iteration 62, loss = 0.41629509
Iteration 63, loss = 0.41344540
Iteration 64, loss = 0.41983396
Iteration 65, loss = 0.41363789
Iteration 66, loss = 0.41174687
Iteration 67, loss = 0.41301224
Iteration 68, loss = 0.41196315
Iteration 69, loss = 0.41585681
Iteration 70, loss = 0.41029429
Iteration 71, loss = 0.41148780
Iteration 72, loss = 0.41315814
Iteration 73, loss = 0.41344354
Iteration 74, loss = 0.41341563
Iteration 75, loss = 0.41363303
Iteration 76, loss = 0.41020858
Iteration 77, loss = 0.40849479
Iteration 78, loss = 0.41221037
Iteration 79, loss = 0.41163342
Iteration 80, loss = 0.41072684
Iteration 81, loss = 0.41190042
Iteration 82, loss = 0.40957432

Iteration 83, loss = 0.40868764
Iteration 84, loss = 0.40903502
Iteration 85, loss = 0.41239183
Iteration 86, loss = 0.41403656
Iteration 87, loss = 0.40825996
Iteration 88, loss = 0.41429728
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.58287976
Iteration 2, loss = 0.49680874
Iteration 3, loss = 0.49021407
Iteration 4, loss = 0.48282055
Iteration 5, loss = 0.47788928
Iteration 6, loss = 0.47233428
Iteration 7, loss = 0.46905924
Iteration 8, loss = 0.46535372
Iteration 9, loss = 0.46358555
Iteration 10, loss = 0.46134045
Iteration 11, loss = 0.46240381
Iteration 12, loss = 0.45801203
Iteration 13, loss = 0.45729017
Iteration 14, loss = 0.45569835
Iteration 15, loss = 0.45396735
Iteration 16, loss = 0.45340928
Iteration 17, loss = 0.45235226
Iteration 18, loss = 0.45050146
Iteration 19, loss = 0.44828179
Iteration 20, loss = 0.44849719
Iteration 21, loss = 0.44611411
Iteration 22, loss = 0.44674249
Iteration 23, loss = 0.44318913
Iteration 24, loss = 0.44453628
Iteration 25, loss = 0.44287721
Iteration 26, loss = 0.44188040
Iteration 27, loss = 0.44195596
Iteration 28, loss = 0.44024665
Iteration 29, loss = 0.44109266
Iteration 30, loss = 0.44097241
Iteration 31, loss = 0.43901378
Iteration 32, loss = 0.43916464
Iteration 33, loss = 0.43829138
Iteration 34, loss = 0.43847342
Iteration 35, loss = 0.43788901
Iteration 36, loss = 0.43767924
Iteration 37, loss = 0.43593664
Iteration 38, loss = 0.43519316
Iteration 39, loss = 0.43602702
Iteration 40, loss = 0.43730307
Iteration 41, loss = 0.43438529
Iteration 42, loss = 0.43479342
Iteration 43, loss = 0.43756184
Iteration 44, loss = 0.43490063
Iteration 45, loss = 0.43456654
Iteration 46, loss = 0.43558368
Iteration 47, loss = 0.43224558
Iteration 48, loss = 0.43354974
Iteration 49, loss = 0.43348727

```
Iteration 50, loss = 0.43429644
Iteration 51, loss = 0.43403932
Iteration 52, loss = 0.43352267
Iteration 53, loss = 0.43148346
Iteration 54, loss = 0.43226848
Iteration 55, loss = 0.43353163
Iteration 56, loss = 0.43273868
Iteration 57, loss = 0.43194794
Iteration 58, loss = 0.43188681
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.58302834
Iteration 2, loss = 0.49476454
Iteration 3, loss = 0.48818511
Iteration 4, loss = 0.48275941
Iteration 5, loss = 0.47889331
Iteration 6, loss = 0.47291542
Iteration 7, loss = 0.47078219
Iteration 8, loss = 0.46863220
Iteration 9, loss = 0.46741343
Iteration 10, loss = 0.46405286
Iteration 11, loss = 0.46407888
Iteration 12, loss = 0.46246873
Iteration 13, loss = 0.46168504
Iteration 14, loss = 0.45936931
Iteration 15, loss = 0.45714227
Iteration 16, loss = 0.45732153
Iteration 17, loss = 0.45662092
Iteration 18, loss = 0.45815702
Iteration 19, loss = 0.45415769
Iteration 20, loss = 0.45532126
Iteration 21, loss = 0.45315456
Iteration 22, loss = 0.45456874
Iteration 23, loss = 0.45060519
Iteration 24, loss = 0.44980109
Iteration 25, loss = 0.45140820
Iteration 26, loss = 0.44854423
Iteration 27, loss = 0.45002444
Iteration 28, loss = 0.44992711
Iteration 29, loss = 0.44877593
Iteration 30, loss = 0.44995610
Iteration 31, loss = 0.44719722
Iteration 32, loss = 0.44736271
Iteration 33, loss = 0.44746871
Iteration 34, loss = 0.44713013
Iteration 35, loss = 0.44735461
Iteration 36, loss = 0.44723273
Iteration 37, loss = 0.44591757
Iteration 38, loss = 0.44605889
Iteration 39, loss = 0.44646694
Iteration 40, loss = 0.44634867
Iteration 41, loss = 0.44445760
Iteration 42, loss = 0.44404089
Iteration 43, loss = 0.44617621
Iteration 44, loss = 0.44516289
Iteration 45, loss = 0.44443406
Iteration 46, loss = 0.44531198
```

Iteration 47, loss = 0.44350413
Iteration 48, loss = 0.44457271
Iteration 49, loss = 0.44277605
Iteration 50, loss = 0.44363126
Iteration 51, loss = 0.44570256
Iteration 52, loss = 0.44353751
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.58413469
Iteration 2, loss = 0.49143164
Iteration 3, loss = 0.48427597
Iteration 4, loss = 0.47565068
Iteration 5, loss = 0.47140565
Iteration 6, loss = 0.46672681
Iteration 7, loss = 0.46475007
Iteration 8, loss = 0.46348939
Iteration 9, loss = 0.46198081
Iteration 10, loss = 0.45855918
Iteration 11, loss = 0.45734545
Iteration 12, loss = 0.45546137
Iteration 13, loss = 0.45215813
Iteration 14, loss = 0.45265617
Iteration 15, loss = 0.44894611
Iteration 16, loss = 0.44862700
Iteration 17, loss = 0.44735017
Iteration 18, loss = 0.45096250
Iteration 19, loss = 0.44593537
Iteration 20, loss = 0.44826210
Iteration 21, loss = 0.44424612
Iteration 22, loss = 0.44568857
Iteration 23, loss = 0.44369511
Iteration 24, loss = 0.44262695
Iteration 25, loss = 0.44294146
Iteration 26, loss = 0.44129265
Iteration 27, loss = 0.44165680
Iteration 28, loss = 0.44277679
Iteration 29, loss = 0.43987502
Iteration 30, loss = 0.44000498
Iteration 31, loss = 0.43770605
Iteration 32, loss = 0.43896682
Iteration 33, loss = 0.43903505
Iteration 34, loss = 0.43905339
Iteration 35, loss = 0.43792949
Iteration 36, loss = 0.43799312
Iteration 37, loss = 0.43978318
Iteration 38, loss = 0.43646791
Iteration 39, loss = 0.43725120
Iteration 40, loss = 0.43681237
Iteration 41, loss = 0.43498414
Iteration 42, loss = 0.43718732
Iteration 43, loss = 0.43688344
Iteration 44, loss = 0.43661295
Iteration 45, loss = 0.43742356
Iteration 46, loss = 0.43688909
Iteration 47, loss = 0.43538666
Iteration 48, loss = 0.43627091
Iteration 49, loss = 0.43516698

```
Iteration 50, loss = 0.43504409
Iteration 51, loss = 0.43702182
Iteration 52, loss = 0.43631809
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.58164618
Iteration 2, loss = 0.49357943
Iteration 3, loss = 0.48726410
Iteration 4, loss = 0.48197519
Iteration 5, loss = 0.47724897
Iteration 6, loss = 0.47227242
Iteration 7, loss = 0.47101014
Iteration 8, loss = 0.46704412
Iteration 9, loss = 0.46606378
Iteration 10, loss = 0.46456222
Iteration 11, loss = 0.46437630
Iteration 12, loss = 0.45982817
Iteration 13, loss = 0.45913088
Iteration 14, loss = 0.45814170
Iteration 15, loss = 0.45668970
Iteration 16, loss = 0.45748551
Iteration 17, loss = 0.45713355
Iteration 18, loss = 0.45616893
Iteration 19, loss = 0.45563724
Iteration 20, loss = 0.45430207
Iteration 21, loss = 0.45382985
Iteration 22, loss = 0.45378331
Iteration 23, loss = 0.45235376
Iteration 24, loss = 0.44885685
Iteration 25, loss = 0.45074619
Iteration 26, loss = 0.45045839
Iteration 27, loss = 0.44783094
Iteration 28, loss = 0.44802774
Iteration 29, loss = 0.44664973
Iteration 30, loss = 0.44636957
Iteration 31, loss = 0.44455957
Iteration 32, loss = 0.44395512
Iteration 33, loss = 0.44280367
Iteration 34, loss = 0.44165746
Iteration 35, loss = 0.44181779
Iteration 36, loss = 0.44137833
Iteration 37, loss = 0.44065577
Iteration 38, loss = 0.43834017
Iteration 39, loss = 0.43755474
Iteration 40, loss = 0.43960814
Iteration 41, loss = 0.43763606
Iteration 42, loss = 0.43712792
Iteration 43, loss = 0.43761440
Iteration 44, loss = 0.43662461
Iteration 45, loss = 0.43570680
Iteration 46, loss = 0.43603991
Iteration 47, loss = 0.43557943
Iteration 48, loss = 0.43503472
Iteration 49, loss = 0.43589747
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54645072
```

Iteration 2, loss = 0.48349676
Iteration 3, loss = 0.47424096
Iteration 4, loss = 0.46908157
Iteration 5, loss = 0.46423612
Iteration 6, loss = 0.46003997
Iteration 7, loss = 0.45596021
Iteration 8, loss = 0.45296536
Iteration 9, loss = 0.45016632
Iteration 10, loss = 0.44716687
Iteration 11, loss = 0.44593014
Iteration 12, loss = 0.44496642
Iteration 13, loss = 0.44369693
Iteration 14, loss = 0.44395073
Iteration 15, loss = 0.44295758
Iteration 16, loss = 0.44279968
Iteration 17, loss = 0.44277490
Iteration 18, loss = 0.44108713
Iteration 19, loss = 0.44297509
Iteration 20, loss = 0.44127487
Iteration 21, loss = 0.44027373
Iteration 22, loss = 0.44139192
Iteration 23, loss = 0.44089470
Iteration 24, loss = 0.44062955
Iteration 25, loss = 0.43867471
Iteration 26, loss = 0.43919742
Iteration 27, loss = 0.43963011
Iteration 28, loss = 0.43890318
Iteration 29, loss = 0.43939615
Iteration 30, loss = 0.43866529
Iteration 31, loss = 0.43967897
Iteration 32, loss = 0.43831464
Iteration 33, loss = 0.43835655
Iteration 34, loss = 0.43927753
Iteration 35, loss = 0.43923701
Iteration 36, loss = 0.43830061

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55480903
Iteration 2, loss = 0.48800117
Iteration 3, loss = 0.47734481
Iteration 4, loss = 0.47089516
Iteration 5, loss = 0.46683531
Iteration 6, loss = 0.46482039
Iteration 7, loss = 0.46120973
Iteration 8, loss = 0.45751869
Iteration 9, loss = 0.45439526
Iteration 10, loss = 0.45375221
Iteration 11, loss = 0.45156059
Iteration 12, loss = 0.44912468
Iteration 13, loss = 0.44706973
Iteration 14, loss = 0.44657485
Iteration 15, loss = 0.44545049
Iteration 16, loss = 0.44257352
Iteration 17, loss = 0.44135747
Iteration 18, loss = 0.44083520
Iteration 19, loss = 0.44304409
Iteration 20, loss = 0.44087247

Iteration 21, loss = 0.44105837
Iteration 22, loss = 0.43947115
Iteration 23, loss = 0.43893518
Iteration 24, loss = 0.43853298
Iteration 25, loss = 0.43717292
Iteration 26, loss = 0.43766621
Iteration 27, loss = 0.43857958
Iteration 28, loss = 0.43692993
Iteration 29, loss = 0.43802837
Iteration 30, loss = 0.43606657
Iteration 31, loss = 0.43662423
Iteration 32, loss = 0.43577480
Iteration 33, loss = 0.43547229
Iteration 34, loss = 0.43611996
Iteration 35, loss = 0.43773178
Iteration 36, loss = 0.43610386

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55873554
Iteration 2, loss = 0.48872934
Iteration 3, loss = 0.47861803
Iteration 4, loss = 0.47395334
Iteration 5, loss = 0.46790351
Iteration 6, loss = 0.46519378
Iteration 7, loss = 0.46101708
Iteration 8, loss = 0.45785960
Iteration 9, loss = 0.45474373
Iteration 10, loss = 0.45239690
Iteration 11, loss = 0.44987496
Iteration 12, loss = 0.44751663
Iteration 13, loss = 0.44555751
Iteration 14, loss = 0.44628312
Iteration 15, loss = 0.44567999
Iteration 16, loss = 0.44421661
Iteration 17, loss = 0.44358321
Iteration 18, loss = 0.44313362
Iteration 19, loss = 0.44405717
Iteration 20, loss = 0.44318370
Iteration 21, loss = 0.44261560
Iteration 22, loss = 0.44117196
Iteration 23, loss = 0.44159835
Iteration 24, loss = 0.44072968
Iteration 25, loss = 0.44079443
Iteration 26, loss = 0.44177979
Iteration 27, loss = 0.44058886
Iteration 28, loss = 0.44048502
Iteration 29, loss = 0.44224144
Iteration 30, loss = 0.44136989
Iteration 31, loss = 0.44097675
Iteration 32, loss = 0.43955762
Iteration 33, loss = 0.43956754

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55822261
Iteration 2, loss = 0.49068140
Iteration 3, loss = 0.47971312
Iteration 4, loss = 0.47391931

Iteration 5, loss = 0.46815659
Iteration 6, loss = 0.46509038
Iteration 7, loss = 0.46367110
Iteration 8, loss = 0.46009868
Iteration 9, loss = 0.45760217
Iteration 10, loss = 0.45661609
Iteration 11, loss = 0.45408988
Iteration 12, loss = 0.45201590
Iteration 13, loss = 0.45084981
Iteration 14, loss = 0.44953895
Iteration 15, loss = 0.44866172
Iteration 16, loss = 0.44790054
Iteration 17, loss = 0.44786802
Iteration 18, loss = 0.44574485
Iteration 19, loss = 0.44756698
Iteration 20, loss = 0.44757841
Iteration 21, loss = 0.44593482
Iteration 22, loss = 0.44388678
Iteration 23, loss = 0.44375870
Iteration 24, loss = 0.44457975
Iteration 25, loss = 0.44340676
Iteration 26, loss = 0.44427489
Iteration 27, loss = 0.44307621
Iteration 28, loss = 0.44316042
Iteration 29, loss = 0.44310616
Iteration 30, loss = 0.44408281
Iteration 31, loss = 0.44336638
Iteration 32, loss = 0.44235541
Iteration 33, loss = 0.44204096

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55715032
Iteration 2, loss = 0.48530894
Iteration 3, loss = 0.47427389
Iteration 4, loss = 0.46775239
Iteration 5, loss = 0.46259569
Iteration 6, loss = 0.45958580
Iteration 7, loss = 0.45843427
Iteration 8, loss = 0.45667341
Iteration 9, loss = 0.45323584
Iteration 10, loss = 0.44731638
Iteration 11, loss = 0.44621997
Iteration 12, loss = 0.44390177
Iteration 13, loss = 0.44200428
Iteration 14, loss = 0.44078995
Iteration 15, loss = 0.44083814
Iteration 16, loss = 0.44053959
Iteration 17, loss = 0.44119560
Iteration 18, loss = 0.43939965
Iteration 19, loss = 0.43879736
Iteration 20, loss = 0.43868004
Iteration 21, loss = 0.43743459
Iteration 22, loss = 0.43847208
Iteration 23, loss = 0.43722720
Iteration 24, loss = 0.43742806
Iteration 25, loss = 0.43716489
Iteration 26, loss = 0.43823217

Iteration 27, loss = 0.43812523
Iteration 28, loss = 0.43523875
Iteration 29, loss = 0.43648128
Iteration 30, loss = 0.43783128
Iteration 31, loss = 0.43610714
Iteration 32, loss = 0.43579200
Iteration 33, loss = 0.43508381
Iteration 34, loss = 0.43687580
Iteration 35, loss = 0.43620199
Iteration 36, loss = 0.43499589
Iteration 37, loss = 0.43642694
Iteration 38, loss = 0.43484742
Iteration 39, loss = 0.43631713

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56313650
Iteration 2, loss = 0.48791264
Iteration 3, loss = 0.47910171
Iteration 4, loss = 0.47166905
Iteration 5, loss = 0.46905191
Iteration 6, loss = 0.46584042
Iteration 7, loss = 0.45989432
Iteration 8, loss = 0.45897639
Iteration 9, loss = 0.45661101
Iteration 10, loss = 0.45576435
Iteration 11, loss = 0.45089456
Iteration 12, loss = 0.44982043
Iteration 13, loss = 0.44765729
Iteration 14, loss = 0.44638357
Iteration 15, loss = 0.44555529
Iteration 16, loss = 0.44568870
Iteration 17, loss = 0.44588960
Iteration 18, loss = 0.44529520
Iteration 19, loss = 0.44399213
Iteration 20, loss = 0.44335985
Iteration 21, loss = 0.44296855
Iteration 22, loss = 0.44330833
Iteration 23, loss = 0.44258582
Iteration 24, loss = 0.44193473
Iteration 25, loss = 0.44183355
Iteration 26, loss = 0.44138731
Iteration 27, loss = 0.44115213
Iteration 28, loss = 0.44156498
Iteration 29, loss = 0.44153728
Iteration 30, loss = 0.44222260

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.58338560
Iteration 2, loss = 0.49020648
Iteration 3, loss = 0.47952660
Iteration 4, loss = 0.47426884
Iteration 5, loss = 0.46799797
Iteration 6, loss = 0.46564632
Iteration 7, loss = 0.46122245
Iteration 8, loss = 0.45649588
Iteration 9, loss = 0.45528369
Iteration 10, loss = 0.45236933

Iteration 11, loss = 0.45161910
Iteration 12, loss = 0.44878210
Iteration 13, loss = 0.44805836
Iteration 14, loss = 0.44810096
Iteration 15, loss = 0.44693228
Iteration 16, loss = 0.44544328
Iteration 17, loss = 0.44608074
Iteration 18, loss = 0.44368174
Iteration 19, loss = 0.44429739
Iteration 20, loss = 0.44320706
Iteration 21, loss = 0.44056283
Iteration 22, loss = 0.44175805
Iteration 23, loss = 0.44046178
Iteration 24, loss = 0.43971525
Iteration 25, loss = 0.43764632
Iteration 26, loss = 0.43759554
Iteration 27, loss = 0.43826719
Iteration 28, loss = 0.43681811
Iteration 29, loss = 0.43633059
Iteration 30, loss = 0.43568141
Iteration 31, loss = 0.43443113
Iteration 32, loss = 0.43603402
Iteration 33, loss = 0.43436773
Iteration 34, loss = 0.43390561
Iteration 35, loss = 0.43583966
Iteration 36, loss = 0.43367053
Iteration 37, loss = 0.43271751
Iteration 38, loss = 0.43310601
Iteration 39, loss = 0.43218799
Iteration 40, loss = 0.43215044
Iteration 41, loss = 0.43189059
Iteration 42, loss = 0.43089756

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.60497588
Iteration 2, loss = 0.49709598
Iteration 3, loss = 0.48430767
Iteration 4, loss = 0.47852229
Iteration 5, loss = 0.47320299
Iteration 6, loss = 0.47020194
Iteration 7, loss = 0.46612705
Iteration 8, loss = 0.46386785
Iteration 9, loss = 0.45888652
Iteration 10, loss = 0.45614187
Iteration 11, loss = 0.45174341
Iteration 12, loss = 0.45029706
Iteration 13, loss = 0.44894748
Iteration 14, loss = 0.44973359
Iteration 15, loss = 0.44509942
Iteration 16, loss = 0.44604482
Iteration 17, loss = 0.44538423
Iteration 18, loss = 0.44501764
Iteration 19, loss = 0.44253036
Iteration 20, loss = 0.44118790
Iteration 21, loss = 0.44199892
Iteration 22, loss = 0.44228820
Iteration 23, loss = 0.44079531

```
Iteration 24, loss = 0.43994243
Iteration 25, loss = 0.44036031
Iteration 26, loss = 0.44001994
Iteration 27, loss = 0.43796909
Iteration 28, loss = 0.43832306
Iteration 29, loss = 0.43878426
Iteration 30, loss = 0.43535711
Iteration 31, loss = 0.43724066
Iteration 32, loss = 0.43952644
Iteration 33, loss = 0.43524687
Iteration 34, loss = 0.43424408
Iteration 35, loss = 0.43522220
Iteration 36, loss = 0.43612287
Iteration 37, loss = 0.43384773
Iteration 38, loss = 0.43317124
Iteration 39, loss = 0.43302112
Iteration 40, loss = 0.43229412
Iteration 41, loss = 0.43489130
Iteration 42, loss = 0.43075062
Iteration 43, loss = 0.43010537
Iteration 44, loss = 0.43095025
Iteration 45, loss = 0.43123676
Iteration 46, loss = 0.43200008
Iteration 47, loss = 0.43158629
Iteration 48, loss = 0.43020367
Iteration 49, loss = 0.43006378
Iteration 50, loss = 0.43006118
Iteration 51, loss = 0.42863810
Iteration 52, loss = 0.43095587
Iteration 53, loss = 0.42866518
Iteration 54, loss = 0.42743405
Iteration 55, loss = 0.42883590
Iteration 56, loss = 0.42812198
Iteration 57, loss = 0.42813017
Iteration 58, loss = 0.42812178
Iteration 59, loss = 0.42504709
Iteration 60, loss = 0.42693123
Iteration 61, loss = 0.42841674
Iteration 62, loss = 0.42587832
Iteration 63, loss = 0.42495168
Iteration 64, loss = 0.42514873
Iteration 65, loss = 0.42507116
Iteration 66, loss = 0.42631908
Iteration 67, loss = 0.42562834
Iteration 68, loss = 0.42630457
Iteration 69, loss = 0.42614131
Iteration 70, loss = 0.42567373
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.60487418
Iteration 2, loss = 0.49806814
Iteration 3, loss = 0.48605569
Iteration 4, loss = 0.47916038
Iteration 5, loss = 0.47137962
Iteration 6, loss = 0.46798534
Iteration 7, loss = 0.46181633
Iteration 8, loss = 0.45760433
```

Iteration 9, loss = 0.45825085
Iteration 10, loss = 0.45340092
Iteration 11, loss = 0.45325202
Iteration 12, loss = 0.45141230
Iteration 13, loss = 0.45007296
Iteration 14, loss = 0.45057609
Iteration 15, loss = 0.44764520
Iteration 16, loss = 0.44805865
Iteration 17, loss = 0.44709465
Iteration 18, loss = 0.44785884
Iteration 19, loss = 0.44403463
Iteration 20, loss = 0.44231624
Iteration 21, loss = 0.44234893
Iteration 22, loss = 0.44353560
Iteration 23, loss = 0.44148185
Iteration 24, loss = 0.44253626
Iteration 25, loss = 0.44152450
Iteration 26, loss = 0.43929656
Iteration 27, loss = 0.43904999
Iteration 28, loss = 0.43949267
Iteration 29, loss = 0.44038504
Iteration 30, loss = 0.43689299
Iteration 31, loss = 0.43382593
Iteration 32, loss = 0.43858779
Iteration 33, loss = 0.43573472
Iteration 34, loss = 0.43325304
Iteration 35, loss = 0.43346646
Iteration 36, loss = 0.43530183
Iteration 37, loss = 0.43505203
Iteration 38, loss = 0.43340096
Iteration 39, loss = 0.43170577
Iteration 40, loss = 0.43483939
Iteration 41, loss = 0.43141611
Iteration 42, loss = 0.43306811
Iteration 43, loss = 0.43070965
Iteration 44, loss = 0.43102444
Iteration 45, loss = 0.43081981
Iteration 46, loss = 0.43179466
Iteration 47, loss = 0.43045546
Iteration 48, loss = 0.43161108
Iteration 49, loss = 0.43267153
Iteration 50, loss = 0.42898645
Iteration 51, loss = 0.42963491
Iteration 52, loss = 0.43274095
Iteration 53, loss = 0.43127208
Iteration 54, loss = 0.42797923
Iteration 55, loss = 0.42865016
Iteration 56, loss = 0.43106324
Iteration 57, loss = 0.43178572
Iteration 58, loss = 0.42956445
Iteration 59, loss = 0.42843142
Iteration 60, loss = 0.42748137
Iteration 61, loss = 0.42851301
Iteration 62, loss = 0.42964111
Iteration 63, loss = 0.42821582
Iteration 64, loss = 0.42675780
Iteration 65, loss = 0.42699453

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.60151937
Iteration 2, loss = 0.49843480
Iteration 3, loss = 0.48772975
Iteration 4, loss = 0.47963479
Iteration 5, loss = 0.47470312
Iteration 6, loss = 0.47109907
Iteration 7, loss = 0.46692756
Iteration 8, loss = 0.46332824
Iteration 9, loss = 0.46064532
Iteration 10, loss = 0.45872214
Iteration 11, loss = 0.45651342
Iteration 12, loss = 0.45683883
Iteration 13, loss = 0.45373918
Iteration 14, loss = 0.45533645
Iteration 15, loss = 0.45186955
Iteration 16, loss = 0.45196217
Iteration 17, loss = 0.45215407
Iteration 18, loss = 0.45219266
Iteration 19, loss = 0.45023138
Iteration 20, loss = 0.45077426
Iteration 21, loss = 0.44964974
Iteration 22, loss = 0.44861719
Iteration 23, loss = 0.44874111
Iteration 24, loss = 0.44807233
Iteration 25, loss = 0.44996022
Iteration 26, loss = 0.44821995
Iteration 27, loss = 0.44784762
Iteration 28, loss = 0.44659932
Iteration 29, loss = 0.44551790
Iteration 30, loss = 0.44559280
Iteration 31, loss = 0.44386206
Iteration 32, loss = 0.44587376
Iteration 33, loss = 0.44224008
Iteration 34, loss = 0.44126672
Iteration 35, loss = 0.44214242
Iteration 36, loss = 0.44130648
Iteration 37, loss = 0.43929257
Iteration 38, loss = 0.43962397
Iteration 39, loss = 0.43792123
Iteration 40, loss = 0.43995043
Iteration 41, loss = 0.43633110
Iteration 42, loss = 0.43939582
Iteration 43, loss = 0.43735796
Iteration 44, loss = 0.43827639
Iteration 45, loss = 0.43827182
Iteration 46, loss = 0.43752036
Iteration 47, loss = 0.43835069
Iteration 48, loss = 0.43684493
Iteration 49, loss = 0.43769123
Iteration 50, loss = 0.43698985
Iteration 51, loss = 0.43644798
Iteration 52, loss = 0.43773818

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.60175843

Iteration 2, loss = 0.49553622
Iteration 3, loss = 0.48214360
Iteration 4, loss = 0.47265919
Iteration 5, loss = 0.46843666
Iteration 6, loss = 0.46338293
Iteration 7, loss = 0.45980140
Iteration 8, loss = 0.45471950
Iteration 9, loss = 0.45289187
Iteration 10, loss = 0.44984107
Iteration 11, loss = 0.44959562
Iteration 12, loss = 0.44901524
Iteration 13, loss = 0.44438417
Iteration 14, loss = 0.44563054
Iteration 15, loss = 0.44446705
Iteration 16, loss = 0.44529015
Iteration 17, loss = 0.44145836
Iteration 18, loss = 0.44160524
Iteration 19, loss = 0.44079108
Iteration 20, loss = 0.44263188
Iteration 21, loss = 0.43947347
Iteration 22, loss = 0.43880907
Iteration 23, loss = 0.43908187
Iteration 24, loss = 0.43918777
Iteration 25, loss = 0.43923701
Iteration 26, loss = 0.43815663
Iteration 27, loss = 0.43666778
Iteration 28, loss = 0.43710463
Iteration 29, loss = 0.43605163
Iteration 30, loss = 0.43706756
Iteration 31, loss = 0.43407770
Iteration 32, loss = 0.43899284
Iteration 33, loss = 0.43413315
Iteration 34, loss = 0.43330183
Iteration 35, loss = 0.43433644
Iteration 36, loss = 0.43445540
Iteration 37, loss = 0.43369327
Iteration 38, loss = 0.43310767
Iteration 39, loss = 0.43223804
Iteration 40, loss = 0.43475080
Iteration 41, loss = 0.43186430
Iteration 42, loss = 0.43123963

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.60605653
Iteration 2, loss = 0.49712767
Iteration 3, loss = 0.48518777
Iteration 4, loss = 0.47665717
Iteration 5, loss = 0.47215703
Iteration 6, loss = 0.46784428
Iteration 7, loss = 0.46472023
Iteration 8, loss = 0.46017106
Iteration 9, loss = 0.45885338
Iteration 10, loss = 0.45906336
Iteration 11, loss = 0.45596940
Iteration 12, loss = 0.45210719
Iteration 13, loss = 0.45062458
Iteration 14, loss = 0.44847149

Iteration 15, loss = 0.45109063
Iteration 16, loss = 0.44610561
Iteration 17, loss = 0.44622000
Iteration 18, loss = 0.44545915
Iteration 19, loss = 0.44462186
Iteration 20, loss = 0.44672793
Iteration 21, loss = 0.44414113
Iteration 22, loss = 0.44320347
Iteration 23, loss = 0.44248621
Iteration 24, loss = 0.44275092
Iteration 25, loss = 0.44244704
Iteration 26, loss = 0.44282074
Iteration 27, loss = 0.44154354

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55032234
Iteration 2, loss = 0.48483119
Iteration 3, loss = 0.47445495
Iteration 4, loss = 0.46860480
Iteration 5, loss = 0.46252624
Iteration 6, loss = 0.45853409
Iteration 7, loss = 0.45663735
Iteration 8, loss = 0.45246650
Iteration 9, loss = 0.45061691
Iteration 10, loss = 0.44967116
Iteration 11, loss = 0.44698420
Iteration 12, loss = 0.44769774
Iteration 13, loss = 0.44600475
Iteration 14, loss = 0.44607493
Iteration 15, loss = 0.44573515
Iteration 16, loss = 0.44587817
Iteration 17, loss = 0.44241579
Iteration 18, loss = 0.44175793
Iteration 19, loss = 0.44209961
Iteration 20, loss = 0.44249136
Iteration 21, loss = 0.44204417
Iteration 22, loss = 0.44106893
Iteration 23, loss = 0.43979048
Iteration 24, loss = 0.44003914
Iteration 25, loss = 0.44006947
Iteration 26, loss = 0.44011401
Iteration 27, loss = 0.43909410
Iteration 28, loss = 0.43996700
Iteration 29, loss = 0.43568499
Iteration 30, loss = 0.43991419
Iteration 31, loss = 0.43733991
Iteration 32, loss = 0.43664222
Iteration 33, loss = 0.43702976
Iteration 34, loss = 0.43547289
Iteration 35, loss = 0.43451906
Iteration 36, loss = 0.43649075
Iteration 37, loss = 0.43521920
Iteration 38, loss = 0.43512750
Iteration 39, loss = 0.43511763
Iteration 40, loss = 0.43358098

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56122783
Iteration 2, loss = 0.48885626
Iteration 3, loss = 0.47664589
Iteration 4, loss = 0.47100716
Iteration 5, loss = 0.46417081
Iteration 6, loss = 0.46198205
Iteration 7, loss = 0.45838406
Iteration 8, loss = 0.45407471
Iteration 9, loss = 0.45063836
Iteration 10, loss = 0.45210725
Iteration 11, loss = 0.44601506
Iteration 12, loss = 0.44371869
Iteration 13, loss = 0.44265873
Iteration 14, loss = 0.44207527
Iteration 15, loss = 0.44141011
Iteration 16, loss = 0.43803964
Iteration 17, loss = 0.43876756
Iteration 18, loss = 0.43740880
Iteration 19, loss = 0.44031226
Iteration 20, loss = 0.43710946
Iteration 21, loss = 0.43635613
Iteration 22, loss = 0.43653844
Iteration 23, loss = 0.43311697
Iteration 24, loss = 0.43395424
Iteration 25, loss = 0.43238958
Iteration 26, loss = 0.43476372
Iteration 27, loss = 0.43047635
Iteration 28, loss = 0.43058512
Iteration 29, loss = 0.43040368
Iteration 30, loss = 0.43147689
Iteration 31, loss = 0.43041838
Iteration 32, loss = 0.42751103
Iteration 33, loss = 0.42874869
Iteration 34, loss = 0.42782386
Iteration 35, loss = 0.42496001
Iteration 36, loss = 0.42588408
Iteration 37, loss = 0.42697675
Iteration 38, loss = 0.42495340
Iteration 39, loss = 0.42462057
Iteration 40, loss = 0.42322364
Iteration 41, loss = 0.42421756
Iteration 42, loss = 0.42247415
Iteration 43, loss = 0.42199346
Iteration 44, loss = 0.42167724
Iteration 45, loss = 0.42153003
Iteration 46, loss = 0.42214777
Iteration 47, loss = 0.41808774
Iteration 48, loss = 0.41765896
Iteration 49, loss = 0.41943607
Iteration 50, loss = 0.41719214
Iteration 51, loss = 0.41763976
Iteration 52, loss = 0.41663483
Iteration 53, loss = 0.41349013
Iteration 54, loss = 0.41288017
Iteration 55, loss = 0.41150919
Iteration 56, loss = 0.40978599
Iteration 57, loss = 0.40708004

Iteration 58, loss = 0.40670552
Iteration 59, loss = 0.40495591
Iteration 60, loss = 0.40161508
Iteration 61, loss = 0.40092087
Iteration 62, loss = 0.40121523
Iteration 63, loss = 0.39784526
Iteration 64, loss = 0.39939355
Iteration 65, loss = 0.39652079
Iteration 66, loss = 0.39504032
Iteration 67, loss = 0.39193093
Iteration 68, loss = 0.39622655
Iteration 69, loss = 0.39228791
Iteration 70, loss = 0.39119132
Iteration 71, loss = 0.39466888
Iteration 72, loss = 0.39194462
Iteration 73, loss = 0.39237650
Iteration 74, loss = 0.39427220
Iteration 75, loss = 0.39168966
Iteration 76, loss = 0.39122353
Iteration 77, loss = 0.39014127
Iteration 78, loss = 0.38995539
Iteration 79, loss = 0.38732812
Iteration 80, loss = 0.38941451
Iteration 81, loss = 0.39083578
Iteration 82, loss = 0.39033474
Iteration 83, loss = 0.39165882
Iteration 84, loss = 0.38993497
Iteration 85, loss = 0.38740933
Iteration 86, loss = 0.38864270
Iteration 87, loss = 0.38960708
Iteration 88, loss = 0.38699345
Iteration 89, loss = 0.38693596
Iteration 90, loss = 0.38809519

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56329944
Iteration 2, loss = 0.49149480
Iteration 3, loss = 0.48071372
Iteration 4, loss = 0.47368740
Iteration 5, loss = 0.46688562
Iteration 6, loss = 0.46237079
Iteration 7, loss = 0.45663093
Iteration 8, loss = 0.45375629
Iteration 9, loss = 0.45059775
Iteration 10, loss = 0.44965789
Iteration 11, loss = 0.44652029
Iteration 12, loss = 0.44509617
Iteration 13, loss = 0.44609571
Iteration 14, loss = 0.44575259
Iteration 15, loss = 0.44380141
Iteration 16, loss = 0.44187706
Iteration 17, loss = 0.44160199
Iteration 18, loss = 0.44110291
Iteration 19, loss = 0.44374347
Iteration 20, loss = 0.43948848
Iteration 21, loss = 0.44111846
Iteration 22, loss = 0.44013301

Iteration 23, loss = 0.43839899
Iteration 24, loss = 0.43692437
Iteration 25, loss = 0.43615677
Iteration 26, loss = 0.43996036
Iteration 27, loss = 0.43383587
Iteration 28, loss = 0.43810824
Iteration 29, loss = 0.43615213
Iteration 30, loss = 0.43825600
Iteration 31, loss = 0.43472042
Iteration 32, loss = 0.43300368
Iteration 33, loss = 0.43510885
Iteration 34, loss = 0.43411572
Iteration 35, loss = 0.43330390
Iteration 36, loss = 0.43192386
Iteration 37, loss = 0.43270836
Iteration 38, loss = 0.43218215
Iteration 39, loss = 0.43006362
Iteration 40, loss = 0.43061487
Iteration 41, loss = 0.42788260
Iteration 42, loss = 0.42923012
Iteration 43, loss = 0.42753696
Iteration 44, loss = 0.42803638
Iteration 45, loss = 0.42803244
Iteration 46, loss = 0.42835002
Iteration 47, loss = 0.42787131
Iteration 48, loss = 0.42619619
Iteration 49, loss = 0.42677740
Iteration 50, loss = 0.42650994
Iteration 51, loss = 0.42732410
Iteration 52, loss = 0.42330274
Iteration 53, loss = 0.42438870
Iteration 54, loss = 0.42304548
Iteration 55, loss = 0.42630522
Iteration 56, loss = 0.42330553
Iteration 57, loss = 0.42274958
Iteration 58, loss = 0.42169377
Iteration 59, loss = 0.42083743
Iteration 60, loss = 0.42116531
Iteration 61, loss = 0.42150678
Iteration 62, loss = 0.41830358
Iteration 63, loss = 0.41797700
Iteration 64, loss = 0.41805522
Iteration 65, loss = 0.41907904
Iteration 66, loss = 0.41800365
Iteration 67, loss = 0.41683239
Iteration 68, loss = 0.41520622
Iteration 69, loss = 0.41461844
Iteration 70, loss = 0.41519871
Iteration 71, loss = 0.41400047
Iteration 72, loss = 0.41067132
Iteration 73, loss = 0.41045230
Iteration 74, loss = 0.41106009
Iteration 75, loss = 0.40931723
Iteration 76, loss = 0.40706595
Iteration 77, loss = 0.40781002
Iteration 78, loss = 0.40534440
Iteration 79, loss = 0.40492081

Iteration 80, loss = 0.40277824
Iteration 81, loss = 0.39995849
Iteration 82, loss = 0.40542236
Iteration 83, loss = 0.40184471
Iteration 84, loss = 0.39916158
Iteration 85, loss = 0.40115349
Iteration 86, loss = 0.40552901
Iteration 87, loss = 0.40184845
Iteration 88, loss = 0.40024837
Iteration 89, loss = 0.39468056
Iteration 90, loss = 0.40035552
Iteration 91, loss = 0.40451932
Iteration 92, loss = 0.39890497
Iteration 93, loss = 0.39758229
Iteration 94, loss = 0.40109802
Iteration 95, loss = 0.39951611
Iteration 96, loss = 0.39838049
Iteration 97, loss = 0.39818267
Iteration 98, loss = 0.39563835
Iteration 99, loss = 0.39592537
Iteration 100, loss = 0.39436730

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56214548
Iteration 2, loss = 0.49067566
Iteration 3, loss = 0.48193818
Iteration 4, loss = 0.47284847
Iteration 5, loss = 0.46768641
Iteration 6, loss = 0.46437918
Iteration 7, loss = 0.45970642
Iteration 8, loss = 0.45816709
Iteration 9, loss = 0.45629056
Iteration 10, loss = 0.45136713
Iteration 11, loss = 0.44949007
Iteration 12, loss = 0.44767612
Iteration 13, loss = 0.44961763
Iteration 14, loss = 0.44672399
Iteration 15, loss = 0.44637784
Iteration 16, loss = 0.44691154
Iteration 17, loss = 0.44442824
Iteration 18, loss = 0.44497412
Iteration 19, loss = 0.44594195
Iteration 20, loss = 0.44335309
Iteration 21, loss = 0.44261317
Iteration 22, loss = 0.44113288
Iteration 23, loss = 0.44242034
Iteration 24, loss = 0.44013164
Iteration 25, loss = 0.44060030
Iteration 26, loss = 0.44252916
Iteration 27, loss = 0.43926607
Iteration 28, loss = 0.44012062
Iteration 29, loss = 0.43890106
Iteration 30, loss = 0.44093738
Iteration 31, loss = 0.44121706
Iteration 32, loss = 0.43836438
Iteration 33, loss = 0.43773047
Iteration 34, loss = 0.43894661

Iteration 35, loss = 0.43883379
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.56254114
Iteration 2, loss = 0.48654784
Iteration 3, loss = 0.47500429
Iteration 4, loss = 0.46816903
Iteration 5, loss = 0.46205284
Iteration 6, loss = 0.45956305
Iteration 7, loss = 0.45679028
Iteration 8, loss = 0.45255959
Iteration 9, loss = 0.45292047
Iteration 10, loss = 0.44753772
Iteration 11, loss = 0.44561170
Iteration 12, loss = 0.44452970
Iteration 13, loss = 0.44574352
Iteration 14, loss = 0.44073501
Iteration 15, loss = 0.43929566
Iteration 16, loss = 0.44035638
Iteration 17, loss = 0.43902302
Iteration 18, loss = 0.43838563
Iteration 19, loss = 0.43737412
Iteration 20, loss = 0.43611710
Iteration 21, loss = 0.43438980
Iteration 22, loss = 0.43439490
Iteration 23, loss = 0.43465229
Iteration 24, loss = 0.43321424
Iteration 25, loss = 0.43053843
Iteration 26, loss = 0.43486167
Iteration 27, loss = 0.43112539
Iteration 28, loss = 0.43187604
Iteration 29, loss = 0.43104763
Iteration 30, loss = 0.43357627
Iteration 31, loss = 0.42975899
Iteration 32, loss = 0.42817874
Iteration 33, loss = 0.42733691
Iteration 34, loss = 0.42824897
Iteration 35, loss = 0.42804380
Iteration 36, loss = 0.42960555
Iteration 37, loss = 0.42566836
Iteration 38, loss = 0.42727559
Iteration 39, loss = 0.42367669
Iteration 40, loss = 0.42465149
Iteration 41, loss = 0.42375897
Iteration 42, loss = 0.42284387
Iteration 43, loss = 0.42321084
Iteration 44, loss = 0.42190354
Iteration 45, loss = 0.42089297
Iteration 46, loss = 0.42073843
Iteration 47, loss = 0.42190468
Iteration 48, loss = 0.41935484
Iteration 49, loss = 0.41994275
Iteration 50, loss = 0.41667282
Iteration 51, loss = 0.41580798
Iteration 52, loss = 0.41396343
Iteration 53, loss = 0.41329738
Iteration 54, loss = 0.41158791

Iteration 55, loss = 0.41115928
Iteration 56, loss = 0.40809967
Iteration 57, loss = 0.40465108
Iteration 58, loss = 0.40341546
Iteration 59, loss = 0.40337419
Iteration 60, loss = 0.40044395
Iteration 61, loss = 0.40098745
Iteration 62, loss = 0.39889171
Iteration 63, loss = 0.39949206
Iteration 64, loss = 0.39743489
Iteration 65, loss = 0.39587705
Iteration 66, loss = 0.39631527
Iteration 67, loss = 0.39534923
Iteration 68, loss = 0.39536868
Iteration 69, loss = 0.39361857
Iteration 70, loss = 0.39444595
Iteration 71, loss = 0.39301103
Iteration 72, loss = 0.39154452
Iteration 73, loss = 0.39197826
Iteration 74, loss = 0.38891793
Iteration 75, loss = 0.39008084
Iteration 76, loss = 0.38961195
Iteration 77, loss = 0.39035701
Iteration 78, loss = 0.39084570
Iteration 79, loss = 0.38659074
Iteration 80, loss = 0.39001102
Iteration 81, loss = 0.38963338
Iteration 82, loss = 0.39188895
Iteration 83, loss = 0.38675961
Iteration 84, loss = 0.38877376
Iteration 85, loss = 0.38899645
Iteration 86, loss = 0.38575228
Iteration 87, loss = 0.38881094
Iteration 88, loss = 0.38951832
Iteration 89, loss = 0.38662546
Iteration 90, loss = 0.38840595

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56181528
Iteration 2, loss = 0.49254100
Iteration 3, loss = 0.47959777
Iteration 4, loss = 0.47139226
Iteration 5, loss = 0.46836824
Iteration 6, loss = 0.46406594
Iteration 7, loss = 0.46263375
Iteration 8, loss = 0.45809411
Iteration 9, loss = 0.45655429
Iteration 10, loss = 0.45425271
Iteration 11, loss = 0.45202831
Iteration 12, loss = 0.44904382
Iteration 13, loss = 0.44653112
Iteration 14, loss = 0.44542868
Iteration 15, loss = 0.44648127
Iteration 16, loss = 0.44537501
Iteration 17, loss = 0.44467078
Iteration 18, loss = 0.44230032
Iteration 19, loss = 0.44156641

Iteration 20, loss = 0.44228078
Iteration 21, loss = 0.44155435
Iteration 22, loss = 0.44137163
Iteration 23, loss = 0.44075680
Iteration 24, loss = 0.43971765
Iteration 25, loss = 0.44103323
Iteration 26, loss = 0.43835996
Iteration 27, loss = 0.43945072
Iteration 28, loss = 0.43707358
Iteration 29, loss = 0.43556398
Iteration 30, loss = 0.43795885
Iteration 31, loss = 0.43349654
Iteration 32, loss = 0.43600597
Iteration 33, loss = 0.43534991
Iteration 34, loss = 0.43368875
Iteration 35, loss = 0.43377451
Iteration 36, loss = 0.43232546
Iteration 37, loss = 0.43445381
Iteration 38, loss = 0.43345075
Iteration 39, loss = 0.43104316
Iteration 40, loss = 0.43264984
Iteration 41, loss = 0.43429875
Iteration 42, loss = 0.43274060
Iteration 43, loss = 0.43374012
Iteration 44, loss = 0.43140578
Iteration 45, loss = 0.43243971
Iteration 46, loss = 0.43251087
Iteration 47, loss = 0.43214746
Iteration 48, loss = 0.43195886
Iteration 49, loss = 0.43067349
Iteration 50, loss = 0.43001950

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54086419
Iteration 2, loss = 0.48586499
Iteration 3, loss = 0.47486412
Iteration 4, loss = 0.46728344
Iteration 5, loss = 0.46171258
Iteration 6, loss = 0.45818757
Iteration 7, loss = 0.45194368
Iteration 8, loss = 0.44911333
Iteration 9, loss = 0.44678602
Iteration 10, loss = 0.44530135
Iteration 11, loss = 0.44112919
Iteration 12, loss = 0.43884469
Iteration 13, loss = 0.43843364
Iteration 14, loss = 0.43460014
Iteration 15, loss = 0.43511705
Iteration 16, loss = 0.43380372
Iteration 17, loss = 0.43282958
Iteration 18, loss = 0.43202402
Iteration 19, loss = 0.43243203
Iteration 20, loss = 0.43015276
Iteration 21, loss = 0.43121895
Iteration 22, loss = 0.42975237
Iteration 23, loss = 0.42807946
Iteration 24, loss = 0.42774181

Iteration 25, loss = 0.42568989
Iteration 26, loss = 0.42634646
Iteration 27, loss = 0.42275819
Iteration 28, loss = 0.42208369
Iteration 29, loss = 0.42407018
Iteration 30, loss = 0.42254851
Iteration 31, loss = 0.42145281
Iteration 32, loss = 0.41931365
Iteration 33, loss = 0.41821682
Iteration 34, loss = 0.41611108
Iteration 35, loss = 0.41692158
Iteration 36, loss = 0.41741980
Iteration 37, loss = 0.41553917
Iteration 38, loss = 0.41375599
Iteration 39, loss = 0.41322530
Iteration 40, loss = 0.41202266
Iteration 41, loss = 0.41148358
Iteration 42, loss = 0.41291275
Iteration 43, loss = 0.41039444
Iteration 44, loss = 0.40981580
Iteration 45, loss = 0.40884023
Iteration 46, loss = 0.40920245
Iteration 47, loss = 0.40857024
Iteration 48, loss = 0.40814649
Iteration 49, loss = 0.40513352
Iteration 50, loss = 0.40619040
Iteration 51, loss = 0.40730549
Iteration 52, loss = 0.40654329
Iteration 53, loss = 0.40624414
Iteration 54, loss = 0.40652892
Iteration 55, loss = 0.40413475
Iteration 56, loss = 0.40343844
Iteration 57, loss = 0.40364791
Iteration 58, loss = 0.40181411
Iteration 59, loss = 0.40158991
Iteration 60, loss = 0.40385516
Iteration 61, loss = 0.40012582
Iteration 62, loss = 0.40136827
Iteration 63, loss = 0.40118936
Iteration 64, loss = 0.39999909
Iteration 65, loss = 0.39863846
Iteration 66, loss = 0.39863314
Iteration 67, loss = 0.39692360
Iteration 68, loss = 0.39920996
Iteration 69, loss = 0.39907605
Iteration 70, loss = 0.39923820
Iteration 71, loss = 0.39788785
Iteration 72, loss = 0.39870734
Iteration 73, loss = 0.39577142
Iteration 74, loss = 0.39641533
Iteration 75, loss = 0.39441639
Iteration 76, loss = 0.39537657
Iteration 77, loss = 0.39487617
Iteration 78, loss = 0.39526969
Iteration 79, loss = 0.39374616
Iteration 80, loss = 0.39406176
Iteration 81, loss = 0.39425042

Iteration 82, loss = 0.39347976
Iteration 83, loss = 0.39248272
Iteration 84, loss = 0.39498589
Iteration 85, loss = 0.39323451
Iteration 86, loss = 0.39173780
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.55269243
Iteration 2, loss = 0.48710789
Iteration 3, loss = 0.47807103
Iteration 4, loss = 0.46874202
Iteration 5, loss = 0.46490065
Iteration 6, loss = 0.46204296
Iteration 7, loss = 0.45719607
Iteration 8, loss = 0.45374916
Iteration 9, loss = 0.44974736
Iteration 10, loss = 0.44948826
Iteration 11, loss = 0.44737858
Iteration 12, loss = 0.44594468
Iteration 13, loss = 0.44755332
Iteration 14, loss = 0.44159611
Iteration 15, loss = 0.43983079
Iteration 16, loss = 0.43933802
Iteration 17, loss = 0.43628290
Iteration 18, loss = 0.43419643
Iteration 19, loss = 0.43150552
Iteration 20, loss = 0.43042326
Iteration 21, loss = 0.42497449
Iteration 22, loss = 0.42432579
Iteration 23, loss = 0.42023301
Iteration 24, loss = 0.41959702
Iteration 25, loss = 0.41875833
Iteration 26, loss = 0.41539594
Iteration 27, loss = 0.41268388
Iteration 28, loss = 0.41333686
Iteration 29, loss = 0.41210153
Iteration 30, loss = 0.40926907
Iteration 31, loss = 0.41072796
Iteration 32, loss = 0.41153369
Iteration 33, loss = 0.40706278
Iteration 34, loss = 0.40482751
Iteration 35, loss = 0.40327905
Iteration 36, loss = 0.40060361
Iteration 37, loss = 0.40379623
Iteration 38, loss = 0.40061501
Iteration 39, loss = 0.40379839
Iteration 40, loss = 0.40065555
Iteration 41, loss = 0.39723978
Iteration 42, loss = 0.39901172
Iteration 43, loss = 0.39985917
Iteration 44, loss = 0.39849563
Iteration 45, loss = 0.39570089
Iteration 46, loss = 0.39836028
Iteration 47, loss = 0.40173279
Iteration 48, loss = 0.39631068
Iteration 49, loss = 0.39744485
Iteration 50, loss = 0.39570059

Iteration 51, loss = 0.39341958
Iteration 52, loss = 0.39578753
Iteration 53, loss = 0.39527703
Iteration 54, loss = 0.39662204
Iteration 55, loss = 0.39671609
Iteration 56, loss = 0.39892447
Iteration 57, loss = 0.39457984
Iteration 58, loss = 0.39573679
Iteration 59, loss = 0.39240933
Iteration 60, loss = 0.39050623
Iteration 61, loss = 0.39163759
Iteration 62, loss = 0.39240776
Iteration 63, loss = 0.38996039
Iteration 64, loss = 0.39045245
Iteration 65, loss = 0.39319501
Iteration 66, loss = 0.39352973
Iteration 67, loss = 0.39129387
Iteration 68, loss = 0.38901652
Iteration 69, loss = 0.39098720
Iteration 70, loss = 0.39387406
Iteration 71, loss = 0.39033626

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55470926
Iteration 2, loss = 0.48840280
Iteration 3, loss = 0.48008895
Iteration 4, loss = 0.47161691
Iteration 5, loss = 0.46550384
Iteration 6, loss = 0.46120036
Iteration 7, loss = 0.45676900
Iteration 8, loss = 0.45227373
Iteration 9, loss = 0.44762504
Iteration 10, loss = 0.44778548
Iteration 11, loss = 0.44684806
Iteration 12, loss = 0.44569328
Iteration 13, loss = 0.44616907
Iteration 14, loss = 0.44381131
Iteration 15, loss = 0.44259242
Iteration 16, loss = 0.44080711
Iteration 17, loss = 0.43871612
Iteration 18, loss = 0.43746584
Iteration 19, loss = 0.43651827
Iteration 20, loss = 0.43656733
Iteration 21, loss = 0.43405625
Iteration 22, loss = 0.43516844
Iteration 23, loss = 0.43529977
Iteration 24, loss = 0.43133850
Iteration 25, loss = 0.43200433
Iteration 26, loss = 0.43207536
Iteration 27, loss = 0.43053015
Iteration 28, loss = 0.43215477
Iteration 29, loss = 0.43028455
Iteration 30, loss = 0.42853147
Iteration 31, loss = 0.42793608
Iteration 32, loss = 0.42532174
Iteration 33, loss = 0.42809652
Iteration 34, loss = 0.42371936

Iteration 35, loss = 0.42104608
Iteration 36, loss = 0.42168048
Iteration 37, loss = 0.42233656
Iteration 38, loss = 0.41882662
Iteration 39, loss = 0.42180557
Iteration 40, loss = 0.41635679
Iteration 41, loss = 0.41577735
Iteration 42, loss = 0.41407299
Iteration 43, loss = 0.41499090
Iteration 44, loss = 0.41352025
Iteration 45, loss = 0.41424305
Iteration 46, loss = 0.41288952
Iteration 47, loss = 0.41177251
Iteration 48, loss = 0.41098765
Iteration 49, loss = 0.41379639
Iteration 50, loss = 0.41158464
Iteration 51, loss = 0.41109982
Iteration 52, loss = 0.41013932
Iteration 53, loss = 0.40770436
Iteration 54, loss = 0.40845048
Iteration 55, loss = 0.40978626
Iteration 56, loss = 0.40901225
Iteration 57, loss = 0.40700892
Iteration 58, loss = 0.40921016
Iteration 59, loss = 0.40703033
Iteration 60, loss = 0.40579833
Iteration 61, loss = 0.40457411
Iteration 62, loss = 0.40908798
Iteration 63, loss = 0.40479416
Iteration 64, loss = 0.40398853
Iteration 65, loss = 0.40112061
Iteration 66, loss = 0.40292540
Iteration 67, loss = 0.40048426
Iteration 68, loss = 0.40050118
Iteration 69, loss = 0.39970404
Iteration 70, loss = 0.39915038
Iteration 71, loss = 0.40190831
Iteration 72, loss = 0.40135150
Iteration 73, loss = 0.40149536
Iteration 74, loss = 0.40018333
Iteration 75, loss = 0.40080210
Iteration 76, loss = 0.39740875
Iteration 77, loss = 0.40060451
Iteration 78, loss = 0.39738006
Iteration 79, loss = 0.39791469
Iteration 80, loss = 0.39876932
Iteration 81, loss = 0.40344441
Iteration 82, loss = 0.39623808
Iteration 83, loss = 0.39635987
Iteration 84, loss = 0.39743683
Iteration 85, loss = 0.39717977
Iteration 86, loss = 0.39759949
Iteration 87, loss = 0.39542138
Iteration 88, loss = 0.39197488
Iteration 89, loss = 0.39492487
Iteration 90, loss = 0.39539036
Iteration 91, loss = 0.39376259

```
Iteration 92, loss = 0.39466315
Iteration 93, loss = 0.39254691
Iteration 94, loss = 0.39489255
Iteration 95, loss = 0.39243990
Iteration 96, loss = 0.39387326
Iteration 97, loss = 0.39311401
Iteration 98, loss = 0.39515027
Iteration 99, loss = 0.39211087
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.55655709
Iteration 2, loss = 0.49122175
Iteration 3, loss = 0.48302324
Iteration 4, loss = 0.47507236
Iteration 5, loss = 0.47056083
Iteration 6, loss = 0.46435190
Iteration 7, loss = 0.46260328
Iteration 8, loss = 0.45794618
Iteration 9, loss = 0.45476171
Iteration 10, loss = 0.45192223
Iteration 11, loss = 0.45008589
Iteration 12, loss = 0.44652365
Iteration 13, loss = 0.44335941
Iteration 14, loss = 0.44434276
Iteration 15, loss = 0.44353302
Iteration 16, loss = 0.44096569
Iteration 17, loss = 0.43853941
Iteration 18, loss = 0.43778202
Iteration 19, loss = 0.43637616
Iteration 20, loss = 0.43637233
Iteration 21, loss = 0.43354241
Iteration 22, loss = 0.43460229
Iteration 23, loss = 0.43435767
Iteration 24, loss = 0.43111744
Iteration 25, loss = 0.43228914
Iteration 26, loss = 0.42999448
Iteration 27, loss = 0.42986636
Iteration 28, loss = 0.42784877
Iteration 29, loss = 0.42873616
Iteration 30, loss = 0.42597582
Iteration 31, loss = 0.42844473
Iteration 32, loss = 0.42603833
Iteration 33, loss = 0.42484118
Iteration 34, loss = 0.42308570
Iteration 35, loss = 0.42106211
Iteration 36, loss = 0.41983338
Iteration 37, loss = 0.42143709
Iteration 38, loss = 0.42147614
Iteration 39, loss = 0.42091813
Iteration 40, loss = 0.41807539
Iteration 41, loss = 0.41689128
Iteration 42, loss = 0.41649189
Iteration 43, loss = 0.41458963
Iteration 44, loss = 0.41421338
Iteration 45, loss = 0.41421098
Iteration 46, loss = 0.41519154
Iteration 47, loss = 0.41068449
```

Iteration 48, loss = 0.41005877
Iteration 49, loss = 0.41077885
Iteration 50, loss = 0.41051004
Iteration 51, loss = 0.41324174
Iteration 52, loss = 0.40632866
Iteration 53, loss = 0.40457129
Iteration 54, loss = 0.40826068
Iteration 55, loss = 0.40492953
Iteration 56, loss = 0.40569632
Iteration 57, loss = 0.40238210
Iteration 58, loss = 0.40936548
Iteration 59, loss = 0.40331370
Iteration 60, loss = 0.40046167
Iteration 61, loss = 0.40044183
Iteration 62, loss = 0.40332981
Iteration 63, loss = 0.40482283
Iteration 64, loss = 0.40408198
Iteration 65, loss = 0.40243717
Iteration 66, loss = 0.40038133
Iteration 67, loss = 0.39606670
Iteration 68, loss = 0.39861058
Iteration 69, loss = 0.39656239
Iteration 70, loss = 0.39602730
Iteration 71, loss = 0.39597361
Iteration 72, loss = 0.39723498
Iteration 73, loss = 0.39348581
Iteration 74, loss = 0.39583649
Iteration 75, loss = 0.39590773
Iteration 76, loss = 0.39156891
Iteration 77, loss = 0.39474941
Iteration 78, loss = 0.39414794
Iteration 79, loss = 0.38884288
Iteration 80, loss = 0.39468833
Iteration 81, loss = 0.39425349
Iteration 82, loss = 0.39302603
Iteration 83, loss = 0.39064837
Iteration 84, loss = 0.39493756
Iteration 85, loss = 0.39328721
Iteration 86, loss = 0.39169049
Iteration 87, loss = 0.39114789
Iteration 88, loss = 0.39055584
Iteration 89, loss = 0.38926863
Iteration 90, loss = 0.38987362

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55478828
Iteration 2, loss = 0.48623676
Iteration 3, loss = 0.47713227
Iteration 4, loss = 0.46952311
Iteration 5, loss = 0.46306507
Iteration 6, loss = 0.45559996
Iteration 7, loss = 0.45267003
Iteration 8, loss = 0.45067008
Iteration 9, loss = 0.44682533
Iteration 10, loss = 0.44611729
Iteration 11, loss = 0.44452587
Iteration 12, loss = 0.44160985

Iteration 13, loss = 0.43857244
Iteration 14, loss = 0.43700702
Iteration 15, loss = 0.43616282
Iteration 16, loss = 0.43580481
Iteration 17, loss = 0.43251394
Iteration 18, loss = 0.43328865
Iteration 19, loss = 0.42899749
Iteration 20, loss = 0.42849696
Iteration 21, loss = 0.42653034
Iteration 22, loss = 0.42814981
Iteration 23, loss = 0.42520448
Iteration 24, loss = 0.42547171
Iteration 25, loss = 0.42408308
Iteration 26, loss = 0.42247652
Iteration 27, loss = 0.41966872
Iteration 28, loss = 0.41822249
Iteration 29, loss = 0.41754853
Iteration 30, loss = 0.41769473
Iteration 31, loss = 0.41313927
Iteration 32, loss = 0.41347315
Iteration 33, loss = 0.41203268
Iteration 34, loss = 0.41309224
Iteration 35, loss = 0.41016647
Iteration 36, loss = 0.40920249
Iteration 37, loss = 0.40869624
Iteration 38, loss = 0.40682975
Iteration 39, loss = 0.40744488
Iteration 40, loss = 0.40951260
Iteration 41, loss = 0.40766436
Iteration 42, loss = 0.40451706
Iteration 43, loss = 0.40460654
Iteration 44, loss = 0.40530354
Iteration 45, loss = 0.40711991
Iteration 46, loss = 0.40218145
Iteration 47, loss = 0.40278777
Iteration 48, loss = 0.40058881
Iteration 49, loss = 0.40045780
Iteration 50, loss = 0.40146354
Iteration 51, loss = 0.40142232
Iteration 52, loss = 0.40065119
Iteration 53, loss = 0.39823820
Iteration 54, loss = 0.40215285
Iteration 55, loss = 0.39736479
Iteration 56, loss = 0.40076807
Iteration 57, loss = 0.39898146
Iteration 58, loss = 0.40271471
Iteration 59, loss = 0.39836686
Iteration 60, loss = 0.39681714
Iteration 61, loss = 0.39665701
Iteration 62, loss = 0.39804048
Iteration 63, loss = 0.40143892
Iteration 64, loss = 0.39508854
Iteration 65, loss = 0.39398370
Iteration 66, loss = 0.39509950
Iteration 67, loss = 0.39333855
Iteration 68, loss = 0.39458197
Iteration 69, loss = 0.39443835

Iteration 70, loss = 0.39636003
Iteration 71, loss = 0.39475459
Iteration 72, loss = 0.39475946
Iteration 73, loss = 0.39348296
Iteration 74, loss = 0.39461398
Iteration 75, loss = 0.38900363
Iteration 76, loss = 0.39155786
Iteration 77, loss = 0.39218459
Iteration 78, loss = 0.38992246
Iteration 79, loss = 0.39020102
Iteration 80, loss = 0.39472405
Iteration 81, loss = 0.39094903
Iteration 82, loss = 0.39136431
Iteration 83, loss = 0.39067747
Iteration 84, loss = 0.39359882
Iteration 85, loss = 0.39167153
Iteration 86, loss = 0.38904544
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.55289156
Iteration 2, loss = 0.48793763
Iteration 3, loss = 0.47827299
Iteration 4, loss = 0.47204227
Iteration 5, loss = 0.46547813
Iteration 6, loss = 0.46319440
Iteration 7, loss = 0.45636279
Iteration 8, loss = 0.45340566
Iteration 9, loss = 0.45035568
Iteration 10, loss = 0.44851383
Iteration 11, loss = 0.44907739
Iteration 12, loss = 0.44481063
Iteration 13, loss = 0.44227873
Iteration 14, loss = 0.44128028
Iteration 15, loss = 0.44084043
Iteration 16, loss = 0.43981507
Iteration 17, loss = 0.43805180
Iteration 18, loss = 0.43886402
Iteration 19, loss = 0.43461640
Iteration 20, loss = 0.43785212
Iteration 21, loss = 0.43328494
Iteration 22, loss = 0.43079839
Iteration 23, loss = 0.43074881
Iteration 24, loss = 0.43170064
Iteration 25, loss = 0.43055609
Iteration 26, loss = 0.42789662
Iteration 27, loss = 0.42702129
Iteration 28, loss = 0.42677173
Iteration 29, loss = 0.42651901
Iteration 30, loss = 0.42490387
Iteration 31, loss = 0.42361321
Iteration 32, loss = 0.42144613
Iteration 33, loss = 0.42426484
Iteration 34, loss = 0.42260775
Iteration 35, loss = 0.42107322
Iteration 36, loss = 0.41845763
Iteration 37, loss = 0.41832794
Iteration 38, loss = 0.42064997

Iteration 39, loss = 0.41794518
Iteration 40, loss = 0.41719654
Iteration 41, loss = 0.41566807
Iteration 42, loss = 0.41600392
Iteration 43, loss = 0.41967499
Iteration 44, loss = 0.41471406
Iteration 45, loss = 0.41556236
Iteration 46, loss = 0.41449160
Iteration 47, loss = 0.41144717
Iteration 48, loss = 0.41343509
Iteration 49, loss = 0.41388514
Iteration 50, loss = 0.41063856
Iteration 51, loss = 0.40928232
Iteration 52, loss = 0.40843647
Iteration 53, loss = 0.40964356
Iteration 54, loss = 0.40930004
Iteration 55, loss = 0.40689710
Iteration 56, loss = 0.40555226
Iteration 57, loss = 0.40600572
Iteration 58, loss = 0.40597725
Iteration 59, loss = 0.40459423
Iteration 60, loss = 0.40513811
Iteration 61, loss = 0.40530843
Iteration 62, loss = 0.40572234
Iteration 63, loss = 0.40340185
Iteration 64, loss = 0.40191056
Iteration 65, loss = 0.39948696
Iteration 66, loss = 0.40138087
Iteration 67, loss = 0.40110771
Iteration 68, loss = 0.40203524
Iteration 69, loss = 0.40300347
Iteration 70, loss = 0.39785079
Iteration 71, loss = 0.40197449
Iteration 72, loss = 0.39626127
Iteration 73, loss = 0.40012196
Iteration 74, loss = 0.39844114
Iteration 75, loss = 0.39767737
Iteration 76, loss = 0.39962064
Iteration 77, loss = 0.39895337
Iteration 78, loss = 0.39625406
Iteration 79, loss = 0.39916179
Iteration 80, loss = 0.39624417
Iteration 81, loss = 0.39389735
Iteration 82, loss = 0.39726740
Iteration 83, loss = 0.39384799
Iteration 84, loss = 0.39328466
Iteration 85, loss = 0.39500543
Iteration 86, loss = 0.39454095
Iteration 87, loss = 0.39195939
Iteration 88, loss = 0.39161530
Iteration 89, loss = 0.39535107
Iteration 90, loss = 0.39114332
Iteration 91, loss = 0.39816767
Iteration 92, loss = 0.39466667
Iteration 93, loss = 0.39317510
Iteration 94, loss = 0.39168085
Iteration 95, loss = 0.39128307

Iteration 96, loss = 0.39063170
Iteration 97, loss = 0.39149872
Iteration 98, loss = 0.39059736
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54648781
Iteration 2, loss = 0.48170512
Iteration 3, loss = 0.47362029
Iteration 4, loss = 0.46697209
Iteration 5, loss = 0.46240416
Iteration 6, loss = 0.45672951
Iteration 7, loss = 0.45359013
Iteration 8, loss = 0.45130488
Iteration 9, loss = 0.44794495
Iteration 10, loss = 0.44604369
Iteration 11, loss = 0.44533843
Iteration 12, loss = 0.44316912
Iteration 13, loss = 0.44290305
Iteration 14, loss = 0.44174281
Iteration 15, loss = 0.44040961
Iteration 16, loss = 0.44074390
Iteration 17, loss = 0.43955283
Iteration 18, loss = 0.43806750
Iteration 19, loss = 0.43753164
Iteration 20, loss = 0.43603000
Iteration 21, loss = 0.43817312
Iteration 22, loss = 0.43559504
Iteration 23, loss = 0.43475610
Iteration 24, loss = 0.43454189
Iteration 25, loss = 0.43545511
Iteration 26, loss = 0.43510760
Iteration 27, loss = 0.43117240
Iteration 28, loss = 0.43257591
Iteration 29, loss = 0.43159867
Iteration 30, loss = 0.43275776
Iteration 31, loss = 0.43010802
Iteration 32, loss = 0.42927066
Iteration 33, loss = 0.42747652
Iteration 34, loss = 0.42704301
Iteration 35, loss = 0.42872877
Iteration 36, loss = 0.42433952
Iteration 37, loss = 0.42523379
Iteration 38, loss = 0.42415774
Iteration 39, loss = 0.42405888
Iteration 40, loss = 0.42321521
Iteration 41, loss = 0.42123496
Iteration 42, loss = 0.42033521
Iteration 43, loss = 0.42166364
Iteration 44, loss = 0.41960108
Iteration 45, loss = 0.41944556
Iteration 46, loss = 0.41790571
Iteration 47, loss = 0.41798181
Iteration 48, loss = 0.41819516
Iteration 49, loss = 0.41635248
Iteration 50, loss = 0.41638175
Iteration 51, loss = 0.41683574
Iteration 52, loss = 0.41479569

Iteration 53, loss = 0.41464017
Iteration 54, loss = 0.41440543
Iteration 55, loss = 0.41301130
Iteration 56, loss = 0.41297696
Iteration 57, loss = 0.41312007
Iteration 58, loss = 0.41090053
Iteration 59, loss = 0.41200847
Iteration 60, loss = 0.41242900
Iteration 61, loss = 0.41125033
Iteration 62, loss = 0.41388744
Iteration 63, loss = 0.41002286
Iteration 64, loss = 0.40937967
Iteration 65, loss = 0.40850543
Iteration 66, loss = 0.40917834
Iteration 67, loss = 0.41061948
Iteration 68, loss = 0.40847958
Iteration 69, loss = 0.40618282
Iteration 70, loss = 0.40601720
Iteration 71, loss = 0.40812025
Iteration 72, loss = 0.40453660
Iteration 73, loss = 0.40451523
Iteration 74, loss = 0.40171720
Iteration 75, loss = 0.40092842
Iteration 76, loss = 0.39859113
Iteration 77, loss = 0.39962760
Iteration 78, loss = 0.39701391
Iteration 79, loss = 0.39595245
Iteration 80, loss = 0.39699812
Iteration 81, loss = 0.39654638
Iteration 82, loss = 0.39380948
Iteration 83, loss = 0.39341679
Iteration 84, loss = 0.39218841
Iteration 85, loss = 0.39157822
Iteration 86, loss = 0.39030128
Iteration 87, loss = 0.38820736
Iteration 88, loss = 0.38623571
Iteration 89, loss = 0.38943341
Iteration 90, loss = 0.38711470
Iteration 91, loss = 0.38772559
Iteration 92, loss = 0.38450659
Iteration 93, loss = 0.38477822
Iteration 94, loss = 0.38415983
Iteration 95, loss = 0.38277044
Iteration 96, loss = 0.38435036
Iteration 97, loss = 0.38337757
Iteration 98, loss = 0.38463756
Iteration 99, loss = 0.38284522
Iteration 100, loss = 0.38214263
Iteration 101, loss = 0.38023909
Iteration 102, loss = 0.38429145
Iteration 103, loss = 0.38230047
Iteration 104, loss = 0.37955369
Iteration 105, loss = 0.38315899
Iteration 106, loss = 0.38215827
Iteration 107, loss = 0.38286015
Iteration 108, loss = 0.37899333
Iteration 109, loss = 0.37966822

Iteration 110, loss = 0.38026994
Iteration 111, loss = 0.37998314
Iteration 112, loss = 0.38241143
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.55674167
Iteration 2, loss = 0.48501711
Iteration 3, loss = 0.47269903
Iteration 4, loss = 0.46727967
Iteration 5, loss = 0.46174137
Iteration 6, loss = 0.45756158
Iteration 7, loss = 0.45290254
Iteration 8, loss = 0.45087853
Iteration 9, loss = 0.44984013
Iteration 10, loss = 0.44544205
Iteration 11, loss = 0.44749044
Iteration 12, loss = 0.44348188
Iteration 13, loss = 0.44227634
Iteration 14, loss = 0.43922082
Iteration 15, loss = 0.44149880
Iteration 16, loss = 0.43904551
Iteration 17, loss = 0.43757800
Iteration 18, loss = 0.43837776
Iteration 19, loss = 0.43764183
Iteration 20, loss = 0.43612562
Iteration 21, loss = 0.43544113
Iteration 22, loss = 0.43365421
Iteration 23, loss = 0.43554900
Iteration 24, loss = 0.43369150
Iteration 25, loss = 0.43443159
Iteration 26, loss = 0.43393270
Iteration 27, loss = 0.43319793
Iteration 28, loss = 0.43414265
Iteration 29, loss = 0.43204303
Iteration 30, loss = 0.43117253
Iteration 31, loss = 0.43076267
Iteration 32, loss = 0.43134189
Iteration 33, loss = 0.43151603
Iteration 34, loss = 0.43017457
Iteration 35, loss = 0.42865049
Iteration 36, loss = 0.42724246
Iteration 37, loss = 0.42820480
Iteration 38, loss = 0.42773400
Iteration 39, loss = 0.42687040
Iteration 40, loss = 0.42610885
Iteration 41, loss = 0.42762203
Iteration 42, loss = 0.42780467
Iteration 43, loss = 0.42440815
Iteration 44, loss = 0.42483209
Iteration 45, loss = 0.42370756
Iteration 46, loss = 0.42261314
Iteration 47, loss = 0.42097524
Iteration 48, loss = 0.42320015
Iteration 49, loss = 0.42357552
Iteration 50, loss = 0.42067979
Iteration 51, loss = 0.42172534
Iteration 52, loss = 0.42226983

Iteration 53, loss = 0.42103925
Iteration 54, loss = 0.41850602
Iteration 55, loss = 0.41834761
Iteration 56, loss = 0.42117758
Iteration 57, loss = 0.41805089
Iteration 58, loss = 0.41905707
Iteration 59, loss = 0.41848292
Iteration 60, loss = 0.41610412
Iteration 61, loss = 0.41547919
Iteration 62, loss = 0.41455373
Iteration 63, loss = 0.41460239
Iteration 64, loss = 0.41511174
Iteration 65, loss = 0.41176559
Iteration 66, loss = 0.41254766
Iteration 67, loss = 0.41260994
Iteration 68, loss = 0.40968249
Iteration 69, loss = 0.40979057
Iteration 70, loss = 0.40657344
Iteration 71, loss = 0.40708757
Iteration 72, loss = 0.40561418
Iteration 73, loss = 0.40526889
Iteration 74, loss = 0.40353025
Iteration 75, loss = 0.40537791
Iteration 76, loss = 0.40611827
Iteration 77, loss = 0.40362538
Iteration 78, loss = 0.40205085
Iteration 79, loss = 0.39867342
Iteration 80, loss = 0.40061830
Iteration 81, loss = 0.39852841
Iteration 82, loss = 0.39571869
Iteration 83, loss = 0.39641382
Iteration 84, loss = 0.39227798
Iteration 85, loss = 0.39263606
Iteration 86, loss = 0.38847713
Iteration 87, loss = 0.39014243
Iteration 88, loss = 0.39070536
Iteration 89, loss = 0.39135559
Iteration 90, loss = 0.38721586
Iteration 91, loss = 0.39140404
Iteration 92, loss = 0.38600835
Iteration 93, loss = 0.38718586
Iteration 94, loss = 0.38277828
Iteration 95, loss = 0.38528088
Iteration 96, loss = 0.38400989
Iteration 97, loss = 0.38357535
Iteration 98, loss = 0.38264469
Iteration 99, loss = 0.38259990
Iteration 100, loss = 0.37770171
Iteration 101, loss = 0.38004733
Iteration 102, loss = 0.38292432
Iteration 103, loss = 0.38316253
Iteration 104, loss = 0.38076852
Iteration 105, loss = 0.37960228
Iteration 106, loss = 0.38079205
Iteration 107, loss = 0.37695136
Iteration 108, loss = 0.37707350
Iteration 109, loss = 0.37680027

Iteration 110, loss = 0.37830130
Iteration 111, loss = 0.37877193
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.55629525
Iteration 2, loss = 0.48741062
Iteration 3, loss = 0.47625626
Iteration 4, loss = 0.47097458
Iteration 5, loss = 0.46449638
Iteration 6, loss = 0.46061734
Iteration 7, loss = 0.45384160
Iteration 8, loss = 0.45352484
Iteration 9, loss = 0.45178996
Iteration 10, loss = 0.44723872
Iteration 11, loss = 0.44933027
Iteration 12, loss = 0.44783625
Iteration 13, loss = 0.44680451
Iteration 14, loss = 0.44211509
Iteration 15, loss = 0.44092687
Iteration 16, loss = 0.44099884
Iteration 17, loss = 0.44070998
Iteration 18, loss = 0.44119993
Iteration 19, loss = 0.43940897
Iteration 20, loss = 0.43885179
Iteration 21, loss = 0.43728519
Iteration 22, loss = 0.43506865
Iteration 23, loss = 0.43472092
Iteration 24, loss = 0.43631416
Iteration 25, loss = 0.43669665
Iteration 26, loss = 0.43524773
Iteration 27, loss = 0.43213438
Iteration 28, loss = 0.43359511
Iteration 29, loss = 0.43183808
Iteration 30, loss = 0.42851423
Iteration 31, loss = 0.43025260
Iteration 32, loss = 0.43170345
Iteration 33, loss = 0.42823088
Iteration 34, loss = 0.42953589
Iteration 35, loss = 0.42752821
Iteration 36, loss = 0.42669619
Iteration 37, loss = 0.42768834
Iteration 38, loss = 0.42418056
Iteration 39, loss = 0.42331270
Iteration 40, loss = 0.42862000
Iteration 41, loss = 0.42439300
Iteration 42, loss = 0.42482180
Iteration 43, loss = 0.42368555
Iteration 44, loss = 0.42092999
Iteration 45, loss = 0.42206630
Iteration 46, loss = 0.42116444
Iteration 47, loss = 0.42039227
Iteration 48, loss = 0.41833432
Iteration 49, loss = 0.42275497
Iteration 50, loss = 0.41777998
Iteration 51, loss = 0.41848169
Iteration 52, loss = 0.42117129
Iteration 53, loss = 0.42041573

Iteration 54, loss = 0.41830397
Iteration 55, loss = 0.41812824
Iteration 56, loss = 0.42010556
Iteration 57, loss = 0.41671436
Iteration 58, loss = 0.41608595
Iteration 59, loss = 0.41491571
Iteration 60, loss = 0.41558266
Iteration 61, loss = 0.41775125
Iteration 62, loss = 0.41420101
Iteration 63, loss = 0.41129729
Iteration 64, loss = 0.41461909
Iteration 65, loss = 0.41158894
Iteration 66, loss = 0.41288177
Iteration 67, loss = 0.41020938
Iteration 68, loss = 0.41365952
Iteration 69, loss = 0.41192620
Iteration 70, loss = 0.40921040
Iteration 71, loss = 0.40860028
Iteration 72, loss = 0.41034438
Iteration 73, loss = 0.40912699
Iteration 74, loss = 0.40852285
Iteration 75, loss = 0.40948544
Iteration 76, loss = 0.40935975
Iteration 77, loss = 0.40646054
Iteration 78, loss = 0.40726391
Iteration 79, loss = 0.40260935
Iteration 80, loss = 0.40621324
Iteration 81, loss = 0.40547515
Iteration 82, loss = 0.40659918
Iteration 83, loss = 0.40240303
Iteration 84, loss = 0.39934682
Iteration 85, loss = 0.40220618
Iteration 86, loss = 0.40248345
Iteration 87, loss = 0.39857532
Iteration 88, loss = 0.40223899
Iteration 89, loss = 0.40040693
Iteration 90, loss = 0.39973831
Iteration 91, loss = 0.39816890
Iteration 92, loss = 0.39690223
Iteration 93, loss = 0.39957933
Iteration 94, loss = 0.39467911
Iteration 95, loss = 0.39597726
Iteration 96, loss = 0.39896846
Iteration 97, loss = 0.39416682
Iteration 98, loss = 0.39656899
Iteration 99, loss = 0.39288734
Iteration 100, loss = 0.39228017
Iteration 101, loss = 0.39682861
Iteration 102, loss = 0.39328645
Iteration 103, loss = 0.39340376
Iteration 104, loss = 0.39356497
Iteration 105, loss = 0.39210322
Iteration 106, loss = 0.39195608
Iteration 107, loss = 0.38925905
Iteration 108, loss = 0.38974162
Iteration 109, loss = 0.39373870
Iteration 110, loss = 0.39071015

Iteration 111, loss = 0.39043220
Iteration 112, loss = 0.38825745
Iteration 113, loss = 0.39012687
Iteration 114, loss = 0.38783391
Iteration 115, loss = 0.39109440
Iteration 116, loss = 0.38731215
Iteration 117, loss = 0.38940552
Iteration 118, loss = 0.38624723
Iteration 119, loss = 0.38509999
Iteration 120, loss = 0.38564887
Iteration 121, loss = 0.38487286
Iteration 122, loss = 0.38598566
Iteration 123, loss = 0.38454953
Iteration 124, loss = 0.39040245
Iteration 125, loss = 0.38402437
Iteration 126, loss = 0.38642042
Iteration 127, loss = 0.38240225
Iteration 128, loss = 0.38567898
Iteration 129, loss = 0.38070624
Iteration 130, loss = 0.38428325
Iteration 131, loss = 0.38475477
Iteration 132, loss = 0.38111520
Iteration 133, loss = 0.38388151
Iteration 134, loss = 0.38483899
Iteration 135, loss = 0.38065147
Iteration 136, loss = 0.38085164
Iteration 137, loss = 0.38349608
Iteration 138, loss = 0.38333222
Iteration 139, loss = 0.37589362
Iteration 140, loss = 0.38048535
Iteration 141, loss = 0.37956976
Iteration 142, loss = 0.37690523
Iteration 143, loss = 0.37603312
Iteration 144, loss = 0.37919809
Iteration 145, loss = 0.37743030
Iteration 146, loss = 0.37637764
Iteration 147, loss = 0.38122228
Iteration 148, loss = 0.38145363
Iteration 149, loss = 0.37603061
Iteration 150, loss = 0.37881887

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55565237
Iteration 2, loss = 0.49001494
Iteration 3, loss = 0.47883675
Iteration 4, loss = 0.47055897
Iteration 5, loss = 0.46599708
Iteration 6, loss = 0.46276785
Iteration 7, loss = 0.45677175
Iteration 8, loss = 0.45499205
Iteration 9, loss = 0.45284535
Iteration 10, loss = 0.45090841
Iteration 11, loss = 0.45244991
Iteration 12, loss = 0.45191413
Iteration 13, loss = 0.45136159
Iteration 14, loss = 0.44916024
Iteration 15, loss = 0.44672365

Iteration 16, loss = 0.44663510
Iteration 17, loss = 0.44602809
Iteration 18, loss = 0.44626366
Iteration 19, loss = 0.44372371
Iteration 20, loss = 0.44588298
Iteration 21, loss = 0.44309080
Iteration 22, loss = 0.44266132
Iteration 23, loss = 0.44057987
Iteration 24, loss = 0.44153424
Iteration 25, loss = 0.44284968
Iteration 26, loss = 0.44073349
Iteration 27, loss = 0.43811220
Iteration 28, loss = 0.43873569
Iteration 29, loss = 0.43848849
Iteration 30, loss = 0.43655982
Iteration 31, loss = 0.43769998
Iteration 32, loss = 0.43820621
Iteration 33, loss = 0.43777992
Iteration 34, loss = 0.43689870
Iteration 35, loss = 0.43438919
Iteration 36, loss = 0.43318927
Iteration 37, loss = 0.43565781
Iteration 38, loss = 0.43404679
Iteration 39, loss = 0.43270659
Iteration 40, loss = 0.43347772
Iteration 41, loss = 0.43149213
Iteration 42, loss = 0.43298271
Iteration 43, loss = 0.43215211
Iteration 44, loss = 0.43160136
Iteration 45, loss = 0.43023572
Iteration 46, loss = 0.43380765
Iteration 47, loss = 0.42915152
Iteration 48, loss = 0.42901668
Iteration 49, loss = 0.43478048
Iteration 50, loss = 0.43060179
Iteration 51, loss = 0.42779631
Iteration 52, loss = 0.43019951
Iteration 53, loss = 0.42841772
Iteration 54, loss = 0.42760411
Iteration 55, loss = 0.42632105
Iteration 56, loss = 0.42848338
Iteration 57, loss = 0.42824716
Iteration 58, loss = 0.42634584
Iteration 59, loss = 0.42592329
Iteration 60, loss = 0.42488255
Iteration 61, loss = 0.42846306
Iteration 62, loss = 0.42542461
Iteration 63, loss = 0.42351600
Iteration 64, loss = 0.42400309
Iteration 65, loss = 0.42345293
Iteration 66, loss = 0.42210608
Iteration 67, loss = 0.42093093
Iteration 68, loss = 0.41950029
Iteration 69, loss = 0.41803352
Iteration 70, loss = 0.41670111
Iteration 71, loss = 0.41642366
Iteration 72, loss = 0.41590172


```
Iteration 73, loss = 0.41107543
Iteration 74, loss = 0.41186455
Iteration 75, loss = 0.41283079
Iteration 76, loss = 0.40897741
Iteration 77, loss = 0.40517250
Iteration 78, loss = 0.40845012
Iteration 79, loss = 0.40214394
Iteration 80, loss = 0.40328163
Iteration 81, loss = 0.40227047
Iteration 82, loss = 0.39809213
Iteration 83, loss = 0.40278958
Iteration 84, loss = 0.40011614
Iteration 85, loss = 0.39897070
Iteration 86, loss = 0.39615627
Iteration 87, loss = 0.39741508
Iteration 88, loss = 0.39902337
Iteration 89, loss = 0.39672523
Iteration 90, loss = 0.39373832
Iteration 91, loss = 0.39630725
Iteration 92, loss = 0.39220988
Iteration 93, loss = 0.39308239
Iteration 94, loss = 0.39165609
Iteration 95, loss = 0.39466594
Iteration 96, loss = 0.39079010
Iteration 97, loss = 0.39089715
Iteration 98, loss = 0.39276139
Iteration 99, loss = 0.38851367
Iteration 100, loss = 0.38667808
Iteration 101, loss = 0.39280082
Iteration 102, loss = 0.38918531
Iteration 103, loss = 0.39221800
Iteration 104, loss = 0.39136680
Iteration 105, loss = 0.38826875
Iteration 106, loss = 0.39209240
Iteration 107, loss = 0.38992773
Iteration 108, loss = 0.38505042
Iteration 109, loss = 0.38570974
Iteration 110, loss = 0.38577465
Iteration 111, loss = 0.39062616
Iteration 112, loss = 0.38594521
Iteration 113, loss = 0.38600042
Iteration 114, loss = 0.38865863
Iteration 115, loss = 0.38811187
Iteration 116, loss = 0.38703426
Iteration 117, loss = 0.38447212
Iteration 118, loss = 0.38987926
Iteration 119, loss = 0.38726380
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.55320775
Iteration 2, loss = 0.48299690
Iteration 3, loss = 0.47111829
Iteration 4, loss = 0.46244634
Iteration 5, loss = 0.45915213
Iteration 6, loss = 0.45486257
Iteration 7, loss = 0.45203271
Iteration 8, loss = 0.44878402
```

Iteration 9, loss = 0.44628307
Iteration 10, loss = 0.44583522
Iteration 11, loss = 0.44554369
Iteration 12, loss = 0.44545552
Iteration 13, loss = 0.44186753
Iteration 14, loss = 0.44091328
Iteration 15, loss = 0.44182237
Iteration 16, loss = 0.43903939
Iteration 17, loss = 0.43946027
Iteration 18, loss = 0.43840925
Iteration 19, loss = 0.43647039
Iteration 20, loss = 0.43877857
Iteration 21, loss = 0.43528606
Iteration 22, loss = 0.43576612
Iteration 23, loss = 0.43352884
Iteration 24, loss = 0.43382709
Iteration 25, loss = 0.43486497
Iteration 26, loss = 0.43093010
Iteration 27, loss = 0.43120857
Iteration 28, loss = 0.43129185
Iteration 29, loss = 0.43240923
Iteration 30, loss = 0.42952225
Iteration 31, loss = 0.43046232
Iteration 32, loss = 0.43076624
Iteration 33, loss = 0.42994176
Iteration 34, loss = 0.42792942
Iteration 35, loss = 0.42685192
Iteration 36, loss = 0.42797719
Iteration 37, loss = 0.42780455
Iteration 38, loss = 0.42692955
Iteration 39, loss = 0.42564193
Iteration 40, loss = 0.42541672
Iteration 41, loss = 0.42500879
Iteration 42, loss = 0.42560374
Iteration 43, loss = 0.42657573
Iteration 44, loss = 0.42546360
Iteration 45, loss = 0.42467262
Iteration 46, loss = 0.42610354
Iteration 47, loss = 0.42592502
Iteration 48, loss = 0.42495928
Iteration 49, loss = 0.42456456
Iteration 50, loss = 0.42245831
Iteration 51, loss = 0.42284263
Iteration 52, loss = 0.42576896
Iteration 53, loss = 0.42158206
Iteration 54, loss = 0.42057535
Iteration 55, loss = 0.42220571
Iteration 56, loss = 0.42068651
Iteration 57, loss = 0.42335027
Iteration 58, loss = 0.42017582
Iteration 59, loss = 0.42056861
Iteration 60, loss = 0.41845045
Iteration 61, loss = 0.41766563
Iteration 62, loss = 0.41647079
Iteration 63, loss = 0.41670954
Iteration 64, loss = 0.41584719
Iteration 65, loss = 0.41609188

Iteration 66, loss = 0.41667558
Iteration 67, loss = 0.41522687
Iteration 68, loss = 0.41405015
Iteration 69, loss = 0.41254083
Iteration 70, loss = 0.41066435
Iteration 71, loss = 0.41384651
Iteration 72, loss = 0.41222865
Iteration 73, loss = 0.41125927
Iteration 74, loss = 0.41126834
Iteration 75, loss = 0.41395070
Iteration 76, loss = 0.40918624
Iteration 77, loss = 0.40992061
Iteration 78, loss = 0.40910897
Iteration 79, loss = 0.41088893
Iteration 80, loss = 0.40918546
Iteration 81, loss = 0.40758196
Iteration 82, loss = 0.40716281
Iteration 83, loss = 0.41069547
Iteration 84, loss = 0.40936533
Iteration 85, loss = 0.40620703
Iteration 86, loss = 0.40411475
Iteration 87, loss = 0.40557085
Iteration 88, loss = 0.40642866
Iteration 89, loss = 0.40357565
Iteration 90, loss = 0.40620610
Iteration 91, loss = 0.40713771
Iteration 92, loss = 0.40460752
Iteration 93, loss = 0.40362918
Iteration 94, loss = 0.40241902
Iteration 95, loss = 0.40444410
Iteration 96, loss = 0.40298203
Iteration 97, loss = 0.40251153
Iteration 98, loss = 0.39989014
Iteration 99, loss = 0.39840429
Iteration 100, loss = 0.40210623
Iteration 101, loss = 0.40184992
Iteration 102, loss = 0.39907505
Iteration 103, loss = 0.39815237
Iteration 104, loss = 0.39831964
Iteration 105, loss = 0.39801805
Iteration 106, loss = 0.40100306
Iteration 107, loss = 0.39717316
Iteration 108, loss = 0.39496649
Iteration 109, loss = 0.39395208
Iteration 110, loss = 0.39466545
Iteration 111, loss = 0.39329928
Iteration 112, loss = 0.39342641
Iteration 113, loss = 0.39457411
Iteration 114, loss = 0.39170063
Iteration 115, loss = 0.39300263
Iteration 116, loss = 0.39072361
Iteration 117, loss = 0.39146707
Iteration 118, loss = 0.39385554
Iteration 119, loss = 0.39153356
Iteration 120, loss = 0.39005738
Iteration 121, loss = 0.38864988
Iteration 122, loss = 0.38777624

Iteration 123, loss = 0.38946246
Iteration 124, loss = 0.38534564
Iteration 125, loss = 0.39395297
Iteration 126, loss = 0.38667815
Iteration 127, loss = 0.38614630
Iteration 128, loss = 0.38417471
Iteration 129, loss = 0.38640389
Iteration 130, loss = 0.38734196
Iteration 131, loss = 0.38273423
Iteration 132, loss = 0.38535732
Iteration 133, loss = 0.38523157
Iteration 134, loss = 0.37997507
Iteration 135, loss = 0.38391415
Iteration 136, loss = 0.38261001
Iteration 137, loss = 0.38207761
Iteration 138, loss = 0.38639170
Iteration 139, loss = 0.38011830
Iteration 140, loss = 0.38433326
Iteration 141, loss = 0.37995565
Iteration 142, loss = 0.37930707
Iteration 143, loss = 0.38353546
Iteration 144, loss = 0.38427055
Iteration 145, loss = 0.37924821

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.55711926
Iteration 2, loss = 0.48630794
Iteration 3, loss = 0.47676003
Iteration 4, loss = 0.47171780
Iteration 5, loss = 0.46472628
Iteration 6, loss = 0.46114996
Iteration 7, loss = 0.45702390
Iteration 8, loss = 0.45475582
Iteration 9, loss = 0.45182777
Iteration 10, loss = 0.44778570
Iteration 11, loss = 0.45106664
Iteration 12, loss = 0.44731840
Iteration 13, loss = 0.44644522
Iteration 14, loss = 0.44486682
Iteration 15, loss = 0.44211690
Iteration 16, loss = 0.44182886
Iteration 17, loss = 0.44077697
Iteration 18, loss = 0.43915133
Iteration 19, loss = 0.43943627
Iteration 20, loss = 0.43921967
Iteration 21, loss = 0.43784346
Iteration 22, loss = 0.43675976
Iteration 23, loss = 0.43673604
Iteration 24, loss = 0.43493437
Iteration 25, loss = 0.43627330
Iteration 26, loss = 0.43454948
Iteration 27, loss = 0.43434116
Iteration 28, loss = 0.43482015
Iteration 29, loss = 0.43298531
Iteration 30, loss = 0.43112148
Iteration 31, loss = 0.43144459
Iteration 32, loss = 0.42953606

Iteration 33, loss = 0.42924293
Iteration 34, loss = 0.42950529
Iteration 35, loss = 0.42983421
Iteration 36, loss = 0.42794168
Iteration 37, loss = 0.42927236
Iteration 38, loss = 0.42555354
Iteration 39, loss = 0.42576363
Iteration 40, loss = 0.42624416
Iteration 41, loss = 0.42542053
Iteration 42, loss = 0.42594174
Iteration 43, loss = 0.42683552
Iteration 44, loss = 0.42365688
Iteration 45, loss = 0.42099562
Iteration 46, loss = 0.42374775
Iteration 47, loss = 0.42288075
Iteration 48, loss = 0.42231360
Iteration 49, loss = 0.42098409
Iteration 50, loss = 0.42254211
Iteration 51, loss = 0.41787458
Iteration 52, loss = 0.41863695
Iteration 53, loss = 0.41738776
Iteration 54, loss = 0.42058016
Iteration 55, loss = 0.41728515
Iteration 56, loss = 0.41530116
Iteration 57, loss = 0.42104121
Iteration 58, loss = 0.41596248
Iteration 59, loss = 0.41686225
Iteration 60, loss = 0.41384706
Iteration 61, loss = 0.41761054
Iteration 62, loss = 0.41810283
Iteration 63, loss = 0.41389965
Iteration 64, loss = 0.41370893
Iteration 65, loss = 0.41384507
Iteration 66, loss = 0.41500585
Iteration 67, loss = 0.41584949
Iteration 68, loss = 0.41559248
Iteration 69, loss = 0.41207029
Iteration 70, loss = 0.41238327
Iteration 71, loss = 0.41355563
Iteration 72, loss = 0.41222694
Iteration 73, loss = 0.41585130
Iteration 74, loss = 0.41168787
Iteration 75, loss = 0.41322348
Iteration 76, loss = 0.41082387
Iteration 77, loss = 0.41406176
Iteration 78, loss = 0.41189564
Iteration 79, loss = 0.40912018
Iteration 80, loss = 0.41263181
Iteration 81, loss = 0.40968781
Iteration 82, loss = 0.41389350
Iteration 83, loss = 0.40756962
Iteration 84, loss = 0.40869120
Iteration 85, loss = 0.40440583
Iteration 86, loss = 0.40904783
Iteration 87, loss = 0.40678975
Iteration 88, loss = 0.40590511
Iteration 89, loss = 0.40255647

```
Iteration 90, loss = 0.40942411
Iteration 91, loss = 0.40895560
Iteration 92, loss = 0.40423586
Iteration 93, loss = 0.40501368
Iteration 94, loss = 0.40538032
Iteration 95, loss = 0.40976729
Iteration 96, loss = 0.40372385
Iteration 97, loss = 0.40079044
Iteration 98, loss = 0.39822631
Iteration 99, loss = 0.39825746
Iteration 100, loss = 0.39847257
Iteration 101, loss = 0.39926110
Iteration 102, loss = 0.40370494
Iteration 103, loss = 0.40157364
Iteration 104, loss = 0.39768452
Iteration 105, loss = 0.39949654
Iteration 106, loss = 0.40043508
Iteration 107, loss = 0.39824620
Iteration 108, loss = 0.39616829
Iteration 109, loss = 0.39350284
Iteration 110, loss = 0.39706273
Iteration 111, loss = 0.40007109
Iteration 112, loss = 0.39730713
Iteration 113, loss = 0.39316701
Iteration 114, loss = 0.39248124
Iteration 115, loss = 0.39949918
Iteration 116, loss = 0.39264018
Iteration 117, loss = 0.39452007
Iteration 118, loss = 0.39275655
Iteration 119, loss = 0.39173917
Iteration 120, loss = 0.39009410
Iteration 121, loss = 0.38890477
Iteration 122, loss = 0.39004455
Iteration 123, loss = 0.38835448
Iteration 124, loss = 0.39314239
Iteration 125, loss = 0.39129206
Iteration 126, loss = 0.38698815
Iteration 127, loss = 0.38977307
Iteration 128, loss = 0.38962957
Iteration 129, loss = 0.39291198
Iteration 130, loss = 0.39175243
Iteration 131, loss = 0.38498260
Iteration 132, loss = 0.38651330
Iteration 133, loss = 0.39074679
Iteration 134, loss = 0.38652180
Iteration 135, loss = 0.38804323
Iteration 136, loss = 0.39033474
Iteration 137, loss = 0.39116847
Iteration 138, loss = 0.38730087
Iteration 139, loss = 0.38516190
Iteration 140, loss = 0.38766982
Iteration 141, loss = 0.38737091
Iteration 142, loss = 0.38790488
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.53215198
Iteration 2, loss = 0.48026981
```

```
Iteration 3, loss = 0.47348003
Iteration 4, loss = 0.47059691
Iteration 5, loss = 0.46805632
Iteration 6, loss = 0.46582406
Iteration 7, loss = 0.46485725
Iteration 8, loss = 0.46183910
Iteration 9, loss = 0.46025180
Iteration 10, loss = 0.45789440
Iteration 11, loss = 0.45130030
Iteration 12, loss = 0.44941053
Iteration 13, loss = 0.44701239
Iteration 14, loss = 0.44826375
Iteration 15, loss = 0.44711403
Iteration 16, loss = 0.44582266
Iteration 17, loss = 0.44523516
Iteration 18, loss = 0.44462779
Iteration 19, loss = 0.44516175
Iteration 20, loss = 0.44521550
Iteration 21, loss = 0.44580308
Iteration 22, loss = 0.44457025
Iteration 23, loss = 0.44382393
Iteration 24, loss = 0.44583530
Iteration 25, loss = 0.44436143
Iteration 26, loss = 0.44147283
Iteration 27, loss = 0.44215590
Iteration 28, loss = 0.44232079
Iteration 29, loss = 0.44264703
Iteration 30, loss = 0.44348683
Iteration 31, loss = 0.44144081
Iteration 32, loss = 0.44191021
Iteration 33, loss = 0.44123751
Iteration 34, loss = 0.44259659
Iteration 35, loss = 0.44162626
Iteration 36, loss = 0.44081247
Iteration 37, loss = 0.44138601
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.53682686
Iteration 2, loss = 0.48311131
Iteration 3, loss = 0.47429477
Iteration 4, loss = 0.46996682
Iteration 5, loss = 0.46714945
Iteration 6, loss = 0.46564106
Iteration 7, loss = 0.46466470
Iteration 8, loss = 0.46276626
Iteration 9, loss = 0.46065297
Iteration 10, loss = 0.45900013
Iteration 11, loss = 0.45613916
Iteration 12, loss = 0.45391670
Iteration 13, loss = 0.44859336
Iteration 14, loss = 0.44522399
Iteration 15, loss = 0.44706037
Iteration 16, loss = 0.44457559
Iteration 17, loss = 0.44537347
Iteration 18, loss = 0.44428495
Iteration 19, loss = 0.44452442
Iteration 20, loss = 0.44252352
```

Iteration 21, loss = 0.44364190
Iteration 22, loss = 0.44383903
Iteration 23, loss = 0.44273125
Iteration 24, loss = 0.44114096
Iteration 25, loss = 0.44117144
Iteration 26, loss = 0.44238031
Iteration 27, loss = 0.44109939
Iteration 28, loss = 0.44160128
Iteration 29, loss = 0.43975554
Iteration 30, loss = 0.44128435
Iteration 31, loss = 0.44016445
Iteration 32, loss = 0.43877625
Iteration 33, loss = 0.43808161
Iteration 34, loss = 0.43711478
Iteration 35, loss = 0.43841097
Iteration 36, loss = 0.43782702
Iteration 37, loss = 0.43497342
Iteration 38, loss = 0.43677849
Iteration 39, loss = 0.43485406
Iteration 40, loss = 0.43342033
Iteration 41, loss = 0.43485520
Iteration 42, loss = 0.43327923
Iteration 43, loss = 0.43574587
Iteration 44, loss = 0.43361799
Iteration 45, loss = 0.43334307
Iteration 46, loss = 0.43237060
Iteration 47, loss = 0.43231574
Iteration 48, loss = 0.43091090
Iteration 49, loss = 0.43040611
Iteration 50, loss = 0.43015138
Iteration 51, loss = 0.43044381
Iteration 52, loss = 0.43031774
Iteration 53, loss = 0.43124384
Iteration 54, loss = 0.42904283
Iteration 55, loss = 0.42936310
Iteration 56, loss = 0.42783746
Iteration 57, loss = 0.42712869
Iteration 58, loss = 0.42673589
Iteration 59, loss = 0.42556208
Iteration 60, loss = 0.42348940
Iteration 61, loss = 0.42480429
Iteration 62, loss = 0.42398732
Iteration 63, loss = 0.42385453
Iteration 64, loss = 0.42294205
Iteration 65, loss = 0.42380287
Iteration 66, loss = 0.42254637
Iteration 67, loss = 0.42097057
Iteration 68, loss = 0.42187760
Iteration 69, loss = 0.42197873
Iteration 70, loss = 0.42171038
Iteration 71, loss = 0.41941002
Iteration 72, loss = 0.42206974
Iteration 73, loss = 0.42026239
Iteration 74, loss = 0.41992681
Iteration 75, loss = 0.41987334
Iteration 76, loss = 0.42150358
Iteration 77, loss = 0.42140018

Iteration 78, loss = 0.42135783
Iteration 79, loss = 0.42088291
Iteration 80, loss = 0.41933674
Iteration 81, loss = 0.41922386
Iteration 82, loss = 0.41800090
Iteration 83, loss = 0.41948753
Iteration 84, loss = 0.41680929
Iteration 85, loss = 0.41810061
Iteration 86, loss = 0.41757056
Iteration 87, loss = 0.41766834
Iteration 88, loss = 0.41747657
Iteration 89, loss = 0.41814243
Iteration 90, loss = 0.41919427
Iteration 91, loss = 0.41918485
Iteration 92, loss = 0.41826742
Iteration 93, loss = 0.41698191
Iteration 94, loss = 0.41668586
Iteration 95, loss = 0.41518563
Iteration 96, loss = 0.41915855
Iteration 97, loss = 0.41592003
Iteration 98, loss = 0.41477132
Iteration 99, loss = 0.41644838
Iteration 100, loss = 0.41354414
Iteration 101, loss = 0.41741748
Iteration 102, loss = 0.41604572
Iteration 103, loss = 0.41568896
Iteration 104, loss = 0.41712131
Iteration 105, loss = 0.41511089
Iteration 106, loss = 0.41662252
Iteration 107, loss = 0.41802313
Iteration 108, loss = 0.41567577
Iteration 109, loss = 0.41839083
Iteration 110, loss = 0.41424606
Iteration 111, loss = 0.41471696

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53872063
Iteration 2, loss = 0.48766737
Iteration 3, loss = 0.47913637
Iteration 4, loss = 0.47414323
Iteration 5, loss = 0.47090562
Iteration 6, loss = 0.46988729
Iteration 7, loss = 0.46695245
Iteration 8, loss = 0.46553047
Iteration 9, loss = 0.46507509
Iteration 10, loss = 0.46137475
Iteration 11, loss = 0.45932334
Iteration 12, loss = 0.45840581
Iteration 13, loss = 0.45455833
Iteration 14, loss = 0.45150456
Iteration 15, loss = 0.45099289
Iteration 16, loss = 0.44790081
Iteration 17, loss = 0.44852592
Iteration 18, loss = 0.44604282
Iteration 19, loss = 0.44656963
Iteration 20, loss = 0.44643139
Iteration 21, loss = 0.44614753

Iteration 22, loss = 0.44685859
Iteration 23, loss = 0.44602115
Iteration 24, loss = 0.44316623
Iteration 25, loss = 0.44439503
Iteration 26, loss = 0.44390538
Iteration 27, loss = 0.44505009
Iteration 28, loss = 0.44522983
Iteration 29, loss = 0.44189873
Iteration 30, loss = 0.44269744
Iteration 31, loss = 0.44148016
Iteration 32, loss = 0.44226484
Iteration 33, loss = 0.44077684
Iteration 34, loss = 0.44011827
Iteration 35, loss = 0.44006346
Iteration 36, loss = 0.44189706
Iteration 37, loss = 0.43896980
Iteration 38, loss = 0.44041521
Iteration 39, loss = 0.43982005
Iteration 40, loss = 0.43864487
Iteration 41, loss = 0.43912230
Iteration 42, loss = 0.43874275
Iteration 43, loss = 0.43963997
Iteration 44, loss = 0.43887556
Iteration 45, loss = 0.43871041
Iteration 46, loss = 0.43881205
Iteration 47, loss = 0.43903506
Iteration 48, loss = 0.43778267

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.53626656
Iteration 2, loss = 0.48642233
Iteration 3, loss = 0.47892907
Iteration 4, loss = 0.47339762
Iteration 5, loss = 0.47306527
Iteration 6, loss = 0.46959786
Iteration 7, loss = 0.46821716
Iteration 8, loss = 0.46705504
Iteration 9, loss = 0.46454456
Iteration 10, loss = 0.46305181
Iteration 11, loss = 0.45900590
Iteration 12, loss = 0.45745786
Iteration 13, loss = 0.45283254
Iteration 14, loss = 0.45126705
Iteration 15, loss = 0.45117679
Iteration 16, loss = 0.44939728
Iteration 17, loss = 0.45135421
Iteration 18, loss = 0.44941512
Iteration 19, loss = 0.44894339
Iteration 20, loss = 0.44772927
Iteration 21, loss = 0.44780637
Iteration 22, loss = 0.44888559
Iteration 23, loss = 0.44685699
Iteration 24, loss = 0.44721706
Iteration 25, loss = 0.44677922
Iteration 26, loss = 0.44658358
Iteration 27, loss = 0.44836633
Iteration 28, loss = 0.44783106

Iteration 29, loss = 0.44413865
Iteration 30, loss = 0.44538492
Iteration 31, loss = 0.44645864
Iteration 32, loss = 0.44555330
Iteration 33, loss = 0.44463329
Iteration 34, loss = 0.44303961
Iteration 35, loss = 0.44520962
Iteration 36, loss = 0.44540218
Iteration 37, loss = 0.44288395
Iteration 38, loss = 0.44326924
Iteration 39, loss = 0.44417423
Iteration 40, loss = 0.44320516
Iteration 41, loss = 0.44302754
Iteration 42, loss = 0.44252062
Iteration 43, loss = 0.44219781
Iteration 44, loss = 0.44325198
Iteration 45, loss = 0.44229939
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.53377079
Iteration 2, loss = 0.48080479
Iteration 3, loss = 0.47342362
Iteration 4, loss = 0.46853395
Iteration 5, loss = 0.46679340
Iteration 6, loss = 0.46399667
Iteration 7, loss = 0.46228238
Iteration 8, loss = 0.46137722
Iteration 9, loss = 0.46073330
Iteration 10, loss = 0.45867476
Iteration 11, loss = 0.45880149
Iteration 12, loss = 0.45594779
Iteration 13, loss = 0.45240424
Iteration 14, loss = 0.45026414
Iteration 15, loss = 0.44750498
Iteration 16, loss = 0.44664303
Iteration 17, loss = 0.44547049
Iteration 18, loss = 0.44288367
Iteration 19, loss = 0.44297878
Iteration 20, loss = 0.44330358
Iteration 21, loss = 0.44197394
Iteration 22, loss = 0.44163394
Iteration 23, loss = 0.44364982
Iteration 24, loss = 0.44125495
Iteration 25, loss = 0.44107547
Iteration 26, loss = 0.44160821
Iteration 27, loss = 0.44133676
Iteration 28, loss = 0.44213962
Iteration 29, loss = 0.43885161
Iteration 30, loss = 0.43873691
Iteration 31, loss = 0.44058476
Iteration 32, loss = 0.44113991
Iteration 33, loss = 0.44074621
Iteration 34, loss = 0.43752028
Iteration 35, loss = 0.43798944
Iteration 36, loss = 0.43752118
Iteration 37, loss = 0.43748347
Iteration 38, loss = 0.43673344

Iteration 39, loss = 0.43695198
Iteration 40, loss = 0.43622106
Iteration 41, loss = 0.43659061
Iteration 42, loss = 0.43538691
Iteration 43, loss = 0.43627982
Iteration 44, loss = 0.43623848
Iteration 45, loss = 0.43488541
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54157798
Iteration 2, loss = 0.48468073
Iteration 3, loss = 0.47579222
Iteration 4, loss = 0.47240263
Iteration 5, loss = 0.46963135
Iteration 6, loss = 0.46806283
Iteration 7, loss = 0.46711203
Iteration 8, loss = 0.46494043
Iteration 9, loss = 0.46365738
Iteration 10, loss = 0.46326651
Iteration 11, loss = 0.46162900
Iteration 12, loss = 0.46110338
Iteration 13, loss = 0.45996315
Iteration 14, loss = 0.45886886
Iteration 15, loss = 0.45723545
Iteration 16, loss = 0.45737721
Iteration 17, loss = 0.45498461
Iteration 18, loss = 0.45283406
Iteration 19, loss = 0.45065967
Iteration 20, loss = 0.45015169
Iteration 21, loss = 0.44876990
Iteration 22, loss = 0.44859514
Iteration 23, loss = 0.44639457
Iteration 24, loss = 0.44613888
Iteration 25, loss = 0.44450343
Iteration 26, loss = 0.44530062
Iteration 27, loss = 0.44537179
Iteration 28, loss = 0.44279859
Iteration 29, loss = 0.44353753
Iteration 30, loss = 0.44370835
Iteration 31, loss = 0.44283193
Iteration 32, loss = 0.44266796
Iteration 33, loss = 0.44368269
Iteration 34, loss = 0.44128134
Iteration 35, loss = 0.44054056
Iteration 36, loss = 0.43960681
Iteration 37, loss = 0.43946694
Iteration 38, loss = 0.44055484
Iteration 39, loss = 0.44130576
Iteration 40, loss = 0.44036369
Iteration 41, loss = 0.44034194
Iteration 42, loss = 0.43851500
Iteration 43, loss = 0.43839507
Iteration 44, loss = 0.43818240
Iteration 45, loss = 0.43862431
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.55377682

Iteration 2, loss = 0.47856495
Iteration 3, loss = 0.47144272
Iteration 4, loss = 0.46533362
Iteration 5, loss = 0.46119171
Iteration 6, loss = 0.45660704
Iteration 7, loss = 0.45389277
Iteration 8, loss = 0.45202417
Iteration 9, loss = 0.44872141
Iteration 10, loss = 0.44534851
Iteration 11, loss = 0.44193373
Iteration 12, loss = 0.44321420
Iteration 13, loss = 0.43951439
Iteration 14, loss = 0.44003862
Iteration 15, loss = 0.43878365
Iteration 16, loss = 0.43623861
Iteration 17, loss = 0.43456707
Iteration 18, loss = 0.43550176
Iteration 19, loss = 0.43455783
Iteration 20, loss = 0.43314700
Iteration 21, loss = 0.43233593
Iteration 22, loss = 0.43120373
Iteration 23, loss = 0.43009491
Iteration 24, loss = 0.43107278
Iteration 25, loss = 0.42768136
Iteration 26, loss = 0.42492310
Iteration 27, loss = 0.42496255
Iteration 28, loss = 0.42561274
Iteration 29, loss = 0.42339010
Iteration 30, loss = 0.42240915
Iteration 31, loss = 0.42243342
Iteration 32, loss = 0.41943213
Iteration 33, loss = 0.42153786
Iteration 34, loss = 0.41837937
Iteration 35, loss = 0.41693038
Iteration 36, loss = 0.41454599
Iteration 37, loss = 0.41237479
Iteration 38, loss = 0.40967888
Iteration 39, loss = 0.41118446
Iteration 40, loss = 0.40732404
Iteration 41, loss = 0.40986513
Iteration 42, loss = 0.40783409
Iteration 43, loss = 0.40577071
Iteration 44, loss = 0.40503600
Iteration 45, loss = 0.40314880
Iteration 46, loss = 0.40391656
Iteration 47, loss = 0.40359613
Iteration 48, loss = 0.40222406
Iteration 49, loss = 0.40161547
Iteration 50, loss = 0.40173673
Iteration 51, loss = 0.40004901
Iteration 52, loss = 0.40334318
Iteration 53, loss = 0.40042995
Iteration 54, loss = 0.40017267
Iteration 55, loss = 0.39676861
Iteration 56, loss = 0.39916822
Iteration 57, loss = 0.39653186
Iteration 58, loss = 0.39887629

Iteration 59, loss = 0.39719101
Iteration 60, loss = 0.39735089
Iteration 61, loss = 0.39777583
Iteration 62, loss = 0.39546298
Iteration 63, loss = 0.39863716
Iteration 64, loss = 0.39552444
Iteration 65, loss = 0.39733924
Iteration 66, loss = 0.39766585
Iteration 67, loss = 0.39478386
Iteration 68, loss = 0.39838607
Iteration 69, loss = 0.39521626
Iteration 70, loss = 0.39440106
Iteration 71, loss = 0.39524572
Iteration 72, loss = 0.39527591
Iteration 73, loss = 0.39414332
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56171245
Iteration 2, loss = 0.48252979
Iteration 3, loss = 0.47203580
Iteration 4, loss = 0.46784605
Iteration 5, loss = 0.46323826
Iteration 6, loss = 0.46182205
Iteration 7, loss = 0.45570063
Iteration 8, loss = 0.45591990
Iteration 9, loss = 0.45068183
Iteration 10, loss = 0.44761766
Iteration 11, loss = 0.44562413
Iteration 12, loss = 0.44250569
Iteration 13, loss = 0.44196473
Iteration 14, loss = 0.43984331
Iteration 15, loss = 0.43696353
Iteration 16, loss = 0.43509190
Iteration 17, loss = 0.43518019
Iteration 18, loss = 0.43590263
Iteration 19, loss = 0.43230521
Iteration 20, loss = 0.43263325
Iteration 21, loss = 0.42945924
Iteration 22, loss = 0.43090763
Iteration 23, loss = 0.43024668
Iteration 24, loss = 0.42688556
Iteration 25, loss = 0.42856308
Iteration 26, loss = 0.42605536
Iteration 27, loss = 0.42598261
Iteration 28, loss = 0.42698190
Iteration 29, loss = 0.42304395
Iteration 30, loss = 0.42332919
Iteration 31, loss = 0.42211040
Iteration 32, loss = 0.41917307
Iteration 33, loss = 0.41744608
Iteration 34, loss = 0.41846015
Iteration 35, loss = 0.41714833
Iteration 36, loss = 0.41693167
Iteration 37, loss = 0.41402639
Iteration 38, loss = 0.41400458
Iteration 39, loss = 0.41259164
Iteration 40, loss = 0.41026928

Iteration 41, loss = 0.41266837
Iteration 42, loss = 0.40806954
Iteration 43, loss = 0.40930202
Iteration 44, loss = 0.40951603
Iteration 45, loss = 0.40810495
Iteration 46, loss = 0.40728593
Iteration 47, loss = 0.40784698
Iteration 48, loss = 0.40723600
Iteration 49, loss = 0.40455809
Iteration 50, loss = 0.40506838
Iteration 51, loss = 0.40797730
Iteration 52, loss = 0.40502212
Iteration 53, loss = 0.40516201
Iteration 54, loss = 0.39922333
Iteration 55, loss = 0.40253617
Iteration 56, loss = 0.40061245
Iteration 57, loss = 0.40030740
Iteration 58, loss = 0.39742098
Iteration 59, loss = 0.39728336
Iteration 60, loss = 0.39927894
Iteration 61, loss = 0.39659131
Iteration 62, loss = 0.39868618
Iteration 63, loss = 0.39836129
Iteration 64, loss = 0.39840116
Iteration 65, loss = 0.39924410
Iteration 66, loss = 0.39711368
Iteration 67, loss = 0.39590176
Iteration 68, loss = 0.39511898
Iteration 69, loss = 0.39843043

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56643477
Iteration 2, loss = 0.48886402
Iteration 3, loss = 0.47802689
Iteration 4, loss = 0.47244316
Iteration 5, loss = 0.46710121
Iteration 6, loss = 0.46309998
Iteration 7, loss = 0.45991571
Iteration 8, loss = 0.45816061
Iteration 9, loss = 0.45340460
Iteration 10, loss = 0.45169764
Iteration 11, loss = 0.45072880
Iteration 12, loss = 0.44672765
Iteration 13, loss = 0.44603017
Iteration 14, loss = 0.44253261
Iteration 15, loss = 0.44187383
Iteration 16, loss = 0.44061174
Iteration 17, loss = 0.44011456
Iteration 18, loss = 0.44196346
Iteration 19, loss = 0.44017184
Iteration 20, loss = 0.43713061
Iteration 21, loss = 0.43527509
Iteration 22, loss = 0.43559086
Iteration 23, loss = 0.43456583
Iteration 24, loss = 0.43434775
Iteration 25, loss = 0.43412803
Iteration 26, loss = 0.43243812

Iteration 27, loss = 0.43330305
Iteration 28, loss = 0.43262785
Iteration 29, loss = 0.43036575
Iteration 30, loss = 0.42884304
Iteration 31, loss = 0.42828157
Iteration 32, loss = 0.42922116
Iteration 33, loss = 0.42589069
Iteration 34, loss = 0.42759427
Iteration 35, loss = 0.42555649
Iteration 36, loss = 0.42643436
Iteration 37, loss = 0.42402234
Iteration 38, loss = 0.42339592
Iteration 39, loss = 0.42243213
Iteration 40, loss = 0.42205091
Iteration 41, loss = 0.42120820
Iteration 42, loss = 0.41883354
Iteration 43, loss = 0.42047158
Iteration 44, loss = 0.41704787
Iteration 45, loss = 0.41668569
Iteration 46, loss = 0.41623373
Iteration 47, loss = 0.41564243
Iteration 48, loss = 0.41338900
Iteration 49, loss = 0.41159174
Iteration 50, loss = 0.41283011
Iteration 51, loss = 0.41340388
Iteration 52, loss = 0.41302600
Iteration 53, loss = 0.41171138
Iteration 54, loss = 0.40693751
Iteration 55, loss = 0.40651046
Iteration 56, loss = 0.40581543
Iteration 57, loss = 0.40482769
Iteration 58, loss = 0.40506546
Iteration 59, loss = 0.40509662
Iteration 60, loss = 0.40305999
Iteration 61, loss = 0.40032633
Iteration 62, loss = 0.40115412
Iteration 63, loss = 0.40070683
Iteration 64, loss = 0.40148034
Iteration 65, loss = 0.40023780
Iteration 66, loss = 0.39649014
Iteration 67, loss = 0.39678385
Iteration 68, loss = 0.39772030
Iteration 69, loss = 0.40065790
Iteration 70, loss = 0.39954099
Iteration 71, loss = 0.39450991
Iteration 72, loss = 0.39543618
Iteration 73, loss = 0.39707402
Iteration 74, loss = 0.39547703
Iteration 75, loss = 0.39431452
Iteration 76, loss = 0.39140021
Iteration 77, loss = 0.39341517
Iteration 78, loss = 0.39186438
Iteration 79, loss = 0.39069941
Iteration 80, loss = 0.39065599
Iteration 81, loss = 0.39182347
Iteration 82, loss = 0.38838341
Iteration 83, loss = 0.39118887

Iteration 84, loss = 0.39169016
Iteration 85, loss = 0.39015210
Iteration 86, loss = 0.38873853
Iteration 87, loss = 0.39071527
Iteration 88, loss = 0.38882281
Iteration 89, loss = 0.38698949
Iteration 90, loss = 0.38859298
Iteration 91, loss = 0.38941031
Iteration 92, loss = 0.38879813
Iteration 93, loss = 0.38761239
Iteration 94, loss = 0.38855223
Iteration 95, loss = 0.38765678
Iteration 96, loss = 0.38681759
Iteration 97, loss = 0.38946698
Iteration 98, loss = 0.38589644
Iteration 99, loss = 0.39010321
Iteration 100, loss = 0.38736969
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56737339
Iteration 2, loss = 0.48729612
Iteration 3, loss = 0.47572646
Iteration 4, loss = 0.47235273
Iteration 5, loss = 0.46701088
Iteration 6, loss = 0.46469244
Iteration 7, loss = 0.46002429
Iteration 8, loss = 0.45809920
Iteration 9, loss = 0.45498366
Iteration 10, loss = 0.45329773
Iteration 11, loss = 0.45099655
Iteration 12, loss = 0.44853207
Iteration 13, loss = 0.44897735
Iteration 14, loss = 0.44422279
Iteration 15, loss = 0.44447102
Iteration 16, loss = 0.44431860
Iteration 17, loss = 0.44200776
Iteration 18, loss = 0.44289679
Iteration 19, loss = 0.44193838
Iteration 20, loss = 0.43976924
Iteration 21, loss = 0.43709040
Iteration 22, loss = 0.43654218
Iteration 23, loss = 0.43660767
Iteration 24, loss = 0.43584785
Iteration 25, loss = 0.43517805
Iteration 26, loss = 0.43438340
Iteration 27, loss = 0.43400723
Iteration 28, loss = 0.43423542
Iteration 29, loss = 0.43264030
Iteration 30, loss = 0.43419062
Iteration 31, loss = 0.43281368
Iteration 32, loss = 0.43202895
Iteration 33, loss = 0.43199574
Iteration 34, loss = 0.43242273
Iteration 35, loss = 0.43351167
Iteration 36, loss = 0.43337294
Iteration 37, loss = 0.43025034
Iteration 38, loss = 0.42998540

Iteration 39, loss = 0.43043661
Iteration 40, loss = 0.42930421
Iteration 41, loss = 0.42827122
Iteration 42, loss = 0.42700166
Iteration 43, loss = 0.43133639
Iteration 44, loss = 0.42937375
Iteration 45, loss = 0.42819528
Iteration 46, loss = 0.42628210
Iteration 47, loss = 0.42836084
Iteration 48, loss = 0.42745170
Iteration 49, loss = 0.42428453
Iteration 50, loss = 0.42576717
Iteration 51, loss = 0.42673203
Iteration 52, loss = 0.42327456
Iteration 53, loss = 0.42644115
Iteration 54, loss = 0.42406165
Iteration 55, loss = 0.42407801
Iteration 56, loss = 0.42337894
Iteration 57, loss = 0.42012762
Iteration 58, loss = 0.42184795
Iteration 59, loss = 0.41867373
Iteration 60, loss = 0.41920541
Iteration 61, loss = 0.41774096
Iteration 62, loss = 0.41700600
Iteration 63, loss = 0.41712537
Iteration 64, loss = 0.41526765
Iteration 65, loss = 0.41397103
Iteration 66, loss = 0.41183001
Iteration 67, loss = 0.41100894
Iteration 68, loss = 0.40902397
Iteration 69, loss = 0.40922355
Iteration 70, loss = 0.40815826
Iteration 71, loss = 0.40495101
Iteration 72, loss = 0.40436830
Iteration 73, loss = 0.40239705
Iteration 74, loss = 0.40169939
Iteration 75, loss = 0.40489620
Iteration 76, loss = 0.40116115
Iteration 77, loss = 0.40238051
Iteration 78, loss = 0.40176947
Iteration 79, loss = 0.39950038
Iteration 80, loss = 0.39706728
Iteration 81, loss = 0.40030588
Iteration 82, loss = 0.39540869
Iteration 83, loss = 0.39624613
Iteration 84, loss = 0.39731210
Iteration 85, loss = 0.39633677
Iteration 86, loss = 0.39644414
Iteration 87, loss = 0.39357001
Iteration 88, loss = 0.39472305
Iteration 89, loss = 0.39259449
Iteration 90, loss = 0.39185599
Iteration 91, loss = 0.39303871
Iteration 92, loss = 0.39058385
Iteration 93, loss = 0.39090111
Iteration 94, loss = 0.39237815
Iteration 95, loss = 0.39017641

Iteration 96, loss = 0.39045833
Iteration 97, loss = 0.38987526
Iteration 98, loss = 0.38836589
Iteration 99, loss = 0.38928452
Iteration 100, loss = 0.38958163
Iteration 101, loss = 0.38952661
Iteration 102, loss = 0.38869921
Iteration 103, loss = 0.39170916
Iteration 104, loss = 0.38884656
Iteration 105, loss = 0.38875965
Iteration 106, loss = 0.38653461
Iteration 107, loss = 0.38331431
Iteration 108, loss = 0.39166653
Iteration 109, loss = 0.38752241
Iteration 110, loss = 0.38841606
Iteration 111, loss = 0.38743548
Iteration 112, loss = 0.38671671
Iteration 113, loss = 0.38802119
Iteration 114, loss = 0.39084268
Iteration 115, loss = 0.38443023
Iteration 116, loss = 0.38648141
Iteration 117, loss = 0.38620314
Iteration 118, loss = 0.38300234
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56826729
Iteration 2, loss = 0.48126226
Iteration 3, loss = 0.46890579
Iteration 4, loss = 0.46437791
Iteration 5, loss = 0.46069748
Iteration 6, loss = 0.45973109
Iteration 7, loss = 0.45731843
Iteration 8, loss = 0.45367859
Iteration 9, loss = 0.45028766
Iteration 10, loss = 0.45060206
Iteration 11, loss = 0.44648759
Iteration 12, loss = 0.44543108
Iteration 13, loss = 0.44333982
Iteration 14, loss = 0.44205968
Iteration 15, loss = 0.43993640
Iteration 16, loss = 0.43916615
Iteration 17, loss = 0.43609224
Iteration 18, loss = 0.43627687
Iteration 19, loss = 0.43553061
Iteration 20, loss = 0.43543344
Iteration 21, loss = 0.43113771
Iteration 22, loss = 0.43149757
Iteration 23, loss = 0.43135251
Iteration 24, loss = 0.43150682
Iteration 25, loss = 0.42845557
Iteration 26, loss = 0.42811783
Iteration 27, loss = 0.42750861
Iteration 28, loss = 0.43078119
Iteration 29, loss = 0.42634460
Iteration 30, loss = 0.42764083
Iteration 31, loss = 0.42643733
Iteration 32, loss = 0.42612422

Iteration 33, loss = 0.42487743
Iteration 34, loss = 0.42584602
Iteration 35, loss = 0.42509671
Iteration 36, loss = 0.42726167
Iteration 37, loss = 0.42264772
Iteration 38, loss = 0.42104724
Iteration 39, loss = 0.42090369
Iteration 40, loss = 0.42230364
Iteration 41, loss = 0.41934251
Iteration 42, loss = 0.42016126
Iteration 43, loss = 0.42096090
Iteration 44, loss = 0.41898711
Iteration 45, loss = 0.41772055
Iteration 46, loss = 0.41467776
Iteration 47, loss = 0.41718361
Iteration 48, loss = 0.41696005
Iteration 49, loss = 0.41490160
Iteration 50, loss = 0.41416320
Iteration 51, loss = 0.41662513
Iteration 52, loss = 0.40986764
Iteration 53, loss = 0.41090427
Iteration 54, loss = 0.41088272
Iteration 55, loss = 0.41012204
Iteration 56, loss = 0.40824372
Iteration 57, loss = 0.40524728
Iteration 58, loss = 0.40689604
Iteration 59, loss = 0.40416867
Iteration 60, loss = 0.40374549
Iteration 61, loss = 0.40187294
Iteration 62, loss = 0.40336136
Iteration 63, loss = 0.40330290
Iteration 64, loss = 0.40122214
Iteration 65, loss = 0.40111588
Iteration 66, loss = 0.39994046
Iteration 67, loss = 0.40158607
Iteration 68, loss = 0.39899348
Iteration 69, loss = 0.39842287
Iteration 70, loss = 0.39832902
Iteration 71, loss = 0.39437742
Iteration 72, loss = 0.39461099
Iteration 73, loss = 0.39420194
Iteration 74, loss = 0.39434595
Iteration 75, loss = 0.39585147
Iteration 76, loss = 0.39343377
Iteration 77, loss = 0.39608437
Iteration 78, loss = 0.39332744
Iteration 79, loss = 0.39243347
Iteration 80, loss = 0.39300361
Iteration 81, loss = 0.39330814
Iteration 82, loss = 0.39013974
Iteration 83, loss = 0.39317978
Iteration 84, loss = 0.39604603
Iteration 85, loss = 0.39129706
Iteration 86, loss = 0.39143722
Iteration 87, loss = 0.39099588
Iteration 88, loss = 0.39154731
Iteration 89, loss = 0.39075759

Iteration 90, loss = 0.38887975
Iteration 91, loss = 0.39131902
Iteration 92, loss = 0.39018066
Iteration 93, loss = 0.39126769
Iteration 94, loss = 0.38906857
Iteration 95, loss = 0.38674091
Iteration 96, loss = 0.39078565
Iteration 97, loss = 0.39122440
Iteration 98, loss = 0.38843865
Iteration 99, loss = 0.38839559
Iteration 100, loss = 0.38750513
Iteration 101, loss = 0.38720738
Iteration 102, loss = 0.38916880
Iteration 103, loss = 0.38914534
Iteration 104, loss = 0.38673541
Iteration 105, loss = 0.39074108
Iteration 106, loss = 0.38874571
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.57168853
Iteration 2, loss = 0.48351858
Iteration 3, loss = 0.47232522
Iteration 4, loss = 0.46914173
Iteration 5, loss = 0.46692123
Iteration 6, loss = 0.46162855
Iteration 7, loss = 0.45734050
Iteration 8, loss = 0.45620164
Iteration 9, loss = 0.45167822
Iteration 10, loss = 0.44881794
Iteration 11, loss = 0.44725865
Iteration 12, loss = 0.44789616
Iteration 13, loss = 0.44428668
Iteration 14, loss = 0.44178782
Iteration 15, loss = 0.43970156
Iteration 16, loss = 0.44003149
Iteration 17, loss = 0.44033434
Iteration 18, loss = 0.43737988
Iteration 19, loss = 0.43613328
Iteration 20, loss = 0.43859674
Iteration 21, loss = 0.43580952
Iteration 22, loss = 0.43488746
Iteration 23, loss = 0.43273150
Iteration 24, loss = 0.43379097
Iteration 25, loss = 0.43162712
Iteration 26, loss = 0.43323482
Iteration 27, loss = 0.43015712
Iteration 28, loss = 0.43153483
Iteration 29, loss = 0.43005124
Iteration 30, loss = 0.43120284
Iteration 31, loss = 0.43005408
Iteration 32, loss = 0.43028330
Iteration 33, loss = 0.42846403
Iteration 34, loss = 0.42929346
Iteration 35, loss = 0.42911531
Iteration 36, loss = 0.42793810
Iteration 37, loss = 0.43080211
Iteration 38, loss = 0.42672424

Iteration 39, loss = 0.42904202
Iteration 40, loss = 0.42781589
Iteration 41, loss = 0.42606831
Iteration 42, loss = 0.42615256
Iteration 43, loss = 0.42458830
Iteration 44, loss = 0.42702029
Iteration 45, loss = 0.42538080
Iteration 46, loss = 0.42383494
Iteration 47, loss = 0.42329682
Iteration 48, loss = 0.42474223
Iteration 49, loss = 0.42317590
Iteration 50, loss = 0.42297271
Iteration 51, loss = 0.42244487
Iteration 52, loss = 0.42558250
Iteration 53, loss = 0.42248174
Iteration 54, loss = 0.42005248
Iteration 55, loss = 0.42332655
Iteration 56, loss = 0.41891891
Iteration 57, loss = 0.41939741
Iteration 58, loss = 0.41785985
Iteration 59, loss = 0.41653689
Iteration 60, loss = 0.41545045
Iteration 61, loss = 0.41330035
Iteration 62, loss = 0.41205437
Iteration 63, loss = 0.41139542
Iteration 64, loss = 0.41011975
Iteration 65, loss = 0.41122905
Iteration 66, loss = 0.40947559
Iteration 67, loss = 0.40653435
Iteration 68, loss = 0.40614543
Iteration 69, loss = 0.40448508
Iteration 70, loss = 0.40447767
Iteration 71, loss = 0.40265761
Iteration 72, loss = 0.39946296
Iteration 73, loss = 0.40338631
Iteration 74, loss = 0.39916391
Iteration 75, loss = 0.39994357
Iteration 76, loss = 0.39765482
Iteration 77, loss = 0.39748923
Iteration 78, loss = 0.39690066
Iteration 79, loss = 0.39484329
Iteration 80, loss = 0.39711155
Iteration 81, loss = 0.39574085
Iteration 82, loss = 0.39586884
Iteration 83, loss = 0.39487623
Iteration 84, loss = 0.39483753
Iteration 85, loss = 0.39419601
Iteration 86, loss = 0.39348865
Iteration 87, loss = 0.39462825
Iteration 88, loss = 0.39095698
Iteration 89, loss = 0.39293329
Iteration 90, loss = 0.39036167
Iteration 91, loss = 0.39110485
Iteration 92, loss = 0.39273010
Iteration 93, loss = 0.39548603
Iteration 94, loss = 0.39247549
Iteration 95, loss = 0.38801196

Iteration 96, loss = 0.39122230
Iteration 97, loss = 0.39095751
Iteration 98, loss = 0.38815326
Iteration 99, loss = 0.39078753
Iteration 100, loss = 0.38672093
Iteration 101, loss = 0.38958695
Iteration 102, loss = 0.39008194
Iteration 103, loss = 0.38629289
Iteration 104, loss = 0.38834663
Iteration 105, loss = 0.38854806
Iteration 106, loss = 0.38801273
Iteration 107, loss = 0.38854966
Iteration 108, loss = 0.38853656
Iteration 109, loss = 0.38735024
Iteration 110, loss = 0.38477553
Iteration 111, loss = 0.38580732
Iteration 112, loss = 0.38812408
Iteration 113, loss = 0.38599027
Iteration 114, loss = 0.38495903
Iteration 115, loss = 0.38693617
Iteration 116, loss = 0.38492522
Iteration 117, loss = 0.38418226
Iteration 118, loss = 0.38858792
Iteration 119, loss = 0.38427115
Iteration 120, loss = 0.38575819
Iteration 121, loss = 0.38707172

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53245863
Iteration 2, loss = 0.48443067
Iteration 3, loss = 0.47694418
Iteration 4, loss = 0.46954237
Iteration 5, loss = 0.46480369
Iteration 6, loss = 0.46216346
Iteration 7, loss = 0.45766530
Iteration 8, loss = 0.45546971
Iteration 9, loss = 0.45027630
Iteration 10, loss = 0.45089895
Iteration 11, loss = 0.44839408
Iteration 12, loss = 0.45048341
Iteration 13, loss = 0.44717336
Iteration 14, loss = 0.44556639
Iteration 15, loss = 0.44428253
Iteration 16, loss = 0.44320803
Iteration 17, loss = 0.44405005
Iteration 18, loss = 0.44141810
Iteration 19, loss = 0.43970468
Iteration 20, loss = 0.43919374
Iteration 21, loss = 0.43893809
Iteration 22, loss = 0.43715186
Iteration 23, loss = 0.43462556
Iteration 24, loss = 0.43326181
Iteration 25, loss = 0.43593414
Iteration 26, loss = 0.43260687
Iteration 27, loss = 0.43129845
Iteration 28, loss = 0.43145372
Iteration 29, loss = 0.42900306

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Iteration 30, loss = 0.42762278
Iteration 31, loss = 0.42608910
Iteration 32, loss = 0.42742109
Iteration 33, loss = 0.42667981
Iteration 34, loss = 0.42341788
Iteration 35, loss = 0.42719522
Iteration 36, loss = 0.42575066
Iteration 37, loss = 0.42501913
Iteration 38, loss = 0.42495570
Iteration 39, loss = 0.42183028
Iteration 40, loss = 0.42539277
Iteration 41, loss = 0.42180427
Iteration 42, loss = 0.42033135
Iteration 43, loss = 0.41630657
Iteration 44, loss = 0.41788998
Iteration 45, loss = 0.41616989
Iteration 46, loss = 0.41856609
Iteration 47, loss = 0.41301261
Iteration 48, loss = 0.41376425
Iteration 49, loss = 0.41158136
Iteration 50, loss = 0.41161703
Iteration 51, loss = 0.41241054
Iteration 52, loss = 0.41132062
Iteration 53, loss = 0.41045498
Iteration 54, loss = 0.41086523
Iteration 55, loss = 0.40713598
Iteration 56, loss = 0.40783603
Iteration 57, loss = 0.40666191
Iteration 58, loss = 0.40593823
Iteration 59, loss = 0.40267848
Iteration 60, loss = 0.40332876
Iteration 61, loss = 0.40083577
Iteration 62, loss = 0.40129905
Iteration 63, loss = 0.40038346
Iteration 64, loss = 0.39762653
Iteration 65, loss = 0.40148403
Iteration 66, loss = 0.39633766
Iteration 67, loss = 0.39668236
Iteration 68, loss = 0.39656722
Iteration 69, loss = 0.39519921
Iteration 70, loss = 0.39312293
Iteration 71, loss = 0.39353155
Iteration 72, loss = 0.39350583
Iteration 73, loss = 0.39284389
Iteration 74, loss = 0.39292731
Iteration 75, loss = 0.39396264
Iteration 76, loss = 0.39274100
Iteration 77, loss = 0.39233976
Iteration 78, loss = 0.39251029
Iteration 79, loss = 0.39251946
Iteration 80, loss = 0.39306428
Iteration 81, loss = 0.39313855
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.53935943
Iteration 2, loss = 0.48494162
Iteration 3, loss = 0.47627354
```


Iteration 4, loss = 0.47232454
Iteration 5, loss = 0.46553098
Iteration 6, loss = 0.46175224
Iteration 7, loss = 0.45882921
Iteration 8, loss = 0.45578106
Iteration 9, loss = 0.45289772
Iteration 10, loss = 0.44985517
Iteration 11, loss = 0.44728501
Iteration 12, loss = 0.44577449
Iteration 13, loss = 0.44494939
Iteration 14, loss = 0.44361851
Iteration 15, loss = 0.44205083
Iteration 16, loss = 0.44245919
Iteration 17, loss = 0.44258301
Iteration 18, loss = 0.44056786
Iteration 19, loss = 0.43907872
Iteration 20, loss = 0.43778989
Iteration 21, loss = 0.43710442
Iteration 22, loss = 0.43736791
Iteration 23, loss = 0.43791128
Iteration 24, loss = 0.43634368
Iteration 25, loss = 0.43541317
Iteration 26, loss = 0.43569685
Iteration 27, loss = 0.43398419
Iteration 28, loss = 0.43254416
Iteration 29, loss = 0.43419579
Iteration 30, loss = 0.43239605
Iteration 31, loss = 0.43127677
Iteration 32, loss = 0.43025227
Iteration 33, loss = 0.43050044
Iteration 34, loss = 0.43280269
Iteration 35, loss = 0.43003410
Iteration 36, loss = 0.43062853
Iteration 37, loss = 0.42797836
Iteration 38, loss = 0.42945563
Iteration 39, loss = 0.42627306
Iteration 40, loss = 0.42578515
Iteration 41, loss = 0.42821183
Iteration 42, loss = 0.42886598
Iteration 43, loss = 0.42372530
Iteration 44, loss = 0.42497116
Iteration 45, loss = 0.42524770
Iteration 46, loss = 0.42240474
Iteration 47, loss = 0.42478533
Iteration 48, loss = 0.42273761
Iteration 49, loss = 0.42500748
Iteration 50, loss = 0.42308966
Iteration 51, loss = 0.42184399
Iteration 52, loss = 0.42184613
Iteration 53, loss = 0.42228145
Iteration 54, loss = 0.41965285
Iteration 55, loss = 0.42157635
Iteration 56, loss = 0.42073038
Iteration 57, loss = 0.42063750
Iteration 58, loss = 0.42147914
Iteration 59, loss = 0.41998732
Iteration 60, loss = 0.41856546

Iteration 61, loss = 0.41618627
Iteration 62, loss = 0.41556962
Iteration 63, loss = 0.41501917
Iteration 64, loss = 0.41370179
Iteration 65, loss = 0.41232172
Iteration 66, loss = 0.41469401
Iteration 67, loss = 0.41186187
Iteration 68, loss = 0.40974909
Iteration 69, loss = 0.40982236
Iteration 70, loss = 0.40682990
Iteration 71, loss = 0.40532234
Iteration 72, loss = 0.40243877
Iteration 73, loss = 0.40023527
Iteration 74, loss = 0.39910728
Iteration 75, loss = 0.39948963
Iteration 76, loss = 0.39881519
Iteration 77, loss = 0.39560989
Iteration 78, loss = 0.39464061
Iteration 79, loss = 0.39430497
Iteration 80, loss = 0.39351841
Iteration 81, loss = 0.39350016
Iteration 82, loss = 0.39101468
Iteration 83, loss = 0.39246217
Iteration 84, loss = 0.39038573
Iteration 85, loss = 0.39155826
Iteration 86, loss = 0.39198175
Iteration 87, loss = 0.38827651
Iteration 88, loss = 0.38872055
Iteration 89, loss = 0.38905731
Iteration 90, loss = 0.39025031
Iteration 91, loss = 0.39185278
Iteration 92, loss = 0.38689262
Iteration 93, loss = 0.38602592
Iteration 94, loss = 0.38753893
Iteration 95, loss = 0.38291587
Iteration 96, loss = 0.38890768
Iteration 97, loss = 0.38362501
Iteration 98, loss = 0.38426395
Iteration 99, loss = 0.38106817
Iteration 100, loss = 0.38380280
Iteration 101, loss = 0.38150634
Iteration 102, loss = 0.38064495
Iteration 103, loss = 0.38212613
Iteration 104, loss = 0.38212702
Iteration 105, loss = 0.38095476
Iteration 106, loss = 0.37977857
Iteration 107, loss = 0.38191880
Iteration 108, loss = 0.37833351
Iteration 109, loss = 0.37937269
Iteration 110, loss = 0.37749574
Iteration 111, loss = 0.37777502
Iteration 112, loss = 0.38393750
Iteration 113, loss = 0.37833913
Iteration 114, loss = 0.37671462
Iteration 115, loss = 0.37862615
Iteration 116, loss = 0.37888700
Iteration 117, loss = 0.37495089

Iteration 118, loss = 0.37776148
Iteration 119, loss = 0.37975584
Iteration 120, loss = 0.37628501
Iteration 121, loss = 0.38382499
Iteration 122, loss = 0.38116999
Iteration 123, loss = 0.37724852
Iteration 124, loss = 0.37652762
Iteration 125, loss = 0.37557643
Iteration 126, loss = 0.37917946
Iteration 127, loss = 0.37485750
Iteration 128, loss = 0.37717936

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54391164
Iteration 2, loss = 0.49086730
Iteration 3, loss = 0.48345509
Iteration 4, loss = 0.47603498
Iteration 5, loss = 0.46997216
Iteration 6, loss = 0.46522528
Iteration 7, loss = 0.46393502
Iteration 8, loss = 0.45996923
Iteration 9, loss = 0.45781540
Iteration 10, loss = 0.45353159
Iteration 11, loss = 0.45289127
Iteration 12, loss = 0.44866284
Iteration 13, loss = 0.44711436
Iteration 14, loss = 0.44631081
Iteration 15, loss = 0.44536495
Iteration 16, loss = 0.44441163
Iteration 17, loss = 0.44447452
Iteration 18, loss = 0.44248367
Iteration 19, loss = 0.44171021
Iteration 20, loss = 0.43973597
Iteration 21, loss = 0.43881822
Iteration 22, loss = 0.43888207
Iteration 23, loss = 0.43768618
Iteration 24, loss = 0.43574786
Iteration 25, loss = 0.43786925
Iteration 26, loss = 0.43747153
Iteration 27, loss = 0.43462039
Iteration 28, loss = 0.43514417
Iteration 29, loss = 0.43459561
Iteration 30, loss = 0.43539718
Iteration 31, loss = 0.43214474
Iteration 32, loss = 0.43305644
Iteration 33, loss = 0.43115660
Iteration 34, loss = 0.43161773
Iteration 35, loss = 0.43044042
Iteration 36, loss = 0.42991912
Iteration 37, loss = 0.42800900
Iteration 38, loss = 0.42898499
Iteration 39, loss = 0.42575524
Iteration 40, loss = 0.42583735
Iteration 41, loss = 0.42681174
Iteration 42, loss = 0.42549893
Iteration 43, loss = 0.42054552
Iteration 44, loss = 0.41876860

Iteration 45, loss = 0.41722911
Iteration 46, loss = 0.41365338
Iteration 47, loss = 0.41162487
Iteration 48, loss = 0.41022579
Iteration 49, loss = 0.41050468
Iteration 50, loss = 0.40648376
Iteration 51, loss = 0.40567311
Iteration 52, loss = 0.40317359
Iteration 53, loss = 0.40335203
Iteration 54, loss = 0.40207814
Iteration 55, loss = 0.40369111
Iteration 56, loss = 0.40023237
Iteration 57, loss = 0.39934846
Iteration 58, loss = 0.39909281
Iteration 59, loss = 0.40061057
Iteration 60, loss = 0.39774437
Iteration 61, loss = 0.39702776
Iteration 62, loss = 0.39537533
Iteration 63, loss = 0.39498960
Iteration 64, loss = 0.39629945
Iteration 65, loss = 0.39339366
Iteration 66, loss = 0.39305096
Iteration 67, loss = 0.39350435
Iteration 68, loss = 0.39035395
Iteration 69, loss = 0.39440374
Iteration 70, loss = 0.39438577
Iteration 71, loss = 0.39515355
Iteration 72, loss = 0.39275301
Iteration 73, loss = 0.39013242
Iteration 74, loss = 0.39096181
Iteration 75, loss = 0.39160731
Iteration 76, loss = 0.39113339
Iteration 77, loss = 0.38921428
Iteration 78, loss = 0.39211057
Iteration 79, loss = 0.39033251
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54502777
Iteration 2, loss = 0.49008194
Iteration 3, loss = 0.48073560
Iteration 4, loss = 0.47482662
Iteration 5, loss = 0.47021555
Iteration 6, loss = 0.46710541
Iteration 7, loss = 0.46473803
Iteration 8, loss = 0.46178780
Iteration 9, loss = 0.45708843
Iteration 10, loss = 0.45613078
Iteration 11, loss = 0.45606079
Iteration 12, loss = 0.45097650
Iteration 13, loss = 0.45143306
Iteration 14, loss = 0.45137112
Iteration 15, loss = 0.44772999
Iteration 16, loss = 0.44749970
Iteration 17, loss = 0.44663900
Iteration 18, loss = 0.44962571
Iteration 19, loss = 0.44590279
Iteration 20, loss = 0.44526580

Iteration 21, loss = 0.44274985
Iteration 22, loss = 0.44177834
Iteration 23, loss = 0.44167989
Iteration 24, loss = 0.44139903
Iteration 25, loss = 0.44279293
Iteration 26, loss = 0.44112046
Iteration 27, loss = 0.43938177
Iteration 28, loss = 0.43902880
Iteration 29, loss = 0.43699017
Iteration 30, loss = 0.43699029
Iteration 31, loss = 0.43439372
Iteration 32, loss = 0.43421015
Iteration 33, loss = 0.43524059
Iteration 34, loss = 0.43434808
Iteration 35, loss = 0.43242674
Iteration 36, loss = 0.43306096
Iteration 37, loss = 0.43149274
Iteration 38, loss = 0.43124850
Iteration 39, loss = 0.43004281
Iteration 40, loss = 0.43053440
Iteration 41, loss = 0.43065954
Iteration 42, loss = 0.42965063
Iteration 43, loss = 0.42809791
Iteration 44, loss = 0.42765031
Iteration 45, loss = 0.42931749
Iteration 46, loss = 0.42710875
Iteration 47, loss = 0.42664019
Iteration 48, loss = 0.42816022
Iteration 49, loss = 0.42739828
Iteration 50, loss = 0.42576754
Iteration 51, loss = 0.42411825
Iteration 52, loss = 0.42672397
Iteration 53, loss = 0.42466641
Iteration 54, loss = 0.42468612
Iteration 55, loss = 0.42413100
Iteration 56, loss = 0.42321155
Iteration 57, loss = 0.42445233
Iteration 58, loss = 0.42232335
Iteration 59, loss = 0.42391386
Iteration 60, loss = 0.42246240
Iteration 61, loss = 0.41990237
Iteration 62, loss = 0.41994282
Iteration 63, loss = 0.41930971
Iteration 64, loss = 0.42102490
Iteration 65, loss = 0.42025347
Iteration 66, loss = 0.41699167
Iteration 67, loss = 0.42052980
Iteration 68, loss = 0.41794407
Iteration 69, loss = 0.41737465
Iteration 70, loss = 0.41878986
Iteration 71, loss = 0.41882767
Iteration 72, loss = 0.41730048
Iteration 73, loss = 0.41848322
Iteration 74, loss = 0.41726895
Iteration 75, loss = 0.41916547
Iteration 76, loss = 0.41693822
Iteration 77, loss = 0.41528044

Iteration 78, loss = 0.41878998
Iteration 79, loss = 0.41565685
Iteration 80, loss = 0.41408507
Iteration 81, loss = 0.41464559
Iteration 82, loss = 0.41755513
Iteration 83, loss = 0.41425213
Iteration 84, loss = 0.41467092
Iteration 85, loss = 0.41407917
Iteration 86, loss = 0.41609953
Iteration 87, loss = 0.41341419
Iteration 88, loss = 0.41295235
Iteration 89, loss = 0.41329323
Iteration 90, loss = 0.41266992
Iteration 91, loss = 0.41387852

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54387135
Iteration 2, loss = 0.48442144
Iteration 3, loss = 0.47601487
Iteration 4, loss = 0.47017885
Iteration 5, loss = 0.46486703
Iteration 6, loss = 0.46110922
Iteration 7, loss = 0.45732617
Iteration 8, loss = 0.45600517
Iteration 9, loss = 0.45142341
Iteration 10, loss = 0.44869947
Iteration 11, loss = 0.45014919
Iteration 12, loss = 0.44593780
Iteration 13, loss = 0.44371198
Iteration 14, loss = 0.44199372
Iteration 15, loss = 0.43999149
Iteration 16, loss = 0.44267304
Iteration 17, loss = 0.43757690
Iteration 18, loss = 0.43690350
Iteration 19, loss = 0.43757734
Iteration 20, loss = 0.43629127
Iteration 21, loss = 0.43202027
Iteration 22, loss = 0.43431662
Iteration 23, loss = 0.43273764
Iteration 24, loss = 0.43148952
Iteration 25, loss = 0.43538111
Iteration 26, loss = 0.43379803
Iteration 27, loss = 0.43238815
Iteration 28, loss = 0.43177493
Iteration 29, loss = 0.43140488
Iteration 30, loss = 0.43244592
Iteration 31, loss = 0.42969434
Iteration 32, loss = 0.42738387
Iteration 33, loss = 0.42890827
Iteration 34, loss = 0.42923280
Iteration 35, loss = 0.42673001
Iteration 36, loss = 0.42926162
Iteration 37, loss = 0.42828934
Iteration 38, loss = 0.42521019
Iteration 39, loss = 0.42594957
Iteration 40, loss = 0.42600973
Iteration 41, loss = 0.42777380

Iteration 42, loss = 0.42594323
Iteration 43, loss = 0.42387031
Iteration 44, loss = 0.42563513
Iteration 45, loss = 0.42550178
Iteration 46, loss = 0.42166231
Iteration 47, loss = 0.42396663
Iteration 48, loss = 0.42027988
Iteration 49, loss = 0.42230164
Iteration 50, loss = 0.42187465
Iteration 51, loss = 0.42026306
Iteration 52, loss = 0.42046893
Iteration 53, loss = 0.42160044
Iteration 54, loss = 0.41734011
Iteration 55, loss = 0.41839155
Iteration 56, loss = 0.41629768
Iteration 57, loss = 0.41587585
Iteration 58, loss = 0.41472478
Iteration 59, loss = 0.41620955
Iteration 60, loss = 0.41794867
Iteration 61, loss = 0.41435534
Iteration 62, loss = 0.41526652
Iteration 63, loss = 0.41297207
Iteration 64, loss = 0.41187491
Iteration 65, loss = 0.41201739
Iteration 66, loss = 0.41204890
Iteration 67, loss = 0.41256849
Iteration 68, loss = 0.41228364
Iteration 69, loss = 0.40743842
Iteration 70, loss = 0.41083598
Iteration 71, loss = 0.40766080
Iteration 72, loss = 0.40875874
Iteration 73, loss = 0.40674090
Iteration 74, loss = 0.40878886
Iteration 75, loss = 0.40777545
Iteration 76, loss = 0.40535464
Iteration 77, loss = 0.40365588
Iteration 78, loss = 0.40520736
Iteration 79, loss = 0.40046416
Iteration 80, loss = 0.40199120
Iteration 81, loss = 0.40220625
Iteration 82, loss = 0.40303088
Iteration 83, loss = 0.40160576
Iteration 84, loss = 0.39916470
Iteration 85, loss = 0.40054552
Iteration 86, loss = 0.40041231
Iteration 87, loss = 0.39942995
Iteration 88, loss = 0.39897755
Iteration 89, loss = 0.40138705
Iteration 90, loss = 0.39575922
Iteration 91, loss = 0.39847926
Iteration 92, loss = 0.39713302
Iteration 93, loss = 0.39594027
Iteration 94, loss = 0.39693826
Iteration 95, loss = 0.39551117
Iteration 96, loss = 0.39487646
Iteration 97, loss = 0.39423978
Iteration 98, loss = 0.39528662

Iteration 99, loss = 0.39381233
Iteration 100, loss = 0.39377334
Iteration 101, loss = 0.39369315
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54427719
Iteration 2, loss = 0.48859286
Iteration 3, loss = 0.47877949
Iteration 4, loss = 0.47236184
Iteration 5, loss = 0.47050741
Iteration 6, loss = 0.46604756
Iteration 7, loss = 0.46425880
Iteration 8, loss = 0.46116518
Iteration 9, loss = 0.45943508
Iteration 10, loss = 0.45688204
Iteration 11, loss = 0.45551147
Iteration 12, loss = 0.45211002
Iteration 13, loss = 0.45009075
Iteration 14, loss = 0.44979580
Iteration 15, loss = 0.45027240
Iteration 16, loss = 0.44675289
Iteration 17, loss = 0.44463866
Iteration 18, loss = 0.44405969
Iteration 19, loss = 0.44167742
Iteration 20, loss = 0.44428496
Iteration 21, loss = 0.44289919
Iteration 22, loss = 0.44052252
Iteration 23, loss = 0.44056893
Iteration 24, loss = 0.43893681
Iteration 25, loss = 0.43915389
Iteration 26, loss = 0.43630048
Iteration 27, loss = 0.43667895
Iteration 28, loss = 0.43539615
Iteration 29, loss = 0.43439060
Iteration 30, loss = 0.43655968
Iteration 31, loss = 0.43378654
Iteration 32, loss = 0.43321213
Iteration 33, loss = 0.43377102
Iteration 34, loss = 0.43588024
Iteration 35, loss = 0.43413045
Iteration 36, loss = 0.43216722
Iteration 37, loss = 0.43149909
Iteration 38, loss = 0.42896470
Iteration 39, loss = 0.42989739
Iteration 40, loss = 0.42898278
Iteration 41, loss = 0.42966356
Iteration 42, loss = 0.42871593
Iteration 43, loss = 0.42715407
Iteration 44, loss = 0.42566930
Iteration 45, loss = 0.42606116
Iteration 46, loss = 0.42366718
Iteration 47, loss = 0.42483861
Iteration 48, loss = 0.42157031
Iteration 49, loss = 0.42210797
Iteration 50, loss = 0.42122739
Iteration 51, loss = 0.41979296
Iteration 52, loss = 0.41924308


```
Iteration 53, loss = 0.41977250
Iteration 54, loss = 0.41683429
Iteration 55, loss = 0.41803970
Iteration 56, loss = 0.41483018
Iteration 57, loss = 0.41599141
Iteration 58, loss = 0.41477060
Iteration 59, loss = 0.41208806
Iteration 60, loss = 0.41277028
Iteration 61, loss = 0.41400057
Iteration 62, loss = 0.41155746
Iteration 63, loss = 0.41266610
Iteration 64, loss = 0.41231380
Iteration 65, loss = 0.41245724
Iteration 66, loss = 0.40716508
Iteration 67, loss = 0.40745008
Iteration 68, loss = 0.40785298
Iteration 69, loss = 0.40692089
Iteration 70, loss = 0.40096511
Iteration 71, loss = 0.40211625
Iteration 72, loss = 0.39986338
Iteration 73, loss = 0.39917472
Iteration 74, loss = 0.39800351
Iteration 75, loss = 0.39714885
Iteration 76, loss = 0.39698333
Iteration 77, loss = 0.39734250
Iteration 78, loss = 0.39346744
Iteration 79, loss = 0.39512686
Iteration 80, loss = 0.39529408
Iteration 81, loss = 0.39114443
Iteration 82, loss = 0.39368708
Iteration 83, loss = 0.39346590
Iteration 84, loss = 0.39227311
Iteration 85, loss = 0.39101906
Iteration 86, loss = 0.38966653
Iteration 87, loss = 0.39162705
Iteration 88, loss = 0.39165682
Iteration 89, loss = 0.39089928
Iteration 90, loss = 0.38967570
Iteration 91, loss = 0.39206926
Iteration 92, loss = 0.38923590
Iteration 93, loss = 0.38817141
Iteration 94, loss = 0.39182371
Iteration 95, loss = 0.38791600
Iteration 96, loss = 0.38606886
Iteration 97, loss = 0.39157131
Iteration 98, loss = 0.38849409
Iteration 99, loss = 0.38595611
Iteration 100, loss = 0.39048941
Iteration 101, loss = 0.38635028
Iteration 102, loss = 0.38683839
Iteration 103, loss = 0.38505781
Iteration 104, loss = 0.38568996
Iteration 105, loss = 0.38487106
Iteration 106, loss = 0.38720257
Iteration 107, loss = 0.38920299
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
```

Iteration 1, loss = 0.53415093
Iteration 2, loss = 0.48145570
Iteration 3, loss = 0.47267031
Iteration 4, loss = 0.46623413
Iteration 5, loss = 0.46582203
Iteration 6, loss = 0.46019836
Iteration 7, loss = 0.45847751
Iteration 8, loss = 0.45451985
Iteration 9, loss = 0.45247336
Iteration 10, loss = 0.44836003
Iteration 11, loss = 0.44641935
Iteration 12, loss = 0.44518131
Iteration 13, loss = 0.44386778
Iteration 14, loss = 0.44234005
Iteration 15, loss = 0.43953378
Iteration 16, loss = 0.43758662
Iteration 17, loss = 0.43790845
Iteration 18, loss = 0.43574757
Iteration 19, loss = 0.43410960
Iteration 20, loss = 0.43476464
Iteration 21, loss = 0.43392883
Iteration 22, loss = 0.43204791
Iteration 23, loss = 0.42921259
Iteration 24, loss = 0.42719816
Iteration 25, loss = 0.42788729
Iteration 26, loss = 0.42665905
Iteration 27, loss = 0.42380250
Iteration 28, loss = 0.42520400
Iteration 29, loss = 0.42362535
Iteration 30, loss = 0.42295912
Iteration 31, loss = 0.42196362
Iteration 32, loss = 0.41954481
Iteration 33, loss = 0.42021176
Iteration 34, loss = 0.41834756
Iteration 35, loss = 0.41831146
Iteration 36, loss = 0.41688631
Iteration 37, loss = 0.41605745
Iteration 38, loss = 0.41724311
Iteration 39, loss = 0.41421527
Iteration 40, loss = 0.41272696
Iteration 41, loss = 0.41152830
Iteration 42, loss = 0.41139486
Iteration 43, loss = 0.41042349
Iteration 44, loss = 0.41268244
Iteration 45, loss = 0.41114095
Iteration 46, loss = 0.40782263
Iteration 47, loss = 0.41171794
Iteration 48, loss = 0.41022618
Iteration 49, loss = 0.40902066
Iteration 50, loss = 0.40851407
Iteration 51, loss = 0.40711135
Iteration 52, loss = 0.40765132
Iteration 53, loss = 0.40554593
Iteration 54, loss = 0.40589967
Iteration 55, loss = 0.40464126
Iteration 56, loss = 0.40478684
Iteration 57, loss = 0.40571483

Iteration 58, loss = 0.40624151
Iteration 59, loss = 0.40138175
Iteration 60, loss = 0.40331505
Iteration 61, loss = 0.40294576
Iteration 62, loss = 0.40044423
Iteration 63, loss = 0.40268012
Iteration 64, loss = 0.40157541
Iteration 65, loss = 0.40170321
Iteration 66, loss = 0.40307779
Iteration 67, loss = 0.40058088
Iteration 68, loss = 0.40041300
Iteration 69, loss = 0.39990981
Iteration 70, loss = 0.39968909

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53874091
Iteration 2, loss = 0.48347664
Iteration 3, loss = 0.47312702
Iteration 4, loss = 0.46645003
Iteration 5, loss = 0.46278198
Iteration 6, loss = 0.46276334
Iteration 7, loss = 0.46029054
Iteration 8, loss = 0.45662008
Iteration 9, loss = 0.45415963
Iteration 10, loss = 0.45157793
Iteration 11, loss = 0.45079039
Iteration 12, loss = 0.44681458
Iteration 13, loss = 0.44566475
Iteration 14, loss = 0.44163537
Iteration 15, loss = 0.44282942
Iteration 16, loss = 0.44313473
Iteration 17, loss = 0.43707231
Iteration 18, loss = 0.43461082
Iteration 19, loss = 0.43587741
Iteration 20, loss = 0.43345010
Iteration 21, loss = 0.43162422
Iteration 22, loss = 0.43400493
Iteration 23, loss = 0.43083545
Iteration 24, loss = 0.42866491
Iteration 25, loss = 0.42745008
Iteration 26, loss = 0.42543071
Iteration 27, loss = 0.42380614
Iteration 28, loss = 0.42456931
Iteration 29, loss = 0.42208166
Iteration 30, loss = 0.42311666
Iteration 31, loss = 0.42166035
Iteration 32, loss = 0.42348772
Iteration 33, loss = 0.42019583
Iteration 34, loss = 0.41772921
Iteration 35, loss = 0.41608681
Iteration 36, loss = 0.41784043
Iteration 37, loss = 0.41768087
Iteration 38, loss = 0.41430766
Iteration 39, loss = 0.41377751
Iteration 40, loss = 0.41235654
Iteration 41, loss = 0.41429141
Iteration 42, loss = 0.41502969

Iteration 43, loss = 0.41349231
Iteration 44, loss = 0.41337843
Iteration 45, loss = 0.41455248
Iteration 46, loss = 0.41198650
Iteration 47, loss = 0.41128204
Iteration 48, loss = 0.40934050
Iteration 49, loss = 0.40984132
Iteration 50, loss = 0.40772172
Iteration 51, loss = 0.40894428
Iteration 52, loss = 0.40638543
Iteration 53, loss = 0.40978524
Iteration 54, loss = 0.40555398
Iteration 55, loss = 0.40699598
Iteration 56, loss = 0.40512081
Iteration 57, loss = 0.40393591
Iteration 58, loss = 0.40480752
Iteration 59, loss = 0.40200980
Iteration 60, loss = 0.40367752
Iteration 61, loss = 0.40398368
Iteration 62, loss = 0.40112431
Iteration 63, loss = 0.40358749
Iteration 64, loss = 0.40007131
Iteration 65, loss = 0.40090595
Iteration 66, loss = 0.39938159
Iteration 67, loss = 0.40166955
Iteration 68, loss = 0.39832454
Iteration 69, loss = 0.40042131
Iteration 70, loss = 0.39872912
Iteration 71, loss = 0.39929486
Iteration 72, loss = 0.40037620
Iteration 73, loss = 0.39873778
Iteration 74, loss = 0.39789887
Iteration 75, loss = 0.39851446
Iteration 76, loss = 0.39833694
Iteration 77, loss = 0.39490356
Iteration 78, loss = 0.39608282
Iteration 79, loss = 0.40128708
Iteration 80, loss = 0.39619647
Iteration 81, loss = 0.39453908
Iteration 82, loss = 0.39440644
Iteration 83, loss = 0.39356943
Iteration 84, loss = 0.39405673
Iteration 85, loss = 0.39350552
Iteration 86, loss = 0.39739666
Iteration 87, loss = 0.39198688
Iteration 88, loss = 0.39294105
Iteration 89, loss = 0.39560111
Iteration 90, loss = 0.38973223
Iteration 91, loss = 0.39406765
Iteration 92, loss = 0.39143073
Iteration 93, loss = 0.39220108
Iteration 94, loss = 0.39030509
Iteration 95, loss = 0.39035957
Iteration 96, loss = 0.38916557
Iteration 97, loss = 0.38906352
Iteration 98, loss = 0.39154907
Iteration 99, loss = 0.38912097

Iteration 100, loss = 0.39150964
Iteration 101, loss = 0.38899819
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.
Iteration 1, loss = 0.54372045
Iteration 2, loss = 0.48643423
Iteration 3, loss = 0.47647124
Iteration 4, loss = 0.47029610
Iteration 5, loss = 0.46789133
Iteration 6, loss = 0.46629085
Iteration 7, loss = 0.46210465
Iteration 8, loss = 0.45891946
Iteration 9, loss = 0.45288062
Iteration 10, loss = 0.45259873
Iteration 11, loss = 0.45054847
Iteration 12, loss = 0.44758971
Iteration 13, loss = 0.44771991
Iteration 14, loss = 0.44445246
Iteration 15, loss = 0.44627100
Iteration 16, loss = 0.44604963
Iteration 17, loss = 0.44252230
Iteration 18, loss = 0.43934309
Iteration 19, loss = 0.43809540
Iteration 20, loss = 0.43697653
Iteration 21, loss = 0.43546218
Iteration 22, loss = 0.43923997
Iteration 23, loss = 0.43363825
Iteration 24, loss = 0.43273388
Iteration 25, loss = 0.43122005
Iteration 26, loss = 0.43131485
Iteration 27, loss = 0.42700194
Iteration 28, loss = 0.42837538
Iteration 29, loss = 0.42861023
Iteration 30, loss = 0.42592246
Iteration 31, loss = 0.42411583
Iteration 32, loss = 0.42754552
Iteration 33, loss = 0.42228011
Iteration 34, loss = 0.41897020
Iteration 35, loss = 0.41998168
Iteration 36, loss = 0.41949715
Iteration 37, loss = 0.41757306
Iteration 38, loss = 0.41564378
Iteration 39, loss = 0.41424051
Iteration 40, loss = 0.41547316
Iteration 41, loss = 0.41638502
Iteration 42, loss = 0.41344709
Iteration 43, loss = 0.41435995
Iteration 44, loss = 0.41240327
Iteration 45, loss = 0.41367276
Iteration 46, loss = 0.41075685
Iteration 47, loss = 0.41145386
Iteration 48, loss = 0.40836060
Iteration 49, loss = 0.40993171
Iteration 50, loss = 0.40757889
Iteration 51, loss = 0.40716357
Iteration 52, loss = 0.40513659
Iteration 53, loss = 0.40440879

```
Iteration 54, loss = 0.40418092
Iteration 55, loss = 0.40549588
Iteration 56, loss = 0.40440647
Iteration 57, loss = 0.40300041
Iteration 58, loss = 0.40093619
Iteration 59, loss = 0.40078394
Iteration 60, loss = 0.40023809
Iteration 61, loss = 0.39911495
Iteration 62, loss = 0.40331859
Iteration 63, loss = 0.40152747
Iteration 64, loss = 0.39732013
Iteration 65, loss = 0.39806475
Iteration 66, loss = 0.39971617
Iteration 67, loss = 0.40017755
Iteration 68, loss = 0.39865229
Iteration 69, loss = 0.39727166
Iteration 70, loss = 0.39686713
Iteration 71, loss = 0.39728784
Iteration 72, loss = 0.40282740
Iteration 73, loss = 0.40160431
Iteration 74, loss = 0.39759370
Iteration 75, loss = 0.39876526
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54302650
Iteration 2, loss = 0.48719937
Iteration 3, loss = 0.47735022
Iteration 4, loss = 0.47127959
Iteration 5, loss = 0.46844607
Iteration 6, loss = 0.46487286
Iteration 7, loss = 0.46154952
Iteration 8, loss = 0.45977430
Iteration 9, loss = 0.45473515
Iteration 10, loss = 0.45243995
Iteration 11, loss = 0.45057511
Iteration 12, loss = 0.45005583
Iteration 13, loss = 0.44758658
Iteration 14, loss = 0.44718664
Iteration 15, loss = 0.44538689
Iteration 16, loss = 0.44561838
Iteration 17, loss = 0.44422152
Iteration 18, loss = 0.44104534
Iteration 19, loss = 0.43963997
Iteration 20, loss = 0.43773363
Iteration 21, loss = 0.43564588
Iteration 22, loss = 0.43981080
Iteration 23, loss = 0.43610526
Iteration 24, loss = 0.43363670
Iteration 25, loss = 0.43129252
Iteration 26, loss = 0.43345782
Iteration 27, loss = 0.43170194
Iteration 28, loss = 0.43103755
Iteration 29, loss = 0.43054589
Iteration 30, loss = 0.42909302
Iteration 31, loss = 0.42749041
Iteration 32, loss = 0.42965478
Iteration 33, loss = 0.42811285
```

Iteration 34, loss = 0.42659364
Iteration 35, loss = 0.42513779
Iteration 36, loss = 0.42513262
Iteration 37, loss = 0.42614373
Iteration 38, loss = 0.42373812
Iteration 39, loss = 0.42370622
Iteration 40, loss = 0.42039649
Iteration 41, loss = 0.42390922
Iteration 42, loss = 0.42163801
Iteration 43, loss = 0.42164418
Iteration 44, loss = 0.42424163
Iteration 45, loss = 0.42042451
Iteration 46, loss = 0.42082431
Iteration 47, loss = 0.42167236
Iteration 48, loss = 0.41858229
Iteration 49, loss = 0.42024701
Iteration 50, loss = 0.41962265
Iteration 51, loss = 0.41879414
Iteration 52, loss = 0.41964456
Iteration 53, loss = 0.41660980
Iteration 54, loss = 0.41650939
Iteration 55, loss = 0.41714185
Iteration 56, loss = 0.41529356
Iteration 57, loss = 0.41250219
Iteration 58, loss = 0.41301312
Iteration 59, loss = 0.41186948
Iteration 60, loss = 0.41136737
Iteration 61, loss = 0.41004643
Iteration 62, loss = 0.41388212
Iteration 63, loss = 0.41597805
Iteration 64, loss = 0.41011860
Iteration 65, loss = 0.41072124
Iteration 66, loss = 0.40845132
Iteration 67, loss = 0.40813136
Iteration 68, loss = 0.40768031
Iteration 69, loss = 0.40812360
Iteration 70, loss = 0.40822923
Iteration 71, loss = 0.40755645
Iteration 72, loss = 0.40928487
Iteration 73, loss = 0.40745414
Iteration 74, loss = 0.40467745
Iteration 75, loss = 0.40434587
Iteration 76, loss = 0.40264484
Iteration 77, loss = 0.40483870
Iteration 78, loss = 0.40273530
Iteration 79, loss = 0.40109100
Iteration 80, loss = 0.40212906
Iteration 81, loss = 0.40343258
Iteration 82, loss = 0.40086981
Iteration 83, loss = 0.40441112
Iteration 84, loss = 0.39751439
Iteration 85, loss = 0.40403273
Iteration 86, loss = 0.39883924
Iteration 87, loss = 0.40133221
Iteration 88, loss = 0.40117536
Iteration 89, loss = 0.39695782
Iteration 90, loss = 0.39829839

```
Iteration 91, loss = 0.39661676
Iteration 92, loss = 0.39584517
Iteration 93, loss = 0.39427342
Iteration 94, loss = 0.39615449
Iteration 95, loss = 0.39624561
Iteration 96, loss = 0.39486584
Iteration 97, loss = 0.39607911
Iteration 98, loss = 0.40126407
Iteration 99, loss = 0.39662293
Iteration 100, loss = 0.39451136
Iteration 101, loss = 0.39536893
Iteration 102, loss = 0.39315742
Iteration 103, loss = 0.39629088
Iteration 104, loss = 0.39282393
Iteration 105, loss = 0.39195377
Iteration 106, loss = 0.39549451
Iteration 107, loss = 0.38978276
Iteration 108, loss = 0.39256573
Iteration 109, loss = 0.39045238
Iteration 110, loss = 0.39335246
Iteration 111, loss = 0.39786713
Iteration 112, loss = 0.39286311
Iteration 113, loss = 0.39081275
Iteration 114, loss = 0.38971006
Iteration 115, loss = 0.39001408
Iteration 116, loss = 0.39070991
Iteration 117, loss = 0.39266435
Iteration 118, loss = 0.38647977
Iteration 119, loss = 0.38664368
Iteration 120, loss = 0.39297694
Iteration 121, loss = 0.39060563
Iteration 122, loss = 0.38459313
Iteration 123, loss = 0.38798875
Iteration 124, loss = 0.39408599
Iteration 125, loss = 0.38961291
Iteration 126, loss = 0.38606536
Iteration 127, loss = 0.39374139
Iteration 128, loss = 0.38539702
Iteration 129, loss = 0.38204006
Iteration 130, loss = 0.38317752
Iteration 131, loss = 0.38552985
Iteration 132, loss = 0.38858560
Iteration 133, loss = 0.38997160
Iteration 134, loss = 0.38612733
Iteration 135, loss = 0.38526533
Iteration 136, loss = 0.38412262
Iteration 137, loss = 0.38244702
Iteration 138, loss = 0.38528794
Iteration 139, loss = 0.38283054
Iteration 140, loss = 0.38230932
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.53820164
Iteration 2, loss = 0.48029797
Iteration 3, loss = 0.47066682
Iteration 4, loss = 0.46557475
Iteration 5, loss = 0.46380141
```


Iteration 6, loss = 0.45928530
Iteration 7, loss = 0.45884065
Iteration 8, loss = 0.45532310
Iteration 9, loss = 0.44983841
Iteration 10, loss = 0.44810280
Iteration 11, loss = 0.44591483
Iteration 12, loss = 0.44501109
Iteration 13, loss = 0.44242660
Iteration 14, loss = 0.43846966
Iteration 15, loss = 0.43685485
Iteration 16, loss = 0.43584324
Iteration 17, loss = 0.43560366
Iteration 18, loss = 0.43211951
Iteration 19, loss = 0.43275686
Iteration 20, loss = 0.43022875
Iteration 21, loss = 0.42974837
Iteration 22, loss = 0.43104122
Iteration 23, loss = 0.42702803
Iteration 24, loss = 0.42280743
Iteration 25, loss = 0.42326212
Iteration 26, loss = 0.42342187
Iteration 27, loss = 0.42152239
Iteration 28, loss = 0.42128752
Iteration 29, loss = 0.41964854
Iteration 30, loss = 0.41876124
Iteration 31, loss = 0.41752547
Iteration 32, loss = 0.41949660
Iteration 33, loss = 0.41576719
Iteration 34, loss = 0.41734088
Iteration 35, loss = 0.41516369
Iteration 36, loss = 0.41268397
Iteration 37, loss = 0.41535787
Iteration 38, loss = 0.41161209
Iteration 39, loss = 0.41355755
Iteration 40, loss = 0.40893068
Iteration 41, loss = 0.41261529
Iteration 42, loss = 0.41217203
Iteration 43, loss = 0.40762992
Iteration 44, loss = 0.41404738
Iteration 45, loss = 0.40819920
Iteration 46, loss = 0.41035809
Iteration 47, loss = 0.40622049
Iteration 48, loss = 0.40700920
Iteration 49, loss = 0.40763609
Iteration 50, loss = 0.40785733
Iteration 51, loss = 0.40702720
Iteration 52, loss = 0.40777489
Iteration 53, loss = 0.40750812
Iteration 54, loss = 0.40340768
Iteration 55, loss = 0.40201123
Iteration 56, loss = 0.40308304
Iteration 57, loss = 0.40156312
Iteration 58, loss = 0.39878211
Iteration 59, loss = 0.40231186
Iteration 60, loss = 0.40259750
Iteration 61, loss = 0.40016213
Iteration 62, loss = 0.39879183

Iteration 63, loss = 0.40276169
Iteration 64, loss = 0.39830580
Iteration 65, loss = 0.39804378
Iteration 66, loss = 0.39755925
Iteration 67, loss = 0.39687562
Iteration 68, loss = 0.39707667
Iteration 69, loss = 0.39735515
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54079443
Iteration 2, loss = 0.48474098
Iteration 3, loss = 0.47638712
Iteration 4, loss = 0.46738825
Iteration 5, loss = 0.46463030
Iteration 6, loss = 0.46150652
Iteration 7, loss = 0.45936891
Iteration 8, loss = 0.45794657
Iteration 9, loss = 0.45573211
Iteration 10, loss = 0.45246827
Iteration 11, loss = 0.45102868
Iteration 12, loss = 0.44905268
Iteration 13, loss = 0.44646595
Iteration 14, loss = 0.44470240
Iteration 15, loss = 0.44549739
Iteration 16, loss = 0.44128008
Iteration 17, loss = 0.44224327
Iteration 18, loss = 0.44179061
Iteration 19, loss = 0.43656996
Iteration 20, loss = 0.43677300
Iteration 21, loss = 0.43511504
Iteration 22, loss = 0.43243620
Iteration 23, loss = 0.43162819
Iteration 24, loss = 0.43172933
Iteration 25, loss = 0.42784698
Iteration 26, loss = 0.42723608
Iteration 27, loss = 0.42524679
Iteration 28, loss = 0.42661604
Iteration 29, loss = 0.42656186
Iteration 30, loss = 0.42324528
Iteration 31, loss = 0.42292049
Iteration 32, loss = 0.42193720
Iteration 33, loss = 0.42246664
Iteration 34, loss = 0.42071034
Iteration 35, loss = 0.42001013
Iteration 36, loss = 0.42005453
Iteration 37, loss = 0.42141661
Iteration 38, loss = 0.41698966
Iteration 39, loss = 0.41553125
Iteration 40, loss = 0.41659253
Iteration 41, loss = 0.41470891
Iteration 42, loss = 0.41516823
Iteration 43, loss = 0.41269753
Iteration 44, loss = 0.41168024
Iteration 45, loss = 0.41257673
Iteration 46, loss = 0.41047409
Iteration 47, loss = 0.41344933
Iteration 48, loss = 0.41096436

Iteration 49, loss = 0.41000470
Iteration 50, loss = 0.40804817
Iteration 51, loss = 0.40871134
Iteration 52, loss = 0.40870471
Iteration 53, loss = 0.40651001
Iteration 54, loss = 0.40509881
Iteration 55, loss = 0.40677352
Iteration 56, loss = 0.40480123
Iteration 57, loss = 0.40609878
Iteration 58, loss = 0.40832931
Iteration 59, loss = 0.40447486
Iteration 60, loss = 0.40602068
Iteration 61, loss = 0.40093983
Iteration 62, loss = 0.40244283
Iteration 63, loss = 0.40239889
Iteration 64, loss = 0.40153689
Iteration 65, loss = 0.40263943
Iteration 66, loss = 0.40169618
Iteration 67, loss = 0.40367424
Iteration 68, loss = 0.40178783
Iteration 69, loss = 0.40076882
Iteration 70, loss = 0.40052425
Iteration 71, loss = 0.39972262
Iteration 72, loss = 0.40119457

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53658771
Iteration 2, loss = 0.48375837
Iteration 3, loss = 0.47542181
Iteration 4, loss = 0.46868712
Iteration 5, loss = 0.46555251
Iteration 6, loss = 0.46217727
Iteration 7, loss = 0.45696971
Iteration 8, loss = 0.45292925
Iteration 9, loss = 0.45031935
Iteration 10, loss = 0.44760568
Iteration 11, loss = 0.44586929
Iteration 12, loss = 0.44236331
Iteration 13, loss = 0.44086051
Iteration 14, loss = 0.43804640
Iteration 15, loss = 0.43835293
Iteration 16, loss = 0.43654340
Iteration 17, loss = 0.43588999
Iteration 18, loss = 0.43557254
Iteration 19, loss = 0.43250085
Iteration 20, loss = 0.43055835
Iteration 21, loss = 0.42759535
Iteration 22, loss = 0.42811381
Iteration 23, loss = 0.42714617
Iteration 24, loss = 0.42446784
Iteration 25, loss = 0.42414548
Iteration 26, loss = 0.42155768
Iteration 27, loss = 0.41922058
Iteration 28, loss = 0.41822313
Iteration 29, loss = 0.41320769
Iteration 30, loss = 0.41149404
Iteration 31, loss = 0.41086847

```
Iteration 32, loss = 0.40806384
Iteration 33, loss = 0.40394331
Iteration 34, loss = 0.40589671
Iteration 35, loss = 0.40352040
Iteration 36, loss = 0.40244877
Iteration 37, loss = 0.40063872
Iteration 38, loss = 0.39987525
Iteration 39, loss = 0.39702920
Iteration 40, loss = 0.39676174
Iteration 41, loss = 0.39542925
Iteration 42, loss = 0.39677900
Iteration 43, loss = 0.39336519
Iteration 44, loss = 0.39329723
Iteration 45, loss = 0.39191615
Iteration 46, loss = 0.38925210
Iteration 47, loss = 0.38974893
Iteration 48, loss = 0.38903706
Iteration 49, loss = 0.38938856
Iteration 50, loss = 0.39027536
Iteration 51, loss = 0.38803894
Iteration 52, loss = 0.38693520
Iteration 53, loss = 0.38928788
Iteration 54, loss = 0.38612138
Iteration 55, loss = 0.38631778
Iteration 56, loss = 0.38196128
Iteration 57, loss = 0.38467976
Iteration 58, loss = 0.38756947
Iteration 59, loss = 0.38454661
Iteration 60, loss = 0.38293824
Iteration 61, loss = 0.38132405
Iteration 62, loss = 0.38286365
Iteration 63, loss = 0.38124056
Iteration 64, loss = 0.38377417
Iteration 65, loss = 0.38103423
Iteration 66, loss = 0.38031211
Iteration 67, loss = 0.37860439
Iteration 68, loss = 0.37962022
Iteration 69, loss = 0.37959099
Iteration 70, loss = 0.37679705
Iteration 71, loss = 0.37712195
Iteration 72, loss = 0.37864029
Iteration 73, loss = 0.37746613
Iteration 74, loss = 0.37860811
Iteration 75, loss = 0.37642414
Iteration 76, loss = 0.37697139
Iteration 77, loss = 0.37594574
Iteration 78, loss = 0.37520364
Iteration 79, loss = 0.37794583
Iteration 80, loss = 0.37759733
Iteration 81, loss = 0.37513625
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54258949
Iteration 2, loss = 0.48409168
Iteration 3, loss = 0.47527146
Iteration 4, loss = 0.46902441
Iteration 5, loss = 0.46629699
```

Iteration 6, loss = 0.46390855
Iteration 7, loss = 0.46016052
Iteration 8, loss = 0.45723194
Iteration 9, loss = 0.45746684
Iteration 10, loss = 0.45391170
Iteration 11, loss = 0.45063275
Iteration 12, loss = 0.45050485
Iteration 13, loss = 0.44519590
Iteration 14, loss = 0.44208589
Iteration 15, loss = 0.44140187
Iteration 16, loss = 0.44137953
Iteration 17, loss = 0.43777185
Iteration 18, loss = 0.43693680
Iteration 19, loss = 0.43457908
Iteration 20, loss = 0.43336468
Iteration 21, loss = 0.43179873
Iteration 22, loss = 0.43124663
Iteration 23, loss = 0.43080451
Iteration 24, loss = 0.42910536
Iteration 25, loss = 0.42646503
Iteration 26, loss = 0.42688298
Iteration 27, loss = 0.42259141
Iteration 28, loss = 0.42400715
Iteration 29, loss = 0.42376528
Iteration 30, loss = 0.41857838
Iteration 31, loss = 0.42054150
Iteration 32, loss = 0.42251084
Iteration 33, loss = 0.41545263
Iteration 34, loss = 0.41939876
Iteration 35, loss = 0.41667995
Iteration 36, loss = 0.41516600
Iteration 37, loss = 0.41359169
Iteration 38, loss = 0.41103383
Iteration 39, loss = 0.41176444
Iteration 40, loss = 0.40903710
Iteration 41, loss = 0.41123026
Iteration 42, loss = 0.40781052
Iteration 43, loss = 0.40661527
Iteration 44, loss = 0.40479735
Iteration 45, loss = 0.40048514
Iteration 46, loss = 0.40203869
Iteration 47, loss = 0.40019307
Iteration 48, loss = 0.39838443
Iteration 49, loss = 0.39695260
Iteration 50, loss = 0.39866076
Iteration 51, loss = 0.39423247
Iteration 52, loss = 0.40196249
Iteration 53, loss = 0.39380236
Iteration 54, loss = 0.39087033
Iteration 55, loss = 0.39111044
Iteration 56, loss = 0.39349357
Iteration 57, loss = 0.38813017
Iteration 58, loss = 0.38813194
Iteration 59, loss = 0.38721143
Iteration 60, loss = 0.38504752
Iteration 61, loss = 0.38621144
Iteration 62, loss = 0.38275334

```
Iteration 63, loss = 0.38273583
Iteration 64, loss = 0.38127340
Iteration 65, loss = 0.37930227
Iteration 66, loss = 0.38179474
Iteration 67, loss = 0.37956262
Iteration 68, loss = 0.37765620
Iteration 69, loss = 0.37934619
Iteration 70, loss = 0.38090082
Iteration 71, loss = 0.38233318
Iteration 72, loss = 0.37986964
Iteration 73, loss = 0.38083265
Iteration 74, loss = 0.37704905
Iteration 75, loss = 0.38246530
Iteration 76, loss = 0.38982406
Iteration 77, loss = 0.37626094
Iteration 78, loss = 0.37510044
Iteration 79, loss = 0.37719352
Iteration 80, loss = 0.37855927
Iteration 81, loss = 0.37461879
Iteration 82, loss = 0.37567175
Iteration 83, loss = 0.37242619
Iteration 84, loss = 0.37551451
Iteration 85, loss = 0.37319946
Iteration 86, loss = 0.37609860
Iteration 87, loss = 0.37241701
Iteration 88, loss = 0.37176940
Iteration 89, loss = 0.37911365
Iteration 90, loss = 0.37550371
Iteration 91, loss = 0.37255442
Iteration 92, loss = 0.36911551
Iteration 93, loss = 0.37201866
Iteration 94, loss = 0.37152665
Iteration 95, loss = 0.36653653
Iteration 96, loss = 0.37090979
Iteration 97, loss = 0.36546996
Iteration 98, loss = 0.37378624
Iteration 99, loss = 0.36773268
Iteration 100, loss = 0.36529130
Iteration 101, loss = 0.37469234
Iteration 102, loss = 0.36877306
Iteration 103, loss = 0.36924568
Iteration 104, loss = 0.36596847
Iteration 105, loss = 0.36748351
Iteration 106, loss = 0.36829809
Iteration 107, loss = 0.36517655
Iteration 108, loss = 0.36682834
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54657314
Iteration 2, loss = 0.49070525
Iteration 3, loss = 0.48175442
Iteration 4, loss = 0.47609857
Iteration 5, loss = 0.46889925
Iteration 6, loss = 0.46464746
Iteration 7, loss = 0.45956648
Iteration 8, loss = 0.45507660
Iteration 9, loss = 0.45396286
```

Iteration 10, loss = 0.45015407
Iteration 11, loss = 0.44651038
Iteration 12, loss = 0.44492063
Iteration 13, loss = 0.44394981
Iteration 14, loss = 0.44064225
Iteration 15, loss = 0.44276012
Iteration 16, loss = 0.43891624
Iteration 17, loss = 0.43791965
Iteration 18, loss = 0.43657702
Iteration 19, loss = 0.43336447
Iteration 20, loss = 0.43323584
Iteration 21, loss = 0.43094390
Iteration 22, loss = 0.43032806
Iteration 23, loss = 0.42854532
Iteration 24, loss = 0.42836130
Iteration 25, loss = 0.42838386
Iteration 26, loss = 0.42691578
Iteration 27, loss = 0.42406568
Iteration 28, loss = 0.42553647
Iteration 29, loss = 0.42461321
Iteration 30, loss = 0.41887144
Iteration 31, loss = 0.42014863
Iteration 32, loss = 0.41381127
Iteration 33, loss = 0.41242908
Iteration 34, loss = 0.40964855
Iteration 35, loss = 0.40912743
Iteration 36, loss = 0.40802056
Iteration 37, loss = 0.41087886
Iteration 38, loss = 0.40661015
Iteration 39, loss = 0.40439324
Iteration 40, loss = 0.40779475
Iteration 41, loss = 0.40598944
Iteration 42, loss = 0.40054046
Iteration 43, loss = 0.40038098
Iteration 44, loss = 0.40091729
Iteration 45, loss = 0.39713745
Iteration 46, loss = 0.39805554
Iteration 47, loss = 0.39601922
Iteration 48, loss = 0.39903104
Iteration 49, loss = 0.39909102
Iteration 50, loss = 0.39499889
Iteration 51, loss = 0.39572776
Iteration 52, loss = 0.39631757
Iteration 53, loss = 0.39631792
Iteration 54, loss = 0.39124255
Iteration 55, loss = 0.39020461
Iteration 56, loss = 0.39024476
Iteration 57, loss = 0.39383872
Iteration 58, loss = 0.38449776
Iteration 59, loss = 0.38814714
Iteration 60, loss = 0.38517088
Iteration 61, loss = 0.38684996
Iteration 62, loss = 0.38468787
Iteration 63, loss = 0.38271827
Iteration 64, loss = 0.38542726
Iteration 65, loss = 0.38330761
Iteration 66, loss = 0.38217925

```
Iteration 67, loss = 0.38134588
Iteration 68, loss = 0.38033430
Iteration 69, loss = 0.37907762
Iteration 70, loss = 0.38161231
Iteration 71, loss = 0.38417886
Iteration 72, loss = 0.38242247
Iteration 73, loss = 0.38016861
Iteration 74, loss = 0.38136557
Iteration 75, loss = 0.38141036
Iteration 76, loss = 0.38168205
Iteration 77, loss = 0.37750858
Iteration 78, loss = 0.37773437
Iteration 79, loss = 0.37950105
Iteration 80, loss = 0.37811866
Iteration 81, loss = 0.37507139
Iteration 82, loss = 0.38100752
Iteration 83, loss = 0.37374281
Iteration 84, loss = 0.37736747
Iteration 85, loss = 0.37390564
Iteration 86, loss = 0.37482827
Iteration 87, loss = 0.37548084
Iteration 88, loss = 0.37250125
Iteration 89, loss = 0.37753253
Iteration 90, loss = 0.37210499
Iteration 91, loss = 0.37378423
Iteration 92, loss = 0.37372439
Iteration 93, loss = 0.37360237
Iteration 94, loss = 0.37285164
Iteration 95, loss = 0.37205171
Iteration 96, loss = 0.36823255
Iteration 97, loss = 0.36949049
Iteration 98, loss = 0.37379432
Iteration 99, loss = 0.37234188
Iteration 100, loss = 0.37125686
Iteration 101, loss = 0.37145332
Iteration 102, loss = 0.37396938
Iteration 103, loss = 0.36882202
Iteration 104, loss = 0.36599212
Iteration 105, loss = 0.37009805
Iteration 106, loss = 0.36736821
Iteration 107, loss = 0.36942784
Iteration 108, loss = 0.36688360
Iteration 109, loss = 0.37002699
Iteration 110, loss = 0.37036303
Iteration 111, loss = 0.36775640
Iteration 112, loss = 0.36620026
Iteration 113, loss = 0.36790295
Iteration 114, loss = 0.36604079
Iteration 115, loss = 0.36635550
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54784661
Iteration 2, loss = 0.49151767
Iteration 3, loss = 0.48076685
Iteration 4, loss = 0.47636995
Iteration 5, loss = 0.46890060
Iteration 6, loss = 0.46498545
```


Iteration 7, loss = 0.46256524
Iteration 8, loss = 0.45982434
Iteration 9, loss = 0.45475114
Iteration 10, loss = 0.45586026
Iteration 11, loss = 0.45003514
Iteration 12, loss = 0.44553079
Iteration 13, loss = 0.44896722
Iteration 14, loss = 0.44431854
Iteration 15, loss = 0.44661024
Iteration 16, loss = 0.44372986
Iteration 17, loss = 0.44022582
Iteration 18, loss = 0.44066550
Iteration 19, loss = 0.43850284
Iteration 20, loss = 0.43773429
Iteration 21, loss = 0.43684533
Iteration 22, loss = 0.43604931
Iteration 23, loss = 0.43435865
Iteration 24, loss = 0.43379722
Iteration 25, loss = 0.43177342
Iteration 26, loss = 0.43363652
Iteration 27, loss = 0.43181121
Iteration 28, loss = 0.43020219
Iteration 29, loss = 0.42899575
Iteration 30, loss = 0.42885926
Iteration 31, loss = 0.42683483
Iteration 32, loss = 0.42550805
Iteration 33, loss = 0.42398350
Iteration 34, loss = 0.42216548
Iteration 35, loss = 0.42167508
Iteration 36, loss = 0.41912535
Iteration 37, loss = 0.41688824
Iteration 38, loss = 0.41533227
Iteration 39, loss = 0.41183074
Iteration 40, loss = 0.41314250
Iteration 41, loss = 0.41192486
Iteration 42, loss = 0.40844067
Iteration 43, loss = 0.40630233
Iteration 44, loss = 0.40913425
Iteration 45, loss = 0.40624323
Iteration 46, loss = 0.40258956
Iteration 47, loss = 0.40214666
Iteration 48, loss = 0.40080976
Iteration 49, loss = 0.40333488
Iteration 50, loss = 0.40095332
Iteration 51, loss = 0.40175422
Iteration 52, loss = 0.40276069
Iteration 53, loss = 0.39900612
Iteration 54, loss = 0.39445295
Iteration 55, loss = 0.39586687
Iteration 56, loss = 0.39905176
Iteration 57, loss = 0.39881771
Iteration 58, loss = 0.39475711
Iteration 59, loss = 0.39237910
Iteration 60, loss = 0.39331135
Iteration 61, loss = 0.39436020
Iteration 62, loss = 0.39138483
Iteration 63, loss = 0.39288124

Iteration 64, loss = 0.39151531
Iteration 65, loss = 0.39266970
Iteration 66, loss = 0.38716939
Iteration 67, loss = 0.39193526
Iteration 68, loss = 0.38911368
Iteration 69, loss = 0.38765841
Iteration 70, loss = 0.38750467
Iteration 71, loss = 0.39027633
Iteration 72, loss = 0.38809587
Iteration 73, loss = 0.38869501
Iteration 74, loss = 0.38690767
Iteration 75, loss = 0.38705159
Iteration 76, loss = 0.38737587
Iteration 77, loss = 0.38917507

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54881965
Iteration 2, loss = 0.48460145
Iteration 3, loss = 0.47285439
Iteration 4, loss = 0.46841948
Iteration 5, loss = 0.46249674
Iteration 6, loss = 0.45928591
Iteration 7, loss = 0.45726473
Iteration 8, loss = 0.45705090
Iteration 9, loss = 0.45301690
Iteration 10, loss = 0.45030199
Iteration 11, loss = 0.44804525
Iteration 12, loss = 0.44220083
Iteration 13, loss = 0.44309638
Iteration 14, loss = 0.43939802
Iteration 15, loss = 0.43973318
Iteration 16, loss = 0.43493187
Iteration 17, loss = 0.43368131
Iteration 18, loss = 0.43234460
Iteration 19, loss = 0.43121908
Iteration 20, loss = 0.43122091
Iteration 21, loss = 0.42832503
Iteration 22, loss = 0.42674579
Iteration 23, loss = 0.42657006
Iteration 24, loss = 0.42586316
Iteration 25, loss = 0.42540571
Iteration 26, loss = 0.42405223
Iteration 27, loss = 0.42073245
Iteration 28, loss = 0.42133775
Iteration 29, loss = 0.42537524
Iteration 30, loss = 0.42249988
Iteration 31, loss = 0.41901307
Iteration 32, loss = 0.41718354
Iteration 33, loss = 0.41542577
Iteration 34, loss = 0.41570379
Iteration 35, loss = 0.41172978
Iteration 36, loss = 0.41163789
Iteration 37, loss = 0.41025876
Iteration 38, loss = 0.41017796
Iteration 39, loss = 0.41009233
Iteration 40, loss = 0.41009614
Iteration 41, loss = 0.40704405

Iteration 42, loss = 0.40748866
Iteration 43, loss = 0.40615629
Iteration 44, loss = 0.40603341
Iteration 45, loss = 0.40637239
Iteration 46, loss = 0.40407222
Iteration 47, loss = 0.40233602
Iteration 48, loss = 0.40098754
Iteration 49, loss = 0.39966392
Iteration 50, loss = 0.40038789
Iteration 51, loss = 0.40106646
Iteration 52, loss = 0.40006100
Iteration 53, loss = 0.39676730
Iteration 54, loss = 0.39454364
Iteration 55, loss = 0.39495380
Iteration 56, loss = 0.39222085
Iteration 57, loss = 0.39297503
Iteration 58, loss = 0.39323280
Iteration 59, loss = 0.39197986
Iteration 60, loss = 0.39395961
Iteration 61, loss = 0.39412076
Iteration 62, loss = 0.39320090
Iteration 63, loss = 0.39284579
Iteration 64, loss = 0.38965975
Iteration 65, loss = 0.38796597
Iteration 66, loss = 0.38867100
Iteration 67, loss = 0.39159564
Iteration 68, loss = 0.38882499
Iteration 69, loss = 0.39258540
Iteration 70, loss = 0.38671594
Iteration 71, loss = 0.38859519
Iteration 72, loss = 0.38757335
Iteration 73, loss = 0.38572431
Iteration 74, loss = 0.38685394
Iteration 75, loss = 0.38522949
Iteration 76, loss = 0.38588831
Iteration 77, loss = 0.38513558
Iteration 78, loss = 0.38440678
Iteration 79, loss = 0.38013214
Iteration 80, loss = 0.38478694
Iteration 81, loss = 0.37970684
Iteration 82, loss = 0.38371345
Iteration 83, loss = 0.38068015
Iteration 84, loss = 0.38383643
Iteration 85, loss = 0.38469749
Iteration 86, loss = 0.37814373
Iteration 87, loss = 0.37895540
Iteration 88, loss = 0.37924759
Iteration 89, loss = 0.37973120
Iteration 90, loss = 0.37954002
Iteration 91, loss = 0.38163658
Iteration 92, loss = 0.37700212
Iteration 93, loss = 0.37554657
Iteration 94, loss = 0.37621325
Iteration 95, loss = 0.37599360
Iteration 96, loss = 0.37598446
Iteration 97, loss = 0.37571586
Iteration 98, loss = 0.37283467

```
Iteration 99, loss = 0.37646897
Iteration 100, loss = 0.37640206
Iteration 101, loss = 0.37934238
Iteration 102, loss = 0.37864580
Iteration 103, loss = 0.37121598
Iteration 104, loss = 0.37287962
Iteration 105, loss = 0.37699608
Iteration 106, loss = 0.37766998
Iteration 107, loss = 0.37220676
Iteration 108, loss = 0.37739615
Iteration 109, loss = 0.37679695
Iteration 110, loss = 0.38260017
Iteration 111, loss = 0.37331671
Iteration 112, loss = 0.37002681
Iteration 113, loss = 0.37105106
Iteration 114, loss = 0.37315289
Iteration 115, loss = 0.37871756
Iteration 116, loss = 0.37050374
Iteration 117, loss = 0.36882578
Iteration 118, loss = 0.36965453
Iteration 119, loss = 0.37647667
Iteration 120, loss = 0.37680236
Iteration 121, loss = 0.36759479
Iteration 122, loss = 0.37091446
Iteration 123, loss = 0.37394229
Iteration 124, loss = 0.37391048
Iteration 125, loss = 0.37431820
Iteration 126, loss = 0.37086929
Iteration 127, loss = 0.36984469
Iteration 128, loss = 0.37130991
Iteration 129, loss = 0.37330581
Iteration 130, loss = 0.36674908
Iteration 131, loss = 0.36949928
Iteration 132, loss = 0.36890560
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54947583
Iteration 2, loss = 0.48962009
Iteration 3, loss = 0.47882559
Iteration 4, loss = 0.47050622
Iteration 5, loss = 0.46664017
Iteration 6, loss = 0.46503686
Iteration 7, loss = 0.46016680
Iteration 8, loss = 0.45457577
Iteration 9, loss = 0.45448038
Iteration 10, loss = 0.45427021
Iteration 11, loss = 0.45028553
Iteration 12, loss = 0.44684189
Iteration 13, loss = 0.44597733
Iteration 14, loss = 0.44462921
Iteration 15, loss = 0.44091249
Iteration 16, loss = 0.44181903
Iteration 17, loss = 0.43924651
Iteration 18, loss = 0.43848386
Iteration 19, loss = 0.43819434
Iteration 20, loss = 0.43646275
Iteration 21, loss = 0.43585772
```

Iteration 22, loss = 0.43483444
Iteration 23, loss = 0.43240734
Iteration 24, loss = 0.43295500
Iteration 25, loss = 0.43054230
Iteration 26, loss = 0.42869296
Iteration 27, loss = 0.42796027
Iteration 28, loss = 0.42447624
Iteration 29, loss = 0.42454783
Iteration 30, loss = 0.42373749
Iteration 31, loss = 0.41913530
Iteration 32, loss = 0.42354421
Iteration 33, loss = 0.41655196
Iteration 34, loss = 0.41337305
Iteration 35, loss = 0.41339390
Iteration 36, loss = 0.40977476
Iteration 37, loss = 0.41034021
Iteration 38, loss = 0.41151993
Iteration 39, loss = 0.40710117
Iteration 40, loss = 0.40545706
Iteration 41, loss = 0.40520142
Iteration 42, loss = 0.40398176
Iteration 43, loss = 0.40102752
Iteration 44, loss = 0.40468120
Iteration 45, loss = 0.40117268
Iteration 46, loss = 0.40062359
Iteration 47, loss = 0.39680664
Iteration 48, loss = 0.39584485
Iteration 49, loss = 0.40107830
Iteration 50, loss = 0.40078704
Iteration 51, loss = 0.39523038
Iteration 52, loss = 0.39387095
Iteration 53, loss = 0.39162686
Iteration 54, loss = 0.39278693
Iteration 55, loss = 0.39573250
Iteration 56, loss = 0.39497554
Iteration 57, loss = 0.39327181
Iteration 58, loss = 0.39021041
Iteration 59, loss = 0.38994123
Iteration 60, loss = 0.38980368
Iteration 61, loss = 0.38773879
Iteration 62, loss = 0.38852117
Iteration 63, loss = 0.38899131
Iteration 64, loss = 0.38450378
Iteration 65, loss = 0.38552667
Iteration 66, loss = 0.38609198
Iteration 67, loss = 0.38384037
Iteration 68, loss = 0.38475929
Iteration 69, loss = 0.38556530
Iteration 70, loss = 0.38303003
Iteration 71, loss = 0.38273970
Iteration 72, loss = 0.38849937
Iteration 73, loss = 0.38266080
Iteration 74, loss = 0.37773956
Iteration 75, loss = 0.38618790
Iteration 76, loss = 0.38244664
Iteration 77, loss = 0.38086248
Iteration 78, loss = 0.38172142

Iteration 79, loss = 0.37957255
Iteration 80, loss = 0.37791750
Iteration 81, loss = 0.37809740
Iteration 82, loss = 0.37741632
Iteration 83, loss = 0.38120731
Iteration 84, loss = 0.38297811
Iteration 85, loss = 0.37693544
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.52438566
Iteration 2, loss = 0.47840708
Iteration 3, loss = 0.46942844
Iteration 4, loss = 0.46251904
Iteration 5, loss = 0.46004625
Iteration 6, loss = 0.45701699
Iteration 7, loss = 0.45296450
Iteration 8, loss = 0.45173618
Iteration 9, loss = 0.44820553
Iteration 10, loss = 0.44813044
Iteration 11, loss = 0.44654984
Iteration 12, loss = 0.44553096
Iteration 13, loss = 0.44486104
Iteration 14, loss = 0.44382276
Iteration 15, loss = 0.44327051
Iteration 16, loss = 0.44298654
Iteration 17, loss = 0.44071936
Iteration 18, loss = 0.44236149
Iteration 19, loss = 0.44152582
Iteration 20, loss = 0.44171735
Iteration 21, loss = 0.43972820
Iteration 22, loss = 0.43848429
Iteration 23, loss = 0.44014375
Iteration 24, loss = 0.43936741
Iteration 25, loss = 0.43827256
Iteration 26, loss = 0.43821821
Iteration 27, loss = 0.43789938
Iteration 28, loss = 0.43719893
Iteration 29, loss = 0.43854376
Iteration 30, loss = 0.43994401
Iteration 31, loss = 0.43763233
Iteration 32, loss = 0.43639043
Iteration 33, loss = 0.43717810

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.52662554
Iteration 2, loss = 0.48097333
Iteration 3, loss = 0.47082074
Iteration 4, loss = 0.46749911
Iteration 5, loss = 0.46198741
Iteration 6, loss = 0.45925575
Iteration 7, loss = 0.45592265
Iteration 8, loss = 0.45176392
Iteration 9, loss = 0.44908925
Iteration 10, loss = 0.44585535
Iteration 11, loss = 0.44363712
Iteration 12, loss = 0.44316675
Iteration 13, loss = 0.44215616

Iteration 14, loss = 0.44180238
Iteration 15, loss = 0.43992545
Iteration 16, loss = 0.43939800
Iteration 17, loss = 0.43816596
Iteration 18, loss = 0.43649029
Iteration 19, loss = 0.43614555
Iteration 20, loss = 0.43708346
Iteration 21, loss = 0.43727701
Iteration 22, loss = 0.43450855
Iteration 23, loss = 0.43381328
Iteration 24, loss = 0.43358685
Iteration 25, loss = 0.43482457
Iteration 26, loss = 0.43418881
Iteration 27, loss = 0.43258709
Iteration 28, loss = 0.43138774
Iteration 29, loss = 0.43174465
Iteration 30, loss = 0.43200517
Iteration 31, loss = 0.42970779
Iteration 32, loss = 0.42913891
Iteration 33, loss = 0.43029302
Iteration 34, loss = 0.42886115
Iteration 35, loss = 0.42718656
Iteration 36, loss = 0.42873772
Iteration 37, loss = 0.42807939
Iteration 38, loss = 0.42809991
Iteration 39, loss = 0.42863355
Iteration 40, loss = 0.42726814
Iteration 41, loss = 0.42735238
Iteration 42, loss = 0.42658464
Iteration 43, loss = 0.42560713
Iteration 44, loss = 0.42714216
Iteration 45, loss = 0.42690578
Iteration 46, loss = 0.42540658

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.52937888
Iteration 2, loss = 0.48250949
Iteration 3, loss = 0.47202113
Iteration 4, loss = 0.46671418
Iteration 5, loss = 0.46181663
Iteration 6, loss = 0.45838840
Iteration 7, loss = 0.45571918
Iteration 8, loss = 0.45284186
Iteration 9, loss = 0.45098066
Iteration 10, loss = 0.44846342
Iteration 11, loss = 0.44803723
Iteration 12, loss = 0.44490477
Iteration 13, loss = 0.44635086
Iteration 14, loss = 0.44497310
Iteration 15, loss = 0.44405884
Iteration 16, loss = 0.44244275
Iteration 17, loss = 0.44274669
Iteration 18, loss = 0.44153605
Iteration 19, loss = 0.44116133
Iteration 20, loss = 0.44226898
Iteration 21, loss = 0.44112022
Iteration 22, loss = 0.43936906

Iteration 23, loss = 0.43989730
Iteration 24, loss = 0.44003585
Iteration 25, loss = 0.43963347
Iteration 26, loss = 0.43931367
Iteration 27, loss = 0.43885833
Iteration 28, loss = 0.43746214
Iteration 29, loss = 0.43885402
Iteration 30, loss = 0.43715638
Iteration 31, loss = 0.43707604
Iteration 32, loss = 0.43619583
Iteration 33, loss = 0.43713198
Iteration 34, loss = 0.43667577
Iteration 35, loss = 0.43601536
Iteration 36, loss = 0.43655724
Iteration 37, loss = 0.43631325
Iteration 38, loss = 0.43492640
Iteration 39, loss = 0.43604155
Iteration 40, loss = 0.43692338
Iteration 41, loss = 0.43594985
Iteration 42, loss = 0.43465489
Iteration 43, loss = 0.43586008
Iteration 44, loss = 0.43585108
Iteration 45, loss = 0.43348870
Iteration 46, loss = 0.43476210
Iteration 47, loss = 0.43550729
Iteration 48, loss = 0.43385642
Iteration 49, loss = 0.43604187
Iteration 50, loss = 0.43486877
Iteration 51, loss = 0.43261183
Iteration 52, loss = 0.43558766
Iteration 53, loss = 0.43461446
Iteration 54, loss = 0.43306665
Iteration 55, loss = 0.43308139
Iteration 56, loss = 0.43223176

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53059338
Iteration 2, loss = 0.48360163
Iteration 3, loss = 0.47311896
Iteration 4, loss = 0.47013018
Iteration 5, loss = 0.46360743
Iteration 6, loss = 0.46020139
Iteration 7, loss = 0.45623952
Iteration 8, loss = 0.45486141
Iteration 9, loss = 0.45483879
Iteration 10, loss = 0.45299305
Iteration 11, loss = 0.45101884
Iteration 12, loss = 0.44859315
Iteration 13, loss = 0.45030201
Iteration 14, loss = 0.44770713
Iteration 15, loss = 0.44812309
Iteration 16, loss = 0.44659601
Iteration 17, loss = 0.44650198
Iteration 18, loss = 0.44601441
Iteration 19, loss = 0.44540663
Iteration 20, loss = 0.44484875
Iteration 21, loss = 0.44334208

Iteration 22, loss = 0.44365729
Iteration 23, loss = 0.44132771
Iteration 24, loss = 0.44197291
Iteration 25, loss = 0.44371845
Iteration 26, loss = 0.44290971
Iteration 27, loss = 0.44209745
Iteration 28, loss = 0.44081270
Iteration 29, loss = 0.44185739
Iteration 30, loss = 0.44016420
Iteration 31, loss = 0.44094691
Iteration 32, loss = 0.43890438
Iteration 33, loss = 0.44065284
Iteration 34, loss = 0.43901859
Iteration 35, loss = 0.44013677
Iteration 36, loss = 0.43876374
Iteration 37, loss = 0.43878285
Iteration 38, loss = 0.44065278
Iteration 39, loss = 0.44076549
Iteration 40, loss = 0.44072960
Iteration 41, loss = 0.44005340
Iteration 42, loss = 0.43793664
Iteration 43, loss = 0.43791830

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.53190345
Iteration 2, loss = 0.47974889
Iteration 3, loss = 0.46975393
Iteration 4, loss = 0.46515069
Iteration 5, loss = 0.45996812
Iteration 6, loss = 0.45485699
Iteration 7, loss = 0.45184628
Iteration 8, loss = 0.45090882
Iteration 9, loss = 0.45032071
Iteration 10, loss = 0.44673907
Iteration 11, loss = 0.44503636
Iteration 12, loss = 0.44394656
Iteration 13, loss = 0.44207265
Iteration 14, loss = 0.43903993
Iteration 15, loss = 0.44114405
Iteration 16, loss = 0.43908716
Iteration 17, loss = 0.43733516
Iteration 18, loss = 0.43818286
Iteration 19, loss = 0.43705693
Iteration 20, loss = 0.43583608
Iteration 21, loss = 0.43541673
Iteration 22, loss = 0.43565558
Iteration 23, loss = 0.43407398
Iteration 24, loss = 0.43340214
Iteration 25, loss = 0.43475125
Iteration 26, loss = 0.43437123
Iteration 27, loss = 0.43276223
Iteration 28, loss = 0.43211647
Iteration 29, loss = 0.43292717
Iteration 30, loss = 0.43197476
Iteration 31, loss = 0.43257414
Iteration 32, loss = 0.43078388
Iteration 33, loss = 0.43062621

Iteration 34, loss = 0.43030541
Iteration 35, loss = 0.43245014
Iteration 36, loss = 0.42892930
Iteration 37, loss = 0.42848811
Iteration 38, loss = 0.43232734
Iteration 39, loss = 0.42984259
Iteration 40, loss = 0.42916823
Iteration 41, loss = 0.43035029
Iteration 42, loss = 0.42913789
Iteration 43, loss = 0.42749301
Iteration 44, loss = 0.42847589
Iteration 45, loss = 0.42834521
Iteration 46, loss = 0.42780514
Iteration 47, loss = 0.42603690
Iteration 48, loss = 0.42635475
Iteration 49, loss = 0.42774368
Iteration 50, loss = 0.42634590
Iteration 51, loss = 0.42619867
Iteration 52, loss = 0.42601910
Iteration 53, loss = 0.42512372
Iteration 54, loss = 0.42648134
Iteration 55, loss = 0.42476244
Iteration 56, loss = 0.42589686
Iteration 57, loss = 0.42540003
Iteration 58, loss = 0.42528960

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.53210508
Iteration 2, loss = 0.48291216
Iteration 3, loss = 0.47385005
Iteration 4, loss = 0.46793871
Iteration 5, loss = 0.46504461
Iteration 6, loss = 0.45903433
Iteration 7, loss = 0.46043833
Iteration 8, loss = 0.45616340
Iteration 9, loss = 0.45589119
Iteration 10, loss = 0.45038114
Iteration 11, loss = 0.44995428
Iteration 12, loss = 0.44940362
Iteration 13, loss = 0.44695428
Iteration 14, loss = 0.44631469
Iteration 15, loss = 0.44482676
Iteration 16, loss = 0.44528052
Iteration 17, loss = 0.44526567
Iteration 18, loss = 0.44405599
Iteration 19, loss = 0.44385957
Iteration 20, loss = 0.44442783
Iteration 21, loss = 0.44104111
Iteration 22, loss = 0.44078962
Iteration 23, loss = 0.44127803
Iteration 24, loss = 0.44213323
Iteration 25, loss = 0.44092833
Iteration 26, loss = 0.44106974
Iteration 27, loss = 0.44234674
Iteration 28, loss = 0.44094459
Iteration 29, loss = 0.43906107
Iteration 30, loss = 0.44007822

Iteration 31, loss = 0.43976304
Iteration 32, loss = 0.43983988
Iteration 33, loss = 0.43865613
Iteration 34, loss = 0.43935537
Iteration 35, loss = 0.43903581
Iteration 36, loss = 0.43924152
Iteration 37, loss = 0.43813363
Iteration 38, loss = 0.43724150
Iteration 39, loss = 0.43960109
Iteration 40, loss = 0.44087936

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55330824
Iteration 2, loss = 0.49245593
Iteration 3, loss = 0.47847916
Iteration 4, loss = 0.46836729
Iteration 5, loss = 0.45998211
Iteration 6, loss = 0.45520667
Iteration 7, loss = 0.45215377
Iteration 8, loss = 0.45158889
Iteration 9, loss = 0.44832354
Iteration 10, loss = 0.44761746
Iteration 11, loss = 0.44574669
Iteration 12, loss = 0.44428432
Iteration 13, loss = 0.44372763
Iteration 14, loss = 0.44331235
Iteration 15, loss = 0.44124446
Iteration 16, loss = 0.44137725
Iteration 17, loss = 0.43912907
Iteration 18, loss = 0.43901178
Iteration 19, loss = 0.44048165
Iteration 20, loss = 0.43694755
Iteration 21, loss = 0.43627963
Iteration 22, loss = 0.43668615
Iteration 23, loss = 0.43431973
Iteration 24, loss = 0.43475772
Iteration 25, loss = 0.43570840
Iteration 26, loss = 0.43350503
Iteration 27, loss = 0.43359109
Iteration 28, loss = 0.43309561
Iteration 29, loss = 0.43276276
Iteration 30, loss = 0.43071366
Iteration 31, loss = 0.43121753
Iteration 32, loss = 0.42953583
Iteration 33, loss = 0.42862403
Iteration 34, loss = 0.42895107
Iteration 35, loss = 0.42871204
Iteration 36, loss = 0.42712549
Iteration 37, loss = 0.42614169
Iteration 38, loss = 0.42639855
Iteration 39, loss = 0.42548598
Iteration 40, loss = 0.42454731
Iteration 41, loss = 0.42713478
Iteration 42, loss = 0.42629493
Iteration 43, loss = 0.42344108
Iteration 44, loss = 0.42327614
Iteration 45, loss = 0.42416899

Iteration 46, loss = 0.42412598
Iteration 47, loss = 0.42504165
Iteration 48, loss = 0.42355531
Iteration 49, loss = 0.42412545
Iteration 50, loss = 0.42145395
Iteration 51, loss = 0.42351274
Iteration 52, loss = 0.41971947
Iteration 53, loss = 0.42287553
Iteration 54, loss = 0.42207188
Iteration 55, loss = 0.42042130
Iteration 56, loss = 0.41889933
Iteration 57, loss = 0.41783725
Iteration 58, loss = 0.41703616
Iteration 59, loss = 0.41854495
Iteration 60, loss = 0.41728635
Iteration 61, loss = 0.41583506
Iteration 62, loss = 0.41410465
Iteration 63, loss = 0.41690376
Iteration 64, loss = 0.41612026
Iteration 65, loss = 0.41730477
Iteration 66, loss = 0.41366496
Iteration 67, loss = 0.41336603
Iteration 68, loss = 0.41189930
Iteration 69, loss = 0.41366207
Iteration 70, loss = 0.41044541
Iteration 71, loss = 0.41099994
Iteration 72, loss = 0.41145730
Iteration 73, loss = 0.41101418
Iteration 74, loss = 0.40969645
Iteration 75, loss = 0.40853080
Iteration 76, loss = 0.40688668
Iteration 77, loss = 0.40707324
Iteration 78, loss = 0.40583030
Iteration 79, loss = 0.40510116
Iteration 80, loss = 0.40186455
Iteration 81, loss = 0.40282087
Iteration 82, loss = 0.39977640
Iteration 83, loss = 0.40030157
Iteration 84, loss = 0.39732559
Iteration 85, loss = 0.39718456
Iteration 86, loss = 0.39697802
Iteration 87, loss = 0.39441388
Iteration 88, loss = 0.39434641
Iteration 89, loss = 0.39519768
Iteration 90, loss = 0.39281510
Iteration 91, loss = 0.39376888
Iteration 92, loss = 0.39446596
Iteration 93, loss = 0.39187049
Iteration 94, loss = 0.39130165
Iteration 95, loss = 0.39072101
Iteration 96, loss = 0.39159243
Iteration 97, loss = 0.38906545
Iteration 98, loss = 0.38993258
Iteration 99, loss = 0.39063477
Iteration 100, loss = 0.38939973
Iteration 101, loss = 0.38997761
Iteration 102, loss = 0.39063943

Iteration 103, loss = 0.38764202
Iteration 104, loss = 0.39029124
Iteration 105, loss = 0.38943299
Iteration 106, loss = 0.38669695
Iteration 107, loss = 0.38784857
Iteration 108, loss = 0.38904462
Iteration 109, loss = 0.38990105
Iteration 110, loss = 0.38721033
Iteration 111, loss = 0.38790001
Iteration 112, loss = 0.38589219
Iteration 113, loss = 0.38736884
Iteration 114, loss = 0.38615125

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.56763897
Iteration 2, loss = 0.49807661
Iteration 3, loss = 0.48560996
Iteration 4, loss = 0.47572890
Iteration 5, loss = 0.46983153
Iteration 6, loss = 0.46406148
Iteration 7, loss = 0.46062260
Iteration 8, loss = 0.45331481
Iteration 9, loss = 0.45020899
Iteration 10, loss = 0.44723735
Iteration 11, loss = 0.44469674
Iteration 12, loss = 0.44153373
Iteration 13, loss = 0.44146771
Iteration 14, loss = 0.43986495
Iteration 15, loss = 0.43960269
Iteration 16, loss = 0.43913775
Iteration 17, loss = 0.43889378
Iteration 18, loss = 0.43569336
Iteration 19, loss = 0.43519074
Iteration 20, loss = 0.43527037
Iteration 21, loss = 0.43441253
Iteration 22, loss = 0.43342077
Iteration 23, loss = 0.43258011
Iteration 24, loss = 0.43133873
Iteration 25, loss = 0.43106278
Iteration 26, loss = 0.42910451
Iteration 27, loss = 0.43154831
Iteration 28, loss = 0.42860288
Iteration 29, loss = 0.42813206
Iteration 30, loss = 0.42802304
Iteration 31, loss = 0.42698669
Iteration 32, loss = 0.42358368
Iteration 33, loss = 0.42550609
Iteration 34, loss = 0.42311227
Iteration 35, loss = 0.42472556
Iteration 36, loss = 0.42434999
Iteration 37, loss = 0.42401799
Iteration 38, loss = 0.42311109
Iteration 39, loss = 0.41862511
Iteration 40, loss = 0.42384104
Iteration 41, loss = 0.42231590
Iteration 42, loss = 0.41730018
Iteration 43, loss = 0.41942737

Iteration 44, loss = 0.41693246
Iteration 45, loss = 0.41822296
Iteration 46, loss = 0.41682499
Iteration 47, loss = 0.41667586
Iteration 48, loss = 0.41323474
Iteration 49, loss = 0.41674192
Iteration 50, loss = 0.41837181
Iteration 51, loss = 0.41560703
Iteration 52, loss = 0.41408522
Iteration 53, loss = 0.41746991
Iteration 54, loss = 0.41113545
Iteration 55, loss = 0.41091428
Iteration 56, loss = 0.41180434
Iteration 57, loss = 0.41144679
Iteration 58, loss = 0.40870294
Iteration 59, loss = 0.40891910
Iteration 60, loss = 0.40966131
Iteration 61, loss = 0.40637093
Iteration 62, loss = 0.40611939
Iteration 63, loss = 0.40467062
Iteration 64, loss = 0.40594094
Iteration 65, loss = 0.40486457
Iteration 66, loss = 0.40260998
Iteration 67, loss = 0.40371937
Iteration 68, loss = 0.40287263
Iteration 69, loss = 0.40241548
Iteration 70, loss = 0.40131536
Iteration 71, loss = 0.39784418
Iteration 72, loss = 0.39860558
Iteration 73, loss = 0.39870347
Iteration 74, loss = 0.39920660
Iteration 75, loss = 0.39786756
Iteration 76, loss = 0.39905787
Iteration 77, loss = 0.39900811
Iteration 78, loss = 0.39616676
Iteration 79, loss = 0.39732046
Iteration 80, loss = 0.39469342
Iteration 81, loss = 0.39264646
Iteration 82, loss = 0.39482566
Iteration 83, loss = 0.39661646
Iteration 84, loss = 0.39432077
Iteration 85, loss = 0.39303838
Iteration 86, loss = 0.39213002
Iteration 87, loss = 0.39499527
Iteration 88, loss = 0.39098250
Iteration 89, loss = 0.39132418
Iteration 90, loss = 0.39043394
Iteration 91, loss = 0.38961163
Iteration 92, loss = 0.38525363
Iteration 93, loss = 0.38911266
Iteration 94, loss = 0.38924573
Iteration 95, loss = 0.39027221
Iteration 96, loss = 0.38667558
Iteration 97, loss = 0.38502925
Iteration 98, loss = 0.38546327
Iteration 99, loss = 0.38458809
Iteration 100, loss = 0.38336337

Iteration 101, loss = 0.38504441
Iteration 102, loss = 0.38744175
Iteration 103, loss = 0.38514362
Iteration 104, loss = 0.38206681
Iteration 105, loss = 0.38451042
Iteration 106, loss = 0.38365224
Iteration 107, loss = 0.38096329
Iteration 108, loss = 0.38235693
Iteration 109, loss = 0.38175035
Iteration 110, loss = 0.38791017
Iteration 111, loss = 0.37997447
Iteration 112, loss = 0.38205215
Iteration 113, loss = 0.38299614
Iteration 114, loss = 0.38105387
Iteration 115, loss = 0.37970695
Iteration 116, loss = 0.38314994
Iteration 117, loss = 0.38397101
Iteration 118, loss = 0.38890412
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56610369
Iteration 2, loss = 0.49595910
Iteration 3, loss = 0.48336056
Iteration 4, loss = 0.47144142
Iteration 5, loss = 0.46528350
Iteration 6, loss = 0.45914952
Iteration 7, loss = 0.45302443
Iteration 8, loss = 0.45083166
Iteration 9, loss = 0.44786422
Iteration 10, loss = 0.44611511
Iteration 11, loss = 0.44518487
Iteration 12, loss = 0.44418784
Iteration 13, loss = 0.44362278
Iteration 14, loss = 0.44044760
Iteration 15, loss = 0.43998588
Iteration 16, loss = 0.44194598
Iteration 17, loss = 0.43980221
Iteration 18, loss = 0.43828226
Iteration 19, loss = 0.43731640
Iteration 20, loss = 0.43938618
Iteration 21, loss = 0.43646189
Iteration 22, loss = 0.43459912
Iteration 23, loss = 0.43537303
Iteration 24, loss = 0.43348729
Iteration 25, loss = 0.43408039
Iteration 26, loss = 0.43298770
Iteration 27, loss = 0.43176508
Iteration 28, loss = 0.43109678
Iteration 29, loss = 0.42874729
Iteration 30, loss = 0.43074759
Iteration 31, loss = 0.42804473
Iteration 32, loss = 0.42766859
Iteration 33, loss = 0.42842133
Iteration 34, loss = 0.42699154
Iteration 35, loss = 0.42738485
Iteration 36, loss = 0.43056664
Iteration 37, loss = 0.42957526

Iteration 38, loss = 0.42836150
Iteration 39, loss = 0.42516722
Iteration 40, loss = 0.42582820
Iteration 41, loss = 0.42526761
Iteration 42, loss = 0.42428895
Iteration 43, loss = 0.42683850
Iteration 44, loss = 0.42313251
Iteration 45, loss = 0.42404656
Iteration 46, loss = 0.42320498
Iteration 47, loss = 0.42425366
Iteration 48, loss = 0.42212392
Iteration 49, loss = 0.42150107
Iteration 50, loss = 0.42492746
Iteration 51, loss = 0.42340182
Iteration 52, loss = 0.42130885
Iteration 53, loss = 0.41937540
Iteration 54, loss = 0.42200279
Iteration 55, loss = 0.41856862
Iteration 56, loss = 0.42081439
Iteration 57, loss = 0.42088679
Iteration 58, loss = 0.41870760
Iteration 59, loss = 0.42029002
Iteration 60, loss = 0.42026542
Iteration 61, loss = 0.41954126
Iteration 62, loss = 0.42016294
Iteration 63, loss = 0.41844664
Iteration 64, loss = 0.41903576

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.56683465
Iteration 2, loss = 0.49851826
Iteration 3, loss = 0.48680666
Iteration 4, loss = 0.47460287
Iteration 5, loss = 0.46742895
Iteration 6, loss = 0.46257010
Iteration 7, loss = 0.45968298
Iteration 8, loss = 0.45665707
Iteration 9, loss = 0.45327704
Iteration 10, loss = 0.44989712
Iteration 11, loss = 0.44930726
Iteration 12, loss = 0.44859917
Iteration 13, loss = 0.44579031
Iteration 14, loss = 0.44538016
Iteration 15, loss = 0.44349065
Iteration 16, loss = 0.44298852
Iteration 17, loss = 0.44191314
Iteration 18, loss = 0.44224564
Iteration 19, loss = 0.44079784
Iteration 20, loss = 0.44214183
Iteration 21, loss = 0.44091118
Iteration 22, loss = 0.43874235
Iteration 23, loss = 0.44065512
Iteration 24, loss = 0.43841789
Iteration 25, loss = 0.43688142
Iteration 26, loss = 0.43676121
Iteration 27, loss = 0.43774761
Iteration 28, loss = 0.43790794

Iteration 29, loss = 0.43701689
Iteration 30, loss = 0.43333328
Iteration 31, loss = 0.43327271
Iteration 32, loss = 0.43344738
Iteration 33, loss = 0.43489085
Iteration 34, loss = 0.43242476
Iteration 35, loss = 0.43335573
Iteration 36, loss = 0.43381326
Iteration 37, loss = 0.43386505
Iteration 38, loss = 0.43103783
Iteration 39, loss = 0.43376994
Iteration 40, loss = 0.43034477
Iteration 41, loss = 0.43080719
Iteration 42, loss = 0.43024758
Iteration 43, loss = 0.43071149
Iteration 44, loss = 0.42833963
Iteration 45, loss = 0.42998869
Iteration 46, loss = 0.42946420
Iteration 47, loss = 0.43287976
Iteration 48, loss = 0.42742579
Iteration 49, loss = 0.42792794
Iteration 50, loss = 0.42791492
Iteration 51, loss = 0.42646601
Iteration 52, loss = 0.42725168
Iteration 53, loss = 0.42560253
Iteration 54, loss = 0.42483777
Iteration 55, loss = 0.42349921
Iteration 56, loss = 0.42378041
Iteration 57, loss = 0.42325587
Iteration 58, loss = 0.42347820
Iteration 59, loss = 0.42097085
Iteration 60, loss = 0.42305551
Iteration 61, loss = 0.42203129
Iteration 62, loss = 0.42215416
Iteration 63, loss = 0.42029338
Iteration 64, loss = 0.42271117
Iteration 65, loss = 0.42082593
Iteration 66, loss = 0.41873854
Iteration 67, loss = 0.41996768
Iteration 68, loss = 0.41843422
Iteration 69, loss = 0.41785576
Iteration 70, loss = 0.41624407
Iteration 71, loss = 0.41632318
Iteration 72, loss = 0.41499871
Iteration 73, loss = 0.41395878
Iteration 74, loss = 0.41321672
Iteration 75, loss = 0.41371408
Iteration 76, loss = 0.41067083
Iteration 77, loss = 0.41149635
Iteration 78, loss = 0.41461271
Iteration 79, loss = 0.41151734
Iteration 80, loss = 0.40778493
Iteration 81, loss = 0.40646887
Iteration 82, loss = 0.40571764
Iteration 83, loss = 0.40579560
Iteration 84, loss = 0.40280693
Iteration 85, loss = 0.40120354

```
Iteration 86, loss = 0.40076460
Iteration 87, loss = 0.40235671
Iteration 88, loss = 0.40300498
Iteration 89, loss = 0.39666051
Iteration 90, loss = 0.40101509
Iteration 91, loss = 0.40047636
Iteration 92, loss = 0.39968624
Iteration 93, loss = 0.39715925
Iteration 94, loss = 0.39304172
Iteration 95, loss = 0.39729323
Iteration 96, loss = 0.39647917
Iteration 97, loss = 0.39332820
Iteration 98, loss = 0.39556292
Iteration 99, loss = 0.39257769
Iteration 100, loss = 0.38847689
Iteration 101, loss = 0.38857458
Iteration 102, loss = 0.39234652
Iteration 103, loss = 0.38999325
Iteration 104, loss = 0.38666206
Iteration 105, loss = 0.38515368
Iteration 106, loss = 0.39041755
Iteration 107, loss = 0.38784284
Iteration 108, loss = 0.39095555
Iteration 109, loss = 0.38111864
Iteration 110, loss = 0.38747704
Iteration 111, loss = 0.38880791
Iteration 112, loss = 0.38525767
Iteration 113, loss = 0.38295190
Iteration 114, loss = 0.38489927
Iteration 115, loss = 0.38313804
Iteration 116, loss = 0.38574243
Iteration 117, loss = 0.38314637
Iteration 118, loss = 0.38111332
Iteration 119, loss = 0.38187291
Iteration 120, loss = 0.38446453
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56785909
Iteration 2, loss = 0.49593995
Iteration 3, loss = 0.48432056
Iteration 4, loss = 0.47050647
Iteration 5, loss = 0.46331346
Iteration 6, loss = 0.45942726
Iteration 7, loss = 0.45430383
Iteration 8, loss = 0.45169805
Iteration 9, loss = 0.44755405
Iteration 10, loss = 0.44541785
Iteration 11, loss = 0.44535564
Iteration 12, loss = 0.44229197
Iteration 13, loss = 0.43941594
Iteration 14, loss = 0.43947829
Iteration 15, loss = 0.43838099
Iteration 16, loss = 0.43826244
Iteration 17, loss = 0.43828947
Iteration 18, loss = 0.43727578
Iteration 19, loss = 0.43618937
Iteration 20, loss = 0.43754981
```

Iteration 21, loss = 0.43531769
Iteration 22, loss = 0.43256214
Iteration 23, loss = 0.43305223
Iteration 24, loss = 0.43132325
Iteration 25, loss = 0.43325212
Iteration 26, loss = 0.43385320
Iteration 27, loss = 0.43387092
Iteration 28, loss = 0.43163601
Iteration 29, loss = 0.43372205
Iteration 30, loss = 0.42924733
Iteration 31, loss = 0.42948203
Iteration 32, loss = 0.42655853
Iteration 33, loss = 0.42717755
Iteration 34, loss = 0.42602057
Iteration 35, loss = 0.42737918
Iteration 36, loss = 0.42822507
Iteration 37, loss = 0.42728311
Iteration 38, loss = 0.42462935
Iteration 39, loss = 0.42814793
Iteration 40, loss = 0.42500050
Iteration 41, loss = 0.42323172
Iteration 42, loss = 0.42419092
Iteration 43, loss = 0.42348369
Iteration 44, loss = 0.42382588
Iteration 45, loss = 0.42431539
Iteration 46, loss = 0.42390184
Iteration 47, loss = 0.42431652
Iteration 48, loss = 0.42606240
Iteration 49, loss = 0.42449515
Iteration 50, loss = 0.42249576
Iteration 51, loss = 0.42267390
Iteration 52, loss = 0.42165178

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56769495
Iteration 2, loss = 0.49807985
Iteration 3, loss = 0.48648419
Iteration 4, loss = 0.47462600
Iteration 5, loss = 0.46630386
Iteration 6, loss = 0.46163490
Iteration 7, loss = 0.45830200
Iteration 8, loss = 0.45359178
Iteration 9, loss = 0.45229818
Iteration 10, loss = 0.44790219
Iteration 11, loss = 0.44897533
Iteration 12, loss = 0.44804332
Iteration 13, loss = 0.44710862
Iteration 14, loss = 0.44757062
Iteration 15, loss = 0.44438803
Iteration 16, loss = 0.44065215
Iteration 17, loss = 0.43977805
Iteration 18, loss = 0.43803673
Iteration 19, loss = 0.43800979
Iteration 20, loss = 0.43936256
Iteration 21, loss = 0.43976570
Iteration 22, loss = 0.43739820
Iteration 23, loss = 0.43576219

Iteration 24, loss = 0.43457730
Iteration 25, loss = 0.43422224
Iteration 26, loss = 0.43234025
Iteration 27, loss = 0.43306269
Iteration 28, loss = 0.43308559
Iteration 29, loss = 0.43367555
Iteration 30, loss = 0.43200112
Iteration 31, loss = 0.43170428
Iteration 32, loss = 0.43066479
Iteration 33, loss = 0.43063295
Iteration 34, loss = 0.43205223
Iteration 35, loss = 0.42884830
Iteration 36, loss = 0.43114810
Iteration 37, loss = 0.42878738
Iteration 38, loss = 0.43080064
Iteration 39, loss = 0.42799017
Iteration 40, loss = 0.42665740
Iteration 41, loss = 0.42705931
Iteration 42, loss = 0.42650117
Iteration 43, loss = 0.42618183
Iteration 44, loss = 0.42553006
Iteration 45, loss = 0.42787757
Iteration 46, loss = 0.42572996
Iteration 47, loss = 0.42360220
Iteration 48, loss = 0.42494469
Iteration 49, loss = 0.42487400
Iteration 50, loss = 0.42338996
Iteration 51, loss = 0.42421570
Iteration 52, loss = 0.42585251
Iteration 53, loss = 0.42382494
Iteration 54, loss = 0.42279356
Iteration 55, loss = 0.42446101
Iteration 56, loss = 0.42500960
Iteration 57, loss = 0.42153120
Iteration 58, loss = 0.42269987
Iteration 59, loss = 0.42117693
Iteration 60, loss = 0.42195611
Iteration 61, loss = 0.42688851
Iteration 62, loss = 0.42385868
Iteration 63, loss = 0.42192536
Iteration 64, loss = 0.42010524
Iteration 65, loss = 0.42038154
Iteration 66, loss = 0.42073504
Iteration 67, loss = 0.42155924
Iteration 68, loss = 0.41830356
Iteration 69, loss = 0.41880620
Iteration 70, loss = 0.41874780
Iteration 71, loss = 0.41884468
Iteration 72, loss = 0.41641966
Iteration 73, loss = 0.41876018
Iteration 74, loss = 0.41901120
Iteration 75, loss = 0.41451155
Iteration 76, loss = 0.41672056
Iteration 77, loss = 0.41450563
Iteration 78, loss = 0.41648580
Iteration 79, loss = 0.41335408
Iteration 80, loss = 0.41177363

Iteration 81, loss = 0.40847419
Iteration 82, loss = 0.40976218
Iteration 83, loss = 0.40813500
Iteration 84, loss = 0.40949617
Iteration 85, loss = 0.40626556
Iteration 86, loss = 0.40614611
Iteration 87, loss = 0.40275800
Iteration 88, loss = 0.40328990
Iteration 89, loss = 0.40319736
Iteration 90, loss = 0.40216259
Iteration 91, loss = 0.40294453
Iteration 92, loss = 0.39948289
Iteration 93, loss = 0.40032263
Iteration 94, loss = 0.39894845
Iteration 95, loss = 0.39899779
Iteration 96, loss = 0.39935234
Iteration 97, loss = 0.39757019
Iteration 98, loss = 0.39766905
Iteration 99, loss = 0.39788335
Iteration 100, loss = 0.39779655
Iteration 101, loss = 0.40041991
Iteration 102, loss = 0.39407428
Iteration 103, loss = 0.39249844
Iteration 104, loss = 0.39575200
Iteration 105, loss = 0.39241428
Iteration 106, loss = 0.39359794
Iteration 107, loss = 0.38918671
Iteration 108, loss = 0.39085429
Iteration 109, loss = 0.39291502
Iteration 110, loss = 0.38897152
Iteration 111, loss = 0.39392114
Iteration 112, loss = 0.38736169
Iteration 113, loss = 0.39498119
Iteration 114, loss = 0.38714991
Iteration 115, loss = 0.39438696
Iteration 116, loss = 0.38988757
Iteration 117, loss = 0.38796418
Iteration 118, loss = 0.38757097
Iteration 119, loss = 0.38543655
Iteration 120, loss = 0.38826483
Iteration 121, loss = 0.38403727
Iteration 122, loss = 0.38610764
Iteration 123, loss = 0.38694878
Iteration 124, loss = 0.38579924
Iteration 125, loss = 0.38448790
Iteration 126, loss = 0.38406279
Iteration 127, loss = 0.38167163
Iteration 128, loss = 0.38733368
Iteration 129, loss = 0.38345602
Iteration 130, loss = 0.38434448
Iteration 131, loss = 0.38284935
Iteration 132, loss = 0.38165306
Iteration 133, loss = 0.38092739
Iteration 134, loss = 0.38321765
Iteration 135, loss = 0.37995613
Iteration 136, loss = 0.38186477
Iteration 137, loss = 0.38060289

Iteration 138, loss = 0.38101131
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.53676929
Iteration 2, loss = 0.48302576
Iteration 3, loss = 0.46935183
Iteration 4, loss = 0.46560772
Iteration 5, loss = 0.46141392
Iteration 6, loss = 0.45850418
Iteration 7, loss = 0.45399386
Iteration 8, loss = 0.44956236
Iteration 9, loss = 0.44875602
Iteration 10, loss = 0.44478507
Iteration 11, loss = 0.44297324
Iteration 12, loss = 0.44112839
Iteration 13, loss = 0.44049934
Iteration 14, loss = 0.43971315
Iteration 15, loss = 0.43685804
Iteration 16, loss = 0.43525326
Iteration 17, loss = 0.43432017
Iteration 18, loss = 0.43169603
Iteration 19, loss = 0.43044310
Iteration 20, loss = 0.42869829
Iteration 21, loss = 0.42870067
Iteration 22, loss = 0.42450615
Iteration 23, loss = 0.42382863
Iteration 24, loss = 0.42278660
Iteration 25, loss = 0.42215159
Iteration 26, loss = 0.42261493
Iteration 27, loss = 0.42039651
Iteration 28, loss = 0.41706783
Iteration 29, loss = 0.41650196
Iteration 30, loss = 0.41730374
Iteration 31, loss = 0.41572725
Iteration 32, loss = 0.41460137
Iteration 33, loss = 0.41324790
Iteration 34, loss = 0.41366757
Iteration 35, loss = 0.41099932
Iteration 36, loss = 0.41053266
Iteration 37, loss = 0.41060138
Iteration 38, loss = 0.41100609
Iteration 39, loss = 0.40883791
Iteration 40, loss = 0.40840331
Iteration 41, loss = 0.40699144
Iteration 42, loss = 0.40436919
Iteration 43, loss = 0.40454498
Iteration 44, loss = 0.40628388
Iteration 45, loss = 0.40648104
Iteration 46, loss = 0.40346629
Iteration 47, loss = 0.40257840
Iteration 48, loss = 0.40377268
Iteration 49, loss = 0.40244421
Iteration 50, loss = 0.40235467
Iteration 51, loss = 0.40082679
Iteration 52, loss = 0.40344976
Iteration 53, loss = 0.40175125
Iteration 54, loss = 0.39902618

Iteration 55, loss = 0.40291396
Iteration 56, loss = 0.40059585
Iteration 57, loss = 0.40194411
Iteration 58, loss = 0.40028334
Iteration 59, loss = 0.39907125
Iteration 60, loss = 0.39973359
Iteration 61, loss = 0.39911844
Iteration 62, loss = 0.39789611
Iteration 63, loss = 0.39755347
Iteration 64, loss = 0.39977485
Iteration 65, loss = 0.39690276
Iteration 66, loss = 0.39931774
Iteration 67, loss = 0.39648570
Iteration 68, loss = 0.39481889
Iteration 69, loss = 0.39707612
Iteration 70, loss = 0.39307181
Iteration 71, loss = 0.39578878
Iteration 72, loss = 0.39398889
Iteration 73, loss = 0.39261418
Iteration 74, loss = 0.39354631
Iteration 75, loss = 0.39219091
Iteration 76, loss = 0.39422425
Iteration 77, loss = 0.39411981
Iteration 78, loss = 0.39282104
Iteration 79, loss = 0.39439381
Iteration 80, loss = 0.39212017
Iteration 81, loss = 0.39357651

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.54319987
Iteration 2, loss = 0.48650549
Iteration 3, loss = 0.47611361
Iteration 4, loss = 0.46838334
Iteration 5, loss = 0.46398474
Iteration 6, loss = 0.45779835
Iteration 7, loss = 0.45394424
Iteration 8, loss = 0.45098299
Iteration 9, loss = 0.44997332
Iteration 10, loss = 0.44788780
Iteration 11, loss = 0.44660876
Iteration 12, loss = 0.44185647
Iteration 13, loss = 0.44077341
Iteration 14, loss = 0.43839638
Iteration 15, loss = 0.43667885
Iteration 16, loss = 0.43302836
Iteration 17, loss = 0.43334372
Iteration 18, loss = 0.43174779
Iteration 19, loss = 0.42880602
Iteration 20, loss = 0.42871326
Iteration 21, loss = 0.42726348
Iteration 22, loss = 0.42654392
Iteration 23, loss = 0.42610342
Iteration 24, loss = 0.42307211
Iteration 25, loss = 0.42156515
Iteration 26, loss = 0.42125527
Iteration 27, loss = 0.42129684
Iteration 28, loss = 0.41843236

Iteration 29, loss = 0.41746331
Iteration 30, loss = 0.41636188
Iteration 31, loss = 0.41778254
Iteration 32, loss = 0.41296222
Iteration 33, loss = 0.41486199
Iteration 34, loss = 0.41185318
Iteration 35, loss = 0.41077331
Iteration 36, loss = 0.41037391
Iteration 37, loss = 0.40937747
Iteration 38, loss = 0.41107280
Iteration 39, loss = 0.40671046
Iteration 40, loss = 0.40456748
Iteration 41, loss = 0.40490087
Iteration 42, loss = 0.40809435
Iteration 43, loss = 0.40311464
Iteration 44, loss = 0.40499130
Iteration 45, loss = 0.40223064
Iteration 46, loss = 0.40655262
Iteration 47, loss = 0.40466889
Iteration 48, loss = 0.40160959
Iteration 49, loss = 0.40013334
Iteration 50, loss = 0.40138369
Iteration 51, loss = 0.39986599
Iteration 52, loss = 0.39942481
Iteration 53, loss = 0.40244407
Iteration 54, loss = 0.39847816
Iteration 55, loss = 0.39578372
Iteration 56, loss = 0.39729175
Iteration 57, loss = 0.39446167
Iteration 58, loss = 0.39531398
Iteration 59, loss = 0.39483859
Iteration 60, loss = 0.39613153
Iteration 61, loss = 0.39536639
Iteration 62, loss = 0.39191368
Iteration 63, loss = 0.39173809
Iteration 64, loss = 0.39267463
Iteration 65, loss = 0.39305616
Iteration 66, loss = 0.39274965
Iteration 67, loss = 0.38886449
Iteration 68, loss = 0.38948902
Iteration 69, loss = 0.39086996
Iteration 70, loss = 0.38826076
Iteration 71, loss = 0.38760291
Iteration 72, loss = 0.38661493
Iteration 73, loss = 0.38686145
Iteration 74, loss = 0.38767196
Iteration 75, loss = 0.38596369
Iteration 76, loss = 0.38711541
Iteration 77, loss = 0.38324700
Iteration 78, loss = 0.38820817
Iteration 79, loss = 0.38404588
Iteration 80, loss = 0.38317029
Iteration 81, loss = 0.38352894
Iteration 82, loss = 0.38107626
Iteration 83, loss = 0.38259572
Iteration 84, loss = 0.38138687
Iteration 85, loss = 0.38430071

Iteration 86, loss = 0.38325172
Iteration 87, loss = 0.38234681
Iteration 88, loss = 0.38089687
Iteration 89, loss = 0.38161671
Iteration 90, loss = 0.37712269
Iteration 91, loss = 0.38198017
Iteration 92, loss = 0.37802571
Iteration 93, loss = 0.37900353
Iteration 94, loss = 0.37522518
Iteration 95, loss = 0.37931956
Iteration 96, loss = 0.37719465
Iteration 97, loss = 0.37672819
Iteration 98, loss = 0.37692623
Iteration 99, loss = 0.37839500
Iteration 100, loss = 0.37678929
Iteration 101, loss = 0.37794614
Iteration 102, loss = 0.37763925
Iteration 103, loss = 0.37442947
Iteration 104, loss = 0.37565803
Iteration 105, loss = 0.37381017

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.54483978
Iteration 2, loss = 0.48479883
Iteration 3, loss = 0.47696486
Iteration 4, loss = 0.46952362
Iteration 5, loss = 0.46408263
Iteration 6, loss = 0.46046849
Iteration 7, loss = 0.45453180
Iteration 8, loss = 0.45401941
Iteration 9, loss = 0.45133597
Iteration 10, loss = 0.44977540
Iteration 11, loss = 0.44876300
Iteration 12, loss = 0.44478631
Iteration 13, loss = 0.44469237
Iteration 14, loss = 0.44071364
Iteration 15, loss = 0.44276119
Iteration 16, loss = 0.44045175
Iteration 17, loss = 0.44108536
Iteration 18, loss = 0.43864898
Iteration 19, loss = 0.43639872
Iteration 20, loss = 0.43673560
Iteration 21, loss = 0.43676101
Iteration 22, loss = 0.43483101
Iteration 23, loss = 0.43464318
Iteration 24, loss = 0.43221235
Iteration 25, loss = 0.43295375
Iteration 26, loss = 0.42953091
Iteration 27, loss = 0.42707699
Iteration 28, loss = 0.42636123
Iteration 29, loss = 0.42424835
Iteration 30, loss = 0.42611987
Iteration 31, loss = 0.42397704
Iteration 32, loss = 0.42050375
Iteration 33, loss = 0.42260643
Iteration 34, loss = 0.41904064
Iteration 35, loss = 0.41860393

Iteration 36, loss = 0.41421218
Iteration 37, loss = 0.41626601
Iteration 38, loss = 0.41398312
Iteration 39, loss = 0.41312659
Iteration 40, loss = 0.40956387
Iteration 41, loss = 0.41454908
Iteration 42, loss = 0.41484521
Iteration 43, loss = 0.40997146
Iteration 44, loss = 0.40565117
Iteration 45, loss = 0.40716242
Iteration 46, loss = 0.40933478
Iteration 47, loss = 0.40673374
Iteration 48, loss = 0.40378525
Iteration 49, loss = 0.40364975
Iteration 50, loss = 0.40216745
Iteration 51, loss = 0.40304506
Iteration 52, loss = 0.40039335
Iteration 53, loss = 0.39886794
Iteration 54, loss = 0.40134445
Iteration 55, loss = 0.39731681
Iteration 56, loss = 0.40006281
Iteration 57, loss = 0.39650280
Iteration 58, loss = 0.39663294
Iteration 59, loss = 0.39709834
Iteration 60, loss = 0.39678955
Iteration 61, loss = 0.39680444
Iteration 62, loss = 0.39435089
Iteration 63, loss = 0.39389238
Iteration 64, loss = 0.39329594
Iteration 65, loss = 0.39378586
Iteration 66, loss = 0.39468060
Iteration 67, loss = 0.39005356
Iteration 68, loss = 0.39145395
Iteration 69, loss = 0.39285318
Iteration 70, loss = 0.39143164
Iteration 71, loss = 0.38841242
Iteration 72, loss = 0.38624239
Iteration 73, loss = 0.39023294
Iteration 74, loss = 0.39022150
Iteration 75, loss = 0.39044818
Iteration 76, loss = 0.38541489
Iteration 77, loss = 0.38787197
Iteration 78, loss = 0.38857827
Iteration 79, loss = 0.38531747
Iteration 80, loss = 0.38414764
Iteration 81, loss = 0.38363656
Iteration 82, loss = 0.38743033
Iteration 83, loss = 0.38806643
Iteration 84, loss = 0.38340356
Iteration 85, loss = 0.38540935
Iteration 86, loss = 0.38367889
Iteration 87, loss = 0.38519208
Iteration 88, loss = 0.38417876
Iteration 89, loss = 0.37824019
Iteration 90, loss = 0.38225414
Iteration 91, loss = 0.38384267
Iteration 92, loss = 0.37892439

Iteration 93, loss = 0.37940076
Iteration 94, loss = 0.37992342
Iteration 95, loss = 0.37805189
Iteration 96, loss = 0.38542640
Iteration 97, loss = 0.38053717
Iteration 98, loss = 0.38070862
Iteration 99, loss = 0.37826463
Iteration 100, loss = 0.38053561
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54718713
Iteration 2, loss = 0.48645064
Iteration 3, loss = 0.47793450
Iteration 4, loss = 0.47078334
Iteration 5, loss = 0.46492922
Iteration 6, loss = 0.46294246
Iteration 7, loss = 0.45788345
Iteration 8, loss = 0.45891739
Iteration 9, loss = 0.45397664
Iteration 10, loss = 0.45021328
Iteration 11, loss = 0.44977934
Iteration 12, loss = 0.44780721
Iteration 13, loss = 0.44550397
Iteration 14, loss = 0.44339785
Iteration 15, loss = 0.44445432
Iteration 16, loss = 0.44272467
Iteration 17, loss = 0.44154205
Iteration 18, loss = 0.44214936
Iteration 19, loss = 0.43978002
Iteration 20, loss = 0.43711786
Iteration 21, loss = 0.43760336
Iteration 22, loss = 0.43604028
Iteration 23, loss = 0.43699757
Iteration 24, loss = 0.43437093
Iteration 25, loss = 0.43387476
Iteration 26, loss = 0.43192248
Iteration 27, loss = 0.42947535
Iteration 28, loss = 0.42825848
Iteration 29, loss = 0.42815946
Iteration 30, loss = 0.42740795
Iteration 31, loss = 0.42801038
Iteration 32, loss = 0.42570450
Iteration 33, loss = 0.42634698
Iteration 34, loss = 0.42350373
Iteration 35, loss = 0.42466123
Iteration 36, loss = 0.42113915
Iteration 37, loss = 0.42592667
Iteration 38, loss = 0.42122423
Iteration 39, loss = 0.42069038
Iteration 40, loss = 0.42021084
Iteration 41, loss = 0.42334117
Iteration 42, loss = 0.42275990
Iteration 43, loss = 0.41915962
Iteration 44, loss = 0.41713259
Iteration 45, loss = 0.41489332
Iteration 46, loss = 0.41698295
Iteration 47, loss = 0.41642692

Iteration 48, loss = 0.41276864
Iteration 49, loss = 0.41506337
Iteration 50, loss = 0.41410633
Iteration 51, loss = 0.41478359
Iteration 52, loss = 0.41032412
Iteration 53, loss = 0.41013282
Iteration 54, loss = 0.40815353
Iteration 55, loss = 0.40977381
Iteration 56, loss = 0.41229500
Iteration 57, loss = 0.40849370
Iteration 58, loss = 0.40938993
Iteration 59, loss = 0.40741094
Iteration 60, loss = 0.40532587
Iteration 61, loss = 0.40837175
Iteration 62, loss = 0.40708268
Iteration 63, loss = 0.40495590
Iteration 64, loss = 0.40274346
Iteration 65, loss = 0.40539971
Iteration 66, loss = 0.40563542
Iteration 67, loss = 0.40306431
Iteration 68, loss = 0.40348858
Iteration 69, loss = 0.40225888
Iteration 70, loss = 0.40186997
Iteration 71, loss = 0.39878270
Iteration 72, loss = 0.39941965
Iteration 73, loss = 0.39809603
Iteration 74, loss = 0.39892504
Iteration 75, loss = 0.40295687
Iteration 76, loss = 0.39874396
Iteration 77, loss = 0.39949022
Iteration 78, loss = 0.39812443
Iteration 79, loss = 0.39872784
Iteration 80, loss = 0.39592008
Iteration 81, loss = 0.39645970
Iteration 82, loss = 0.39538543
Iteration 83, loss = 0.39505930
Iteration 84, loss = 0.39754321
Iteration 85, loss = 0.39516240
Iteration 86, loss = 0.39430667
Iteration 87, loss = 0.39732912
Iteration 88, loss = 0.39794797
Iteration 89, loss = 0.39366949
Iteration 90, loss = 0.39435153
Iteration 91, loss = 0.39293269

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.54766899
Iteration 2, loss = 0.48311685
Iteration 3, loss = 0.47176415
Iteration 4, loss = 0.46803790
Iteration 5, loss = 0.45952875
Iteration 6, loss = 0.45726758
Iteration 7, loss = 0.45296146
Iteration 8, loss = 0.45179094
Iteration 9, loss = 0.44793757
Iteration 10, loss = 0.44769899
Iteration 11, loss = 0.44206744

Iteration 12, loss = 0.43984325
Iteration 13, loss = 0.43920124
Iteration 14, loss = 0.43689716
Iteration 15, loss = 0.43670487
Iteration 16, loss = 0.43647598
Iteration 17, loss = 0.43486587
Iteration 18, loss = 0.43115750
Iteration 19, loss = 0.43100289
Iteration 20, loss = 0.42929011
Iteration 21, loss = 0.42756779
Iteration 22, loss = 0.42500595
Iteration 23, loss = 0.42696878
Iteration 24, loss = 0.42204587
Iteration 25, loss = 0.42254327
Iteration 26, loss = 0.42008705
Iteration 27, loss = 0.41948363
Iteration 28, loss = 0.41547073
Iteration 29, loss = 0.41726245
Iteration 30, loss = 0.41935951
Iteration 31, loss = 0.41707062
Iteration 32, loss = 0.41497206
Iteration 33, loss = 0.41424074
Iteration 34, loss = 0.41314644
Iteration 35, loss = 0.41217714
Iteration 36, loss = 0.41223276
Iteration 37, loss = 0.41288481
Iteration 38, loss = 0.41071459
Iteration 39, loss = 0.41050435
Iteration 40, loss = 0.40863708
Iteration 41, loss = 0.40974427
Iteration 42, loss = 0.41246858
Iteration 43, loss = 0.41052493
Iteration 44, loss = 0.40892405
Iteration 45, loss = 0.40708106
Iteration 46, loss = 0.40934345
Iteration 47, loss = 0.40812963
Iteration 48, loss = 0.40732631
Iteration 49, loss = 0.40384609
Iteration 50, loss = 0.40618855
Iteration 51, loss = 0.40357034
Iteration 52, loss = 0.40664912
Iteration 53, loss = 0.40334895
Iteration 54, loss = 0.40152335
Iteration 55, loss = 0.40290267
Iteration 56, loss = 0.40016589
Iteration 57, loss = 0.39794038
Iteration 58, loss = 0.40241005
Iteration 59, loss = 0.40090372
Iteration 60, loss = 0.39972774
Iteration 61, loss = 0.40082488
Iteration 62, loss = 0.40078282
Iteration 63, loss = 0.39803260
Iteration 64, loss = 0.39854489
Iteration 65, loss = 0.39890768
Iteration 66, loss = 0.39670467
Iteration 67, loss = 0.40208889
Iteration 68, loss = 0.39849473

Iteration 69, loss = 0.39730866
Iteration 70, loss = 0.39484029
Iteration 71, loss = 0.39432065
Iteration 72, loss = 0.39558468
Iteration 73, loss = 0.39250591
Iteration 74, loss = 0.39543720
Iteration 75, loss = 0.39874698
Iteration 76, loss = 0.39489233
Iteration 77, loss = 0.39177430
Iteration 78, loss = 0.39298162
Iteration 79, loss = 0.39682459
Iteration 80, loss = 0.39401960
Iteration 81, loss = 0.39471908
Iteration 82, loss = 0.39101109
Iteration 83, loss = 0.39304912
Iteration 84, loss = 0.39334035
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54706972
Iteration 2, loss = 0.48414050
Iteration 3, loss = 0.47506944
Iteration 4, loss = 0.46869958
Iteration 5, loss = 0.46586249
Iteration 6, loss = 0.46219706
Iteration 7, loss = 0.45889577
Iteration 8, loss = 0.45532341
Iteration 9, loss = 0.45218277
Iteration 10, loss = 0.44910072
Iteration 11, loss = 0.44662334
Iteration 12, loss = 0.44776978
Iteration 13, loss = 0.44483523
Iteration 14, loss = 0.44199162
Iteration 15, loss = 0.44217201
Iteration 16, loss = 0.43958166
Iteration 17, loss = 0.43915858
Iteration 18, loss = 0.43754232
Iteration 19, loss = 0.43658450
Iteration 20, loss = 0.43658869
Iteration 21, loss = 0.43344708
Iteration 22, loss = 0.43199565
Iteration 23, loss = 0.43288407
Iteration 24, loss = 0.43083303
Iteration 25, loss = 0.43089197
Iteration 26, loss = 0.43027496
Iteration 27, loss = 0.42884193
Iteration 28, loss = 0.42863288
Iteration 29, loss = 0.42527342
Iteration 30, loss = 0.42759702
Iteration 31, loss = 0.42522688
Iteration 32, loss = 0.42922947
Iteration 33, loss = 0.42457910
Iteration 34, loss = 0.42268365
Iteration 35, loss = 0.42354022
Iteration 36, loss = 0.42167021
Iteration 37, loss = 0.41881401
Iteration 38, loss = 0.42088623
Iteration 39, loss = 0.41842541

Iteration 40, loss = 0.41799863
Iteration 41, loss = 0.41859807
Iteration 42, loss = 0.41439427
Iteration 43, loss = 0.41478155
Iteration 44, loss = 0.41530097
Iteration 45, loss = 0.41454327
Iteration 46, loss = 0.41263261
Iteration 47, loss = 0.41276705
Iteration 48, loss = 0.41097404
Iteration 49, loss = 0.40924864
Iteration 50, loss = 0.40920891
Iteration 51, loss = 0.40920431
Iteration 52, loss = 0.40898196
Iteration 53, loss = 0.40782927
Iteration 54, loss = 0.40588854
Iteration 55, loss = 0.40894075
Iteration 56, loss = 0.40903941
Iteration 57, loss = 0.40542905
Iteration 58, loss = 0.41359006
Iteration 59, loss = 0.40339023
Iteration 60, loss = 0.40232346
Iteration 61, loss = 0.40414893
Iteration 62, loss = 0.40304322
Iteration 63, loss = 0.40219065
Iteration 64, loss = 0.40006535
Iteration 65, loss = 0.40110932
Iteration 66, loss = 0.40558394
Iteration 67, loss = 0.39921809
Iteration 68, loss = 0.40220836
Iteration 69, loss = 0.40496429
Iteration 70, loss = 0.39981389
Iteration 71, loss = 0.39971360
Iteration 72, loss = 0.40244798
Iteration 73, loss = 0.39841754
Iteration 74, loss = 0.39849096
Iteration 75, loss = 0.39960346

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55087735
Iteration 2, loss = 0.48214729
Iteration 3, loss = 0.47182820
Iteration 4, loss = 0.46636964
Iteration 5, loss = 0.45874502
Iteration 6, loss = 0.45363959
Iteration 7, loss = 0.44733503
Iteration 8, loss = 0.44323273
Iteration 9, loss = 0.44157327
Iteration 10, loss = 0.44015364
Iteration 11, loss = 0.43932251
Iteration 12, loss = 0.43837965
Iteration 13, loss = 0.43680491
Iteration 14, loss = 0.43611020
Iteration 15, loss = 0.43330258
Iteration 16, loss = 0.43180623
Iteration 17, loss = 0.43108556
Iteration 18, loss = 0.42927589
Iteration 19, loss = 0.42892876

Iteration 20, loss = 0.42789390
Iteration 21, loss = 0.42543375
Iteration 22, loss = 0.42645352
Iteration 23, loss = 0.42522025
Iteration 24, loss = 0.42112268
Iteration 25, loss = 0.42006684
Iteration 26, loss = 0.41817786
Iteration 27, loss = 0.41701808
Iteration 28, loss = 0.41511209
Iteration 29, loss = 0.41782716
Iteration 30, loss = 0.41324775
Iteration 31, loss = 0.41066145
Iteration 32, loss = 0.40983964
Iteration 33, loss = 0.40650212
Iteration 34, loss = 0.40513294
Iteration 35, loss = 0.40355008
Iteration 36, loss = 0.40144784
Iteration 37, loss = 0.40267589
Iteration 38, loss = 0.39983788
Iteration 39, loss = 0.39813243
Iteration 40, loss = 0.39581641
Iteration 41, loss = 0.39524294
Iteration 42, loss = 0.39356663
Iteration 43, loss = 0.39499965
Iteration 44, loss = 0.39146832
Iteration 45, loss = 0.38993372
Iteration 46, loss = 0.39210504
Iteration 47, loss = 0.38944344
Iteration 48, loss = 0.38635271
Iteration 49, loss = 0.38784362
Iteration 50, loss = 0.38672187
Iteration 51, loss = 0.38481699
Iteration 52, loss = 0.38437775
Iteration 53, loss = 0.38326963
Iteration 54, loss = 0.38699819
Iteration 55, loss = 0.38271489
Iteration 56, loss = 0.38269404
Iteration 57, loss = 0.37919156
Iteration 58, loss = 0.38345347
Iteration 59, loss = 0.38094189
Iteration 60, loss = 0.38155629
Iteration 61, loss = 0.38069695
Iteration 62, loss = 0.37717305
Iteration 63, loss = 0.37933746
Iteration 64, loss = 0.38028315
Iteration 65, loss = 0.37622247
Iteration 66, loss = 0.37569183
Iteration 67, loss = 0.37624655
Iteration 68, loss = 0.37474466
Iteration 69, loss = 0.37885973
Iteration 70, loss = 0.37937400
Iteration 71, loss = 0.37670447
Iteration 72, loss = 0.37596068
Iteration 73, loss = 0.37659602

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.

Iteration 1, loss = 0.55835680

Iteration 2, loss = 0.48432371
Iteration 3, loss = 0.47577345
Iteration 4, loss = 0.46973358
Iteration 5, loss = 0.46522727
Iteration 6, loss = 0.46118942
Iteration 7, loss = 0.45503177
Iteration 8, loss = 0.45067410
Iteration 9, loss = 0.44458558
Iteration 10, loss = 0.44054566
Iteration 11, loss = 0.44052151
Iteration 12, loss = 0.43530293
Iteration 13, loss = 0.43460247
Iteration 14, loss = 0.43656416
Iteration 15, loss = 0.43317922
Iteration 16, loss = 0.43153288
Iteration 17, loss = 0.43112132
Iteration 18, loss = 0.42809140
Iteration 19, loss = 0.42614758
Iteration 20, loss = 0.42515387
Iteration 21, loss = 0.42049532
Iteration 22, loss = 0.42594907
Iteration 23, loss = 0.41926987
Iteration 24, loss = 0.41641634
Iteration 25, loss = 0.41778164
Iteration 26, loss = 0.41653573
Iteration 27, loss = 0.41560928
Iteration 28, loss = 0.41240675
Iteration 29, loss = 0.40953340
Iteration 30, loss = 0.40736995
Iteration 31, loss = 0.40887143
Iteration 32, loss = 0.40713877
Iteration 33, loss = 0.40586869
Iteration 34, loss = 0.40346138
Iteration 35, loss = 0.40306989
Iteration 36, loss = 0.40083061
Iteration 37, loss = 0.39819040
Iteration 38, loss = 0.39894655
Iteration 39, loss = 0.39735401
Iteration 40, loss = 0.39745032
Iteration 41, loss = 0.39846169
Iteration 42, loss = 0.39511635
Iteration 43, loss = 0.39745373
Iteration 44, loss = 0.39926247
Iteration 45, loss = 0.39478392
Iteration 46, loss = 0.39053740
Iteration 47, loss = 0.38795994
Iteration 48, loss = 0.38883630
Iteration 49, loss = 0.38809240
Iteration 50, loss = 0.38779075
Iteration 51, loss = 0.38348474
Iteration 52, loss = 0.38446168
Iteration 53, loss = 0.38543412
Iteration 54, loss = 0.38325095
Iteration 55, loss = 0.38326844
Iteration 56, loss = 0.38744763
Iteration 57, loss = 0.38421536
Iteration 58, loss = 0.37645691

```
Iteration 59, loss = 0.38127855
Iteration 60, loss = 0.37770160
Iteration 61, loss = 0.37647666
Iteration 62, loss = 0.37958840
Iteration 63, loss = 0.37763705
Iteration 64, loss = 0.38051734
Iteration 65, loss = 0.37630660
Iteration 66, loss = 0.37713583
Iteration 67, loss = 0.37324796
Iteration 68, loss = 0.37480107
Iteration 69, loss = 0.37763637
Iteration 70, loss = 0.37703967
Iteration 71, loss = 0.37481709
Iteration 72, loss = 0.37324017
Iteration 73, loss = 0.37048600
Iteration 74, loss = 0.37284834
Iteration 75, loss = 0.37365856
Iteration 76, loss = 0.36936260
Iteration 77, loss = 0.36872761
Iteration 78, loss = 0.36480413
Iteration 79, loss = 0.36742495
Iteration 80, loss = 0.36942638
Iteration 81, loss = 0.37231594
Iteration 82, loss = 0.36866430
Iteration 83, loss = 0.36603982
Iteration 84, loss = 0.36922059
Iteration 85, loss = 0.37058443
Iteration 86, loss = 0.36893744
Iteration 87, loss = 0.36589645
Iteration 88, loss = 0.36660818
Iteration 89, loss = 0.36656478
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.55975425
Iteration 2, loss = 0.48540727
Iteration 3, loss = 0.47231164
Iteration 4, loss = 0.46660297
Iteration 5, loss = 0.46187771
Iteration 6, loss = 0.45637088
Iteration 7, loss = 0.45218023
Iteration 8, loss = 0.44675013
Iteration 9, loss = 0.44192394
Iteration 10, loss = 0.44118306
Iteration 11, loss = 0.44060474
Iteration 12, loss = 0.43878363
Iteration 13, loss = 0.43762846
Iteration 14, loss = 0.43829284
Iteration 15, loss = 0.43638375
Iteration 16, loss = 0.43411923
Iteration 17, loss = 0.43382471
Iteration 18, loss = 0.43177583
Iteration 19, loss = 0.43041134
Iteration 20, loss = 0.43331513
Iteration 21, loss = 0.42978255
Iteration 22, loss = 0.42843464
Iteration 23, loss = 0.42839425
Iteration 24, loss = 0.42523493
```

Iteration 25, loss = 0.42333922
Iteration 26, loss = 0.42387660
Iteration 27, loss = 0.42415272
Iteration 28, loss = 0.42207181
Iteration 29, loss = 0.41872951
Iteration 30, loss = 0.41906799
Iteration 31, loss = 0.41911459
Iteration 32, loss = 0.41720771
Iteration 33, loss = 0.41413464
Iteration 34, loss = 0.41140227
Iteration 35, loss = 0.41107079
Iteration 36, loss = 0.41456915
Iteration 37, loss = 0.41096130
Iteration 38, loss = 0.40886620
Iteration 39, loss = 0.41043871
Iteration 40, loss = 0.40910242
Iteration 41, loss = 0.40783617
Iteration 42, loss = 0.40770752
Iteration 43, loss = 0.40969819
Iteration 44, loss = 0.41075237
Iteration 45, loss = 0.40270468
Iteration 46, loss = 0.40601876
Iteration 47, loss = 0.40037256
Iteration 48, loss = 0.40520547
Iteration 49, loss = 0.39762714
Iteration 50, loss = 0.39861855
Iteration 51, loss = 0.39582060
Iteration 52, loss = 0.39623713
Iteration 53, loss = 0.39447378
Iteration 54, loss = 0.39538799
Iteration 55, loss = 0.39063808
Iteration 56, loss = 0.39358101
Iteration 57, loss = 0.39143628
Iteration 58, loss = 0.38737778
Iteration 59, loss = 0.38954248
Iteration 60, loss = 0.38799037
Iteration 61, loss = 0.38547930
Iteration 62, loss = 0.38684833
Iteration 63, loss = 0.38353706
Iteration 64, loss = 0.38437874
Iteration 65, loss = 0.38608326
Iteration 66, loss = 0.38515228
Iteration 67, loss = 0.38130770
Iteration 68, loss = 0.37961442
Iteration 69, loss = 0.38144112
Iteration 70, loss = 0.38119705
Iteration 71, loss = 0.37913934
Iteration 72, loss = 0.38043429
Iteration 73, loss = 0.38058287
Iteration 74, loss = 0.38218221
Iteration 75, loss = 0.37723166
Iteration 76, loss = 0.37832957
Iteration 77, loss = 0.37469412
Iteration 78, loss = 0.37543144
Iteration 79, loss = 0.37792944
Iteration 80, loss = 0.37474708
Iteration 81, loss = 0.37314981

Iteration 82, loss = 0.37131028
Iteration 83, loss = 0.37515161
Iteration 84, loss = 0.37156983
Iteration 85, loss = 0.37153765
Iteration 86, loss = 0.37114279
Iteration 87, loss = 0.37191768
Iteration 88, loss = 0.37264417
Iteration 89, loss = 0.36829157
Iteration 90, loss = 0.37785317
Iteration 91, loss = 0.37103414
Iteration 92, loss = 0.36669135
Iteration 93, loss = 0.36868287
Iteration 94, loss = 0.36740967
Iteration 95, loss = 0.36694481
Iteration 96, loss = 0.36541114
Iteration 97, loss = 0.36699989
Iteration 98, loss = 0.36513639
Iteration 99, loss = 0.36705390
Iteration 100, loss = 0.36368316
Iteration 101, loss = 0.36898640
Iteration 102, loss = 0.36735664
Iteration 103, loss = 0.36726841
Iteration 104, loss = 0.36605086
Iteration 105, loss = 0.36583556
Iteration 106, loss = 0.36368019
Iteration 107, loss = 0.35842997
Iteration 108, loss = 0.36461377
Iteration 109, loss = 0.37258554
Iteration 110, loss = 0.36509995
Iteration 111, loss = 0.36286804
Iteration 112, loss = 0.36654709
Iteration 113, loss = 0.36183918
Iteration 114, loss = 0.36446615
Iteration 115, loss = 0.35870790
Iteration 116, loss = 0.36670106
Iteration 117, loss = 0.36554339
Iteration 118, loss = 0.36254769

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.56094975
Iteration 2, loss = 0.48690570
Iteration 3, loss = 0.47417346
Iteration 4, loss = 0.47104257
Iteration 5, loss = 0.46716234
Iteration 6, loss = 0.45922124
Iteration 7, loss = 0.45829785
Iteration 8, loss = 0.45158738
Iteration 9, loss = 0.44783992
Iteration 10, loss = 0.44589625
Iteration 11, loss = 0.44386034
Iteration 12, loss = 0.44259143
Iteration 13, loss = 0.44166472
Iteration 14, loss = 0.43980716
Iteration 15, loss = 0.44036809
Iteration 16, loss = 0.43744178
Iteration 17, loss = 0.44039131
Iteration 18, loss = 0.43562623

Iteration 19, loss = 0.43257973
Iteration 20, loss = 0.43413788
Iteration 21, loss = 0.43350555
Iteration 22, loss = 0.43052120
Iteration 23, loss = 0.43346235
Iteration 24, loss = 0.42994910
Iteration 25, loss = 0.42924526
Iteration 26, loss = 0.42747242
Iteration 27, loss = 0.42925585
Iteration 28, loss = 0.42749437
Iteration 29, loss = 0.42667374
Iteration 30, loss = 0.42438027
Iteration 31, loss = 0.42550021
Iteration 32, loss = 0.42451090
Iteration 33, loss = 0.42226336
Iteration 34, loss = 0.42166091
Iteration 35, loss = 0.42039152
Iteration 36, loss = 0.42072539
Iteration 37, loss = 0.41963998
Iteration 38, loss = 0.41849554
Iteration 39, loss = 0.41772499
Iteration 40, loss = 0.41930762
Iteration 41, loss = 0.41641588
Iteration 42, loss = 0.41769703
Iteration 43, loss = 0.41872762
Iteration 44, loss = 0.41458207
Iteration 45, loss = 0.41136741
Iteration 46, loss = 0.41228414
Iteration 47, loss = 0.40914285
Iteration 48, loss = 0.41264303
Iteration 49, loss = 0.40773023
Iteration 50, loss = 0.40913610
Iteration 51, loss = 0.40554535
Iteration 52, loss = 0.40530497
Iteration 53, loss = 0.40665635
Iteration 54, loss = 0.39979048
Iteration 55, loss = 0.40034170
Iteration 56, loss = 0.40014626
Iteration 57, loss = 0.39807164
Iteration 58, loss = 0.39446394
Iteration 59, loss = 0.39404277
Iteration 60, loss = 0.39680942
Iteration 61, loss = 0.38939026
Iteration 62, loss = 0.38941266
Iteration 63, loss = 0.38883603
Iteration 64, loss = 0.38955490
Iteration 65, loss = 0.38818497
Iteration 66, loss = 0.38300350
Iteration 67, loss = 0.38706578
Iteration 68, loss = 0.38357393
Iteration 69, loss = 0.38615658
Iteration 70, loss = 0.38401233
Iteration 71, loss = 0.38451554
Iteration 72, loss = 0.37723239
Iteration 73, loss = 0.38024911
Iteration 74, loss = 0.38280741
Iteration 75, loss = 0.38094257

```
Iteration 76, loss = 0.38098395
Iteration 77, loss = 0.37479361
Iteration 78, loss = 0.37567688
Iteration 79, loss = 0.37918553
Iteration 80, loss = 0.37558492
Iteration 81, loss = 0.37830946
Iteration 82, loss = 0.37545046
Iteration 83, loss = 0.37498953
Iteration 84, loss = 0.37361584
Iteration 85, loss = 0.37685276
Iteration 86, loss = 0.37270696
Iteration 87, loss = 0.37531308
Iteration 88, loss = 0.37012837
Iteration 89, loss = 0.37303308
Iteration 90, loss = 0.37543378
Iteration 91, loss = 0.37492661
Iteration 92, loss = 0.37054859
Iteration 93, loss = 0.36906303
Iteration 94, loss = 0.37141192
Iteration 95, loss = 0.36816175
Iteration 96, loss = 0.37070165
Iteration 97, loss = 0.36917213
Iteration 98, loss = 0.36733753
Iteration 99, loss = 0.36915523
Iteration 100, loss = 0.36852836
Iteration 101, loss = 0.36904061
Iteration 102, loss = 0.36541755
Iteration 103, loss = 0.37001952
Iteration 104, loss = 0.36745981
Iteration 105, loss = 0.37576620
Iteration 106, loss = 0.37301679
Iteration 107, loss = 0.36727549
Iteration 108, loss = 0.36494897
Iteration 109, loss = 0.36837431
Iteration 110, loss = 0.36848716
Iteration 111, loss = 0.36393306
Iteration 112, loss = 0.37090782
Iteration 113, loss = 0.36272533
Iteration 114, loss = 0.37175155
Iteration 115, loss = 0.36248712
Iteration 116, loss = 0.36517696
Iteration 117, loss = 0.36555986
Iteration 118, loss = 0.36511153
Iteration 119, loss = 0.36426151
Iteration 120, loss = 0.36401375
Iteration 121, loss = 0.36337879
Iteration 122, loss = 0.36669721
Iteration 123, loss = 0.36620272
Iteration 124, loss = 0.36328211
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.56246813
Iteration 2, loss = 0.48370047
Iteration 3, loss = 0.47213323
Iteration 4, loss = 0.46654980
Iteration 5, loss = 0.46359509
Iteration 6, loss = 0.45418538
```

Iteration 7, loss = 0.45390211
Iteration 8, loss = 0.44820075
Iteration 9, loss = 0.44492568
Iteration 10, loss = 0.44158549
Iteration 11, loss = 0.43827314
Iteration 12, loss = 0.43587571
Iteration 13, loss = 0.43552027
Iteration 14, loss = 0.43312429
Iteration 15, loss = 0.43222845
Iteration 16, loss = 0.43168642
Iteration 17, loss = 0.42974951
Iteration 18, loss = 0.42834898
Iteration 19, loss = 0.42682623
Iteration 20, loss = 0.42835236
Iteration 21, loss = 0.42753618
Iteration 22, loss = 0.42342939
Iteration 23, loss = 0.42378452
Iteration 24, loss = 0.42238873
Iteration 25, loss = 0.42006640
Iteration 26, loss = 0.41838260
Iteration 27, loss = 0.42027583
Iteration 28, loss = 0.41682135
Iteration 29, loss = 0.41722692
Iteration 30, loss = 0.41710753
Iteration 31, loss = 0.41548514
Iteration 32, loss = 0.41506781
Iteration 33, loss = 0.41356158
Iteration 34, loss = 0.41066965
Iteration 35, loss = 0.41176567
Iteration 36, loss = 0.41011312
Iteration 37, loss = 0.41126040
Iteration 38, loss = 0.40797757
Iteration 39, loss = 0.40688394
Iteration 40, loss = 0.40714121
Iteration 41, loss = 0.40414760
Iteration 42, loss = 0.40551090
Iteration 43, loss = 0.40772144
Iteration 44, loss = 0.40386128
Iteration 45, loss = 0.40293036
Iteration 46, loss = 0.39976244
Iteration 47, loss = 0.39770732
Iteration 48, loss = 0.40320737
Iteration 49, loss = 0.39781597
Iteration 50, loss = 0.39883037
Iteration 51, loss = 0.39496635
Iteration 52, loss = 0.39909781
Iteration 53, loss = 0.39492254
Iteration 54, loss = 0.39629091
Iteration 55, loss = 0.39431828
Iteration 56, loss = 0.39417815
Iteration 57, loss = 0.39310626
Iteration 58, loss = 0.39285082
Iteration 59, loss = 0.39516645
Iteration 60, loss = 0.39597716
Iteration 61, loss = 0.39177521
Iteration 62, loss = 0.38925943
Iteration 63, loss = 0.39202510

Iteration 64, loss = 0.38872659
Iteration 65, loss = 0.39301830
Iteration 66, loss = 0.38548540
Iteration 67, loss = 0.39038227
Iteration 68, loss = 0.38597301
Iteration 69, loss = 0.38674676
Iteration 70, loss = 0.38626917
Iteration 71, loss = 0.38390494
Iteration 72, loss = 0.38307007
Iteration 73, loss = 0.38453303
Iteration 74, loss = 0.38193595
Iteration 75, loss = 0.38296528
Iteration 76, loss = 0.38147336
Iteration 77, loss = 0.37821945
Iteration 78, loss = 0.38374461
Iteration 79, loss = 0.38594346
Iteration 80, loss = 0.38265364
Iteration 81, loss = 0.37878847
Iteration 82, loss = 0.37817854
Iteration 83, loss = 0.37694436
Iteration 84, loss = 0.37493586
Iteration 85, loss = 0.37468130
Iteration 86, loss = 0.37661677
Iteration 87, loss = 0.37652708
Iteration 88, loss = 0.37346600
Iteration 89, loss = 0.37533060
Iteration 90, loss = 0.37246611
Iteration 91, loss = 0.37487875
Iteration 92, loss = 0.37521777
Iteration 93, loss = 0.36955637
Iteration 94, loss = 0.37059886
Iteration 95, loss = 0.37120998
Iteration 96, loss = 0.36959028
Iteration 97, loss = 0.36793065
Iteration 98, loss = 0.37207904
Iteration 99, loss = 0.37047402
Iteration 100, loss = 0.37254322
Iteration 101, loss = 0.36693574
Iteration 102, loss = 0.36794937
Iteration 103, loss = 0.36664730
Iteration 104, loss = 0.36769047
Iteration 105, loss = 0.36958089
Iteration 106, loss = 0.36875068
Iteration 107, loss = 0.36806485
Iteration 108, loss = 0.36672537

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.56061175
Iteration 2, loss = 0.48846507
Iteration 3, loss = 0.47618684
Iteration 4, loss = 0.46928874
Iteration 5, loss = 0.46597029
Iteration 6, loss = 0.46080040
Iteration 7, loss = 0.45800434
Iteration 8, loss = 0.45381020
Iteration 9, loss = 0.45016168
Iteration 10, loss = 0.44736821

Iteration 11, loss = 0.44551942
Iteration 12, loss = 0.44234847
Iteration 13, loss = 0.44222801
Iteration 14, loss = 0.43799560
Iteration 15, loss = 0.43801350
Iteration 16, loss = 0.43718022
Iteration 17, loss = 0.43562715
Iteration 18, loss = 0.43398292
Iteration 19, loss = 0.43501616
Iteration 20, loss = 0.43435086
Iteration 21, loss = 0.43408070
Iteration 22, loss = 0.43338096
Iteration 23, loss = 0.43017539
Iteration 24, loss = 0.42939247
Iteration 25, loss = 0.42773971
Iteration 26, loss = 0.42517632
Iteration 27, loss = 0.42950191
Iteration 28, loss = 0.42452282
Iteration 29, loss = 0.42346546
Iteration 30, loss = 0.42275809
Iteration 31, loss = 0.41853418
Iteration 32, loss = 0.41678128
Iteration 33, loss = 0.41806840
Iteration 34, loss = 0.41775787
Iteration 35, loss = 0.41442106
Iteration 36, loss = 0.41404806
Iteration 37, loss = 0.41376539
Iteration 38, loss = 0.41208690
Iteration 39, loss = 0.41162859
Iteration 40, loss = 0.40945781
Iteration 41, loss = 0.40861455
Iteration 42, loss = 0.40966260
Iteration 43, loss = 0.40878318
Iteration 44, loss = 0.40285387
Iteration 45, loss = 0.40565340
Iteration 46, loss = 0.40397639
Iteration 47, loss = 0.40325384
Iteration 48, loss = 0.40106405
Iteration 49, loss = 0.40257286
Iteration 50, loss = 0.40127001
Iteration 51, loss = 0.40281481
Iteration 52, loss = 0.39880072
Iteration 53, loss = 0.39696006
Iteration 54, loss = 0.39649523
Iteration 55, loss = 0.39591577
Iteration 56, loss = 0.39480726
Iteration 57, loss = 0.39490507
Iteration 58, loss = 0.39217060
Iteration 59, loss = 0.39132509
Iteration 60, loss = 0.39292872
Iteration 61, loss = 0.39130007
Iteration 62, loss = 0.39174888
Iteration 63, loss = 0.39112803
Iteration 64, loss = 0.38783814
Iteration 65, loss = 0.39541603
Iteration 66, loss = 0.38921684
Iteration 67, loss = 0.38668560

Iteration 68, loss = 0.38728749
Iteration 69, loss = 0.38473803
Iteration 70, loss = 0.38409566
Iteration 71, loss = 0.38553533
Iteration 72, loss = 0.38635199
Iteration 73, loss = 0.38223716
Iteration 74, loss = 0.38323125
Iteration 75, loss = 0.38662558
Iteration 76, loss = 0.38154186
Iteration 77, loss = 0.38288353
Iteration 78, loss = 0.38562656
Iteration 79, loss = 0.37823030
Iteration 80, loss = 0.38225944
Iteration 81, loss = 0.38199207
Iteration 82, loss = 0.38055676
Iteration 83, loss = 0.38014844
Iteration 84, loss = 0.38029390
Iteration 85, loss = 0.37914149
Iteration 86, loss = 0.37528739
Iteration 87, loss = 0.37638860
Iteration 88, loss = 0.37645548
Iteration 89, loss = 0.38055842
Iteration 90, loss = 0.37737353
Iteration 91, loss = 0.37869312
Iteration 92, loss = 0.37242658
Iteration 93, loss = 0.37480319
Iteration 94, loss = 0.37888876
Iteration 95, loss = 0.37371866
Iteration 96, loss = 0.37355370
Iteration 97, loss = 0.37326945
Iteration 98, loss = 0.37279894
Iteration 99, loss = 0.37632946
Iteration 100, loss = 0.37289102
Iteration 101, loss = 0.37403307
Iteration 102, loss = 0.37277772
Iteration 103, loss = 0.37178218

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.52928158
Iteration 2, loss = 0.48103883
Iteration 3, loss = 0.47002763
Iteration 4, loss = 0.46448800
Iteration 5, loss = 0.45768354
Iteration 6, loss = 0.45038372
Iteration 7, loss = 0.44838501
Iteration 8, loss = 0.44550587
Iteration 9, loss = 0.44334643
Iteration 10, loss = 0.44006590
Iteration 11, loss = 0.43924685
Iteration 12, loss = 0.43646447
Iteration 13, loss = 0.43498745
Iteration 14, loss = 0.43330068
Iteration 15, loss = 0.43359240
Iteration 16, loss = 0.43224007
Iteration 17, loss = 0.42976290
Iteration 18, loss = 0.42790649
Iteration 19, loss = 0.42381360

Iteration 20, loss = 0.42377274
Iteration 21, loss = 0.42245753
Iteration 22, loss = 0.41953254
Iteration 23, loss = 0.41576998
Iteration 24, loss = 0.41291004
Iteration 25, loss = 0.40966317
Iteration 26, loss = 0.40718778
Iteration 27, loss = 0.40684974
Iteration 28, loss = 0.40519656
Iteration 29, loss = 0.40093407
Iteration 30, loss = 0.40131197
Iteration 31, loss = 0.39616791
Iteration 32, loss = 0.39527281
Iteration 33, loss = 0.39480343
Iteration 34, loss = 0.39170632
Iteration 35, loss = 0.39138037
Iteration 36, loss = 0.38868556
Iteration 37, loss = 0.38735204
Iteration 38, loss = 0.38762440
Iteration 39, loss = 0.38779028
Iteration 40, loss = 0.38694124
Iteration 41, loss = 0.38718554
Iteration 42, loss = 0.38354290
Iteration 43, loss = 0.38282097
Iteration 44, loss = 0.38130580
Iteration 45, loss = 0.37941637
Iteration 46, loss = 0.37817305
Iteration 47, loss = 0.37826920
Iteration 48, loss = 0.37856327
Iteration 49, loss = 0.37474578
Iteration 50, loss = 0.37964317
Iteration 51, loss = 0.37642174
Iteration 52, loss = 0.37424198
Iteration 53, loss = 0.37567353
Iteration 54, loss = 0.37515871
Iteration 55, loss = 0.37387868
Iteration 56, loss = 0.37235600
Iteration 57, loss = 0.37216205
Iteration 58, loss = 0.37414506
Iteration 59, loss = 0.37377129
Iteration 60, loss = 0.37208232
Iteration 61, loss = 0.37306332
Iteration 62, loss = 0.37003307
Iteration 63, loss = 0.37045767
Iteration 64, loss = 0.37039901
Iteration 65, loss = 0.37088495
Iteration 66, loss = 0.37109231
Iteration 67, loss = 0.37002037
Iteration 68, loss = 0.36986150
Iteration 69, loss = 0.36720698
Iteration 70, loss = 0.36782843
Iteration 71, loss = 0.36632399
Iteration 72, loss = 0.36464848
Iteration 73, loss = 0.37014114
Iteration 74, loss = 0.36612581
Iteration 75, loss = 0.36577915
Iteration 76, loss = 0.36356152

```
Iteration 77, loss = 0.36290070
Iteration 78, loss = 0.36412365
Iteration 79, loss = 0.36443712
Iteration 80, loss = 0.36085519
Iteration 81, loss = 0.36446117
Iteration 82, loss = 0.36536901
Iteration 83, loss = 0.36488071
Iteration 84, loss = 0.35924317
Iteration 85, loss = 0.36327358
Iteration 86, loss = 0.36210756
Iteration 87, loss = 0.36140858
Iteration 88, loss = 0.36234921
Iteration 89, loss = 0.36114903
Iteration 90, loss = 0.36217341
Iteration 91, loss = 0.36327039
Iteration 92, loss = 0.36180563
Iteration 93, loss = 0.35979817
Iteration 94, loss = 0.35985430
Iteration 95, loss = 0.35932521
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.53932886
Iteration 2, loss = 0.48577300
Iteration 3, loss = 0.47353861
Iteration 4, loss = 0.46507169
Iteration 5, loss = 0.45800932
Iteration 6, loss = 0.45434867
Iteration 7, loss = 0.45222319
Iteration 8, loss = 0.44574561
Iteration 9, loss = 0.44352773
Iteration 10, loss = 0.44180824
Iteration 11, loss = 0.43802103
Iteration 12, loss = 0.43569859
Iteration 13, loss = 0.43326277
Iteration 14, loss = 0.43233248
Iteration 15, loss = 0.43343942
Iteration 16, loss = 0.43140769
Iteration 17, loss = 0.42865192
Iteration 18, loss = 0.42589156
Iteration 19, loss = 0.42474019
Iteration 20, loss = 0.42206933
Iteration 21, loss = 0.42369009
Iteration 22, loss = 0.42211924
Iteration 23, loss = 0.41798641
Iteration 24, loss = 0.41706752
Iteration 25, loss = 0.41644371
Iteration 26, loss = 0.41469793
Iteration 27, loss = 0.41495364
Iteration 28, loss = 0.41516723
Iteration 29, loss = 0.41176312
Iteration 30, loss = 0.40715341
Iteration 31, loss = 0.40989024
Iteration 32, loss = 0.40721762
Iteration 33, loss = 0.40525270
Iteration 34, loss = 0.40256956
Iteration 35, loss = 0.40216394
Iteration 36, loss = 0.39778435
```

Iteration 37, loss = 0.39656199
Iteration 38, loss = 0.39436949
Iteration 39, loss = 0.39725026
Iteration 40, loss = 0.39693510
Iteration 41, loss = 0.39163863
Iteration 42, loss = 0.38787452
Iteration 43, loss = 0.38963371
Iteration 44, loss = 0.38793360
Iteration 45, loss = 0.38617409
Iteration 46, loss = 0.38680360
Iteration 47, loss = 0.37941340
Iteration 48, loss = 0.37965308
Iteration 49, loss = 0.38203924
Iteration 50, loss = 0.37760096
Iteration 51, loss = 0.38171437
Iteration 52, loss = 0.37520509
Iteration 53, loss = 0.37481330
Iteration 54, loss = 0.37476233
Iteration 55, loss = 0.37497368
Iteration 56, loss = 0.37415481
Iteration 57, loss = 0.37056543
Iteration 58, loss = 0.37625896
Iteration 59, loss = 0.37276678
Iteration 60, loss = 0.37129298
Iteration 61, loss = 0.36762210
Iteration 62, loss = 0.37066989
Iteration 63, loss = 0.37061954
Iteration 64, loss = 0.36590107
Iteration 65, loss = 0.36413932
Iteration 66, loss = 0.36386153
Iteration 67, loss = 0.36504561
Iteration 68, loss = 0.36481396
Iteration 69, loss = 0.36529129
Iteration 70, loss = 0.36166282
Iteration 71, loss = 0.36016659
Iteration 72, loss = 0.36288812
Iteration 73, loss = 0.35979251
Iteration 74, loss = 0.35812702
Iteration 75, loss = 0.36176590
Iteration 76, loss = 0.35942936
Iteration 77, loss = 0.36049412
Iteration 78, loss = 0.35875352
Iteration 79, loss = 0.36011132
Iteration 80, loss = 0.35892287
Iteration 81, loss = 0.35991414
Iteration 82, loss = 0.35596493
Iteration 83, loss = 0.35584354
Iteration 84, loss = 0.35556288
Iteration 85, loss = 0.35521965
Iteration 86, loss = 0.35631357
Iteration 87, loss = 0.35667136
Iteration 88, loss = 0.35040343
Iteration 89, loss = 0.35313479
Iteration 90, loss = 0.35299139
Iteration 91, loss = 0.35463592
Iteration 92, loss = 0.35400280
Iteration 93, loss = 0.35092716

Iteration 94, loss = 0.35271756
Iteration 95, loss = 0.34936966
Iteration 96, loss = 0.35016104
Iteration 97, loss = 0.35511983
Iteration 98, loss = 0.34596839
Iteration 99, loss = 0.34977706
Iteration 100, loss = 0.34546183
Iteration 101, loss = 0.34634707
Iteration 102, loss = 0.34504661
Iteration 103, loss = 0.34628899
Iteration 104, loss = 0.34576592
Iteration 105, loss = 0.34441935
Iteration 106, loss = 0.34662674
Iteration 107, loss = 0.34685471
Iteration 108, loss = 0.34343010
Iteration 109, loss = 0.34092280
Iteration 110, loss = 0.33956382
Iteration 111, loss = 0.33913546
Iteration 112, loss = 0.34019132
Iteration 113, loss = 0.34052225
Iteration 114, loss = 0.34064577
Iteration 115, loss = 0.34015830
Iteration 116, loss = 0.34050023
Iteration 117, loss = 0.34466829
Iteration 118, loss = 0.34057319
Iteration 119, loss = 0.34015788
Iteration 120, loss = 0.34199957
Iteration 121, loss = 0.34408915

Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

Iteration 1, loss = 0.53898036
Iteration 2, loss = 0.48583929
Iteration 3, loss = 0.47344146
Iteration 4, loss = 0.46525232
Iteration 5, loss = 0.45900142
Iteration 6, loss = 0.45423883
Iteration 7, loss = 0.44968997
Iteration 8, loss = 0.44615704
Iteration 9, loss = 0.44323548
Iteration 10, loss = 0.44274806
Iteration 11, loss = 0.44161010
Iteration 12, loss = 0.43715455
Iteration 13, loss = 0.43496908
Iteration 14, loss = 0.43400913
Iteration 15, loss = 0.43159950
Iteration 16, loss = 0.43118819
Iteration 17, loss = 0.43030745
Iteration 18, loss = 0.42799228
Iteration 19, loss = 0.42776524
Iteration 20, loss = 0.42413843
Iteration 21, loss = 0.42289517
Iteration 22, loss = 0.42412983
Iteration 23, loss = 0.42120273
Iteration 24, loss = 0.41696568
Iteration 25, loss = 0.42053342
Iteration 26, loss = 0.41908886
Iteration 27, loss = 0.41525210

Iteration 28, loss = 0.41651040
Iteration 29, loss = 0.41523149
Iteration 30, loss = 0.41360997
Iteration 31, loss = 0.41386251
Iteration 32, loss = 0.41167025
Iteration 33, loss = 0.41224100
Iteration 34, loss = 0.40983422
Iteration 35, loss = 0.40960365
Iteration 36, loss = 0.40861930
Iteration 37, loss = 0.40812132
Iteration 38, loss = 0.40986303
Iteration 39, loss = 0.40353390
Iteration 40, loss = 0.40392754
Iteration 41, loss = 0.40364006
Iteration 42, loss = 0.40005917
Iteration 43, loss = 0.39733485
Iteration 44, loss = 0.39842922
Iteration 45, loss = 0.39391663
Iteration 46, loss = 0.39284823
Iteration 47, loss = 0.38902441
Iteration 48, loss = 0.39020811
Iteration 49, loss = 0.38810622
Iteration 50, loss = 0.38542413
Iteration 51, loss = 0.38800007
Iteration 52, loss = 0.38526387
Iteration 53, loss = 0.38222135
Iteration 54, loss = 0.38238112
Iteration 55, loss = 0.37981129
Iteration 56, loss = 0.37915882
Iteration 57, loss = 0.38036709
Iteration 58, loss = 0.38163670
Iteration 59, loss = 0.38000480
Iteration 60, loss = 0.38153757
Iteration 61, loss = 0.37617261
Iteration 62, loss = 0.37723761
Iteration 63, loss = 0.37280372
Iteration 64, loss = 0.38017301
Iteration 65, loss = 0.37395504
Iteration 66, loss = 0.37549681
Iteration 67, loss = 0.37152818
Iteration 68, loss = 0.37044777
Iteration 69, loss = 0.37258195
Iteration 70, loss = 0.37279973
Iteration 71, loss = 0.37061620
Iteration 72, loss = 0.36940384
Iteration 73, loss = 0.37106250
Iteration 74, loss = 0.36737649
Iteration 75, loss = 0.37076673
Iteration 76, loss = 0.36810524
Iteration 77, loss = 0.36774100
Iteration 78, loss = 0.36599349
Iteration 79, loss = 0.36798568
Iteration 80, loss = 0.36747796
Iteration 81, loss = 0.36833294
Iteration 82, loss = 0.36301422
Iteration 83, loss = 0.36536185
Iteration 84, loss = 0.36565232

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Iteration 85, loss = 0.36412004
Iteration 86, loss = 0.36733668
Iteration 87, loss = 0.36334063
Iteration 88, loss = 0.36254214
Iteration 89, loss = 0.36201830
Iteration 90, loss = 0.36037052
Iteration 91, loss = 0.36222412
Iteration 92, loss = 0.36079242
Iteration 93, loss = 0.35891041
Iteration 94, loss = 0.36366046
Iteration 95, loss = 0.36005021
Iteration 96, loss = 0.36119624
Iteration 97, loss = 0.35968720
Iteration 98, loss = 0.35948067
Iteration 99, loss = 0.35730716
Iteration 100, loss = 0.35979279
Iteration 101, loss = 0.35781303
Iteration 102, loss = 0.35477075
Iteration 103, loss = 0.35691257
Iteration 104, loss = 0.35923299
Iteration 105, loss = 0.35159638
Iteration 106, loss = 0.35194946
Iteration 107, loss = 0.35459831
Iteration 108, loss = 0.35219920
Iteration 109, loss = 0.35238346
Iteration 110, loss = 0.35084195
Iteration 111, loss = 0.35111303
Iteration 112, loss = 0.35653571
Iteration 113, loss = 0.35094475
Iteration 114, loss = 0.34985542
Iteration 115, loss = 0.35254798
Iteration 116, loss = 0.35347017
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54118621
Iteration 2, loss = 0.48711586
Iteration 3, loss = 0.47753167
Iteration 4, loss = 0.46997957
Iteration 5, loss = 0.46350577
Iteration 6, loss = 0.46172247
Iteration 7, loss = 0.45797207
Iteration 8, loss = 0.45300745
Iteration 9, loss = 0.44999532
Iteration 10, loss = 0.44806878
Iteration 11, loss = 0.44268345
Iteration 12, loss = 0.44088336
Iteration 13, loss = 0.43651593
Iteration 14, loss = 0.43637961
Iteration 15, loss = 0.43689579
Iteration 16, loss = 0.43259958
Iteration 17, loss = 0.43400325
Iteration 18, loss = 0.43117995
Iteration 19, loss = 0.42902380
Iteration 20, loss = 0.42831065
Iteration 21, loss = 0.42781891
Iteration 22, loss = 0.42619799
Iteration 23, loss = 0.42490636
```


Iteration 24, loss = 0.42003059
Iteration 25, loss = 0.41975758
Iteration 26, loss = 0.42130509
Iteration 27, loss = 0.41654206
Iteration 28, loss = 0.41663697
Iteration 29, loss = 0.41233884
Iteration 30, loss = 0.41197857
Iteration 31, loss = 0.41098751
Iteration 32, loss = 0.40767032
Iteration 33, loss = 0.40668915
Iteration 34, loss = 0.40379245
Iteration 35, loss = 0.40123818
Iteration 36, loss = 0.39873245
Iteration 37, loss = 0.39858622
Iteration 38, loss = 0.39678930
Iteration 39, loss = 0.39394511
Iteration 40, loss = 0.38982415
Iteration 41, loss = 0.39174237
Iteration 42, loss = 0.38512653
Iteration 43, loss = 0.38432491
Iteration 44, loss = 0.38621648
Iteration 45, loss = 0.38610991
Iteration 46, loss = 0.38065307
Iteration 47, loss = 0.38114254
Iteration 48, loss = 0.38028661
Iteration 49, loss = 0.38202431
Iteration 50, loss = 0.37714977
Iteration 51, loss = 0.38338019
Iteration 52, loss = 0.37826595
Iteration 53, loss = 0.37633706
Iteration 54, loss = 0.37599047
Iteration 55, loss = 0.37301818
Iteration 56, loss = 0.37624322
Iteration 57, loss = 0.37403640
Iteration 58, loss = 0.38014813
Iteration 59, loss = 0.37876637
Iteration 60, loss = 0.37553351
Iteration 61, loss = 0.37120555
Iteration 62, loss = 0.37325813
Iteration 63, loss = 0.37266771
Iteration 64, loss = 0.37365232
Iteration 65, loss = 0.37053109
Iteration 66, loss = 0.36852259
Iteration 67, loss = 0.36775910
Iteration 68, loss = 0.36827358
Iteration 69, loss = 0.37151734
Iteration 70, loss = 0.36846266
Iteration 71, loss = 0.36544073
Iteration 72, loss = 0.36791257
Iteration 73, loss = 0.36665079
Iteration 74, loss = 0.36441018
Iteration 75, loss = 0.36841629
Iteration 76, loss = 0.36809643
Iteration 77, loss = 0.36331031
Iteration 78, loss = 0.36252330
Iteration 79, loss = 0.36280351
Iteration 80, loss = 0.36211158

Iteration 81, loss = 0.36484696
Iteration 82, loss = 0.36439931
Iteration 83, loss = 0.36386040
Iteration 84, loss = 0.36478936
Iteration 85, loss = 0.36431231
Iteration 86, loss = 0.36269075
Iteration 87, loss = 0.35985776
Iteration 88, loss = 0.36094170
Iteration 89, loss = 0.36118973
Iteration 90, loss = 0.35999843
Iteration 91, loss = 0.35765395
Iteration 92, loss = 0.35625804
Iteration 93, loss = 0.35747232
Iteration 94, loss = 0.36211432
Iteration 95, loss = 0.36353300
Iteration 96, loss = 0.35763109
Iteration 97, loss = 0.35612586
Iteration 98, loss = 0.35364235
Iteration 99, loss = 0.35672639
Iteration 100, loss = 0.35630199
Iteration 101, loss = 0.35566326
Iteration 102, loss = 0.35147211
Iteration 103, loss = 0.35398910
Iteration 104, loss = 0.35585567
Iteration 105, loss = 0.35117108
Iteration 106, loss = 0.35363376
Iteration 107, loss = 0.35499633
Iteration 108, loss = 0.35297451
Iteration 109, loss = 0.35049287
Iteration 110, loss = 0.35028134
Iteration 111, loss = 0.34969429
Iteration 112, loss = 0.34872110
Iteration 113, loss = 0.34936786

Training loss did not improve more than tol=0.001000 for 10 consecutive epoch s. Stopping.

Iteration 1, loss = 0.54004558
Iteration 2, loss = 0.48257600
Iteration 3, loss = 0.47093620
Iteration 4, loss = 0.46351556
Iteration 5, loss = 0.45554337
Iteration 6, loss = 0.45356035
Iteration 7, loss = 0.44680033
Iteration 8, loss = 0.44248989
Iteration 9, loss = 0.44031373
Iteration 10, loss = 0.44123849
Iteration 11, loss = 0.43456100
Iteration 12, loss = 0.43408306
Iteration 13, loss = 0.43060488
Iteration 14, loss = 0.43211662
Iteration 15, loss = 0.42850954
Iteration 16, loss = 0.42574422
Iteration 17, loss = 0.42474957
Iteration 18, loss = 0.42664723
Iteration 19, loss = 0.42346869
Iteration 20, loss = 0.42399491
Iteration 21, loss = 0.42283094
Iteration 22, loss = 0.42069891

Iteration 23, loss = 0.41975720
Iteration 24, loss = 0.41836057
Iteration 25, loss = 0.41867778
Iteration 26, loss = 0.41784922
Iteration 27, loss = 0.41328099
Iteration 28, loss = 0.41314456
Iteration 29, loss = 0.40927668
Iteration 30, loss = 0.40957928
Iteration 31, loss = 0.41178745
Iteration 32, loss = 0.40781605
Iteration 33, loss = 0.40566859
Iteration 34, loss = 0.40362187
Iteration 35, loss = 0.40195041
Iteration 36, loss = 0.39751273
Iteration 37, loss = 0.39695118
Iteration 38, loss = 0.39697409
Iteration 39, loss = 0.39225694
Iteration 40, loss = 0.39245117
Iteration 41, loss = 0.38930009
Iteration 42, loss = 0.38601962
Iteration 43, loss = 0.38459881
Iteration 44, loss = 0.38554052
Iteration 45, loss = 0.38768616
Iteration 46, loss = 0.38077704
Iteration 47, loss = 0.37780564
Iteration 48, loss = 0.38147081
Iteration 49, loss = 0.38326081
Iteration 50, loss = 0.37799379
Iteration 51, loss = 0.37741056
Iteration 52, loss = 0.38000621
Iteration 53, loss = 0.37560302
Iteration 54, loss = 0.37515012
Iteration 55, loss = 0.37237787
Iteration 56, loss = 0.37438645
Iteration 57, loss = 0.37223399
Iteration 58, loss = 0.37439426
Iteration 59, loss = 0.37721821
Iteration 60, loss = 0.37362319
Iteration 61, loss = 0.37115590
Iteration 62, loss = 0.37057279
Iteration 63, loss = 0.36820659
Iteration 64, loss = 0.37227242
Iteration 65, loss = 0.37047879
Iteration 66, loss = 0.36664686
Iteration 67, loss = 0.36537412
Iteration 68, loss = 0.36885241
Iteration 69, loss = 0.36556983
Iteration 70, loss = 0.36328591
Iteration 71, loss = 0.36270073
Iteration 72, loss = 0.36278062
Iteration 73, loss = 0.36460323
Iteration 74, loss = 0.36649426
Iteration 75, loss = 0.36925423
Iteration 76, loss = 0.36381858
Iteration 77, loss = 0.36348100
Iteration 78, loss = 0.36100627
Iteration 79, loss = 0.36302047

```
Iteration 80, loss = 0.36556212
Iteration 81, loss = 0.36356374
Iteration 82, loss = 0.36305235
Iteration 83, loss = 0.36153286
Iteration 84, loss = 0.35805087
Iteration 85, loss = 0.35951757
Iteration 86, loss = 0.35686553
Iteration 87, loss = 0.35871099
Iteration 88, loss = 0.35675737
Iteration 89, loss = 0.36047220
Iteration 90, loss = 0.35994644
Iteration 91, loss = 0.35546036
Iteration 92, loss = 0.35580050
Iteration 93, loss = 0.35462193
Iteration 94, loss = 0.36269460
Iteration 95, loss = 0.35974355
Iteration 96, loss = 0.36051572
Iteration 97, loss = 0.35928359
Iteration 98, loss = 0.35436168
Iteration 99, loss = 0.35617515
Iteration 100, loss = 0.35553337
Iteration 101, loss = 0.35315744
Iteration 102, loss = 0.35258787
Iteration 103, loss = 0.35361302
Iteration 104, loss = 0.35483173
Iteration 105, loss = 0.35075130
Iteration 106, loss = 0.35366224
Iteration 107, loss = 0.35263646
Iteration 108, loss = 0.35314758
Iteration 109, loss = 0.35224660
Iteration 110, loss = 0.35020282
Iteration 111, loss = 0.35052612
Iteration 112, loss = 0.34928137
Iteration 113, loss = 0.34810776
Iteration 114, loss = 0.35048807
Iteration 115, loss = 0.34740115
Iteration 116, loss = 0.34972268
Iteration 117, loss = 0.35193601
Iteration 118, loss = 0.34556731
Iteration 119, loss = 0.35260691
Iteration 120, loss = 0.35127609
Iteration 121, loss = 0.34621506
Iteration 122, loss = 0.34992754
Iteration 123, loss = 0.34593887
Iteration 124, loss = 0.35007892
Iteration 125, loss = 0.34647031
Iteration 126, loss = 0.34752508
Iteration 127, loss = 0.34951842
Iteration 128, loss = 0.35470069
Iteration 129, loss = 0.35022905
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
Iteration 1, loss = 0.54386834
Iteration 2, loss = 0.48433346
Iteration 3, loss = 0.47366075
Iteration 4, loss = 0.46507697
Iteration 5, loss = 0.46035530
```

Iteration 6, loss = 0.45846547
Iteration 7, loss = 0.45300156
Iteration 8, loss = 0.45035727
Iteration 9, loss = 0.44564218
Iteration 10, loss = 0.44389839
Iteration 11, loss = 0.44335564
Iteration 12, loss = 0.43905110
Iteration 13, loss = 0.43610579
Iteration 14, loss = 0.43692357
Iteration 15, loss = 0.43701968
Iteration 16, loss = 0.43379401
Iteration 17, loss = 0.43155997
Iteration 18, loss = 0.43373022
Iteration 19, loss = 0.43067625
Iteration 20, loss = 0.42677935
Iteration 21, loss = 0.42586574
Iteration 22, loss = 0.42606283
Iteration 23, loss = 0.42359754
Iteration 24, loss = 0.42371171
Iteration 25, loss = 0.42163751
Iteration 26, loss = 0.41863262
Iteration 27, loss = 0.41971350
Iteration 28, loss = 0.41775243
Iteration 29, loss = 0.41402060
Iteration 30, loss = 0.41416483
Iteration 31, loss = 0.41186819
Iteration 32, loss = 0.41014592
Iteration 33, loss = 0.40863826
Iteration 34, loss = 0.40917231
Iteration 35, loss = 0.40966103
Iteration 36, loss = 0.40530594
Iteration 37, loss = 0.40372988
Iteration 38, loss = 0.40436931
Iteration 39, loss = 0.40304171
Iteration 40, loss = 0.40125975
Iteration 41, loss = 0.40173379
Iteration 42, loss = 0.39868402
Iteration 43, loss = 0.39684707
Iteration 44, loss = 0.39719819
Iteration 45, loss = 0.39230894
Iteration 46, loss = 0.39088695
Iteration 47, loss = 0.39066683
Iteration 48, loss = 0.39051991
Iteration 49, loss = 0.38797296
Iteration 50, loss = 0.38693228
Iteration 51, loss = 0.38765767
Iteration 52, loss = 0.38430872
Iteration 53, loss = 0.38172242
Iteration 54, loss = 0.38059267
Iteration 55, loss = 0.38210223
Iteration 56, loss = 0.38385926
Iteration 57, loss = 0.37826923
Iteration 58, loss = 0.37707875
Iteration 59, loss = 0.38026943
Iteration 60, loss = 0.37665684
Iteration 61, loss = 0.38034831
Iteration 62, loss = 0.37878314

```
Iteration 63, loss = 0.37688188
Iteration 64, loss = 0.37902740
Iteration 65, loss = 0.37357896
Iteration 66, loss = 0.37398933
Iteration 67, loss = 0.37332449
Iteration 68, loss = 0.37547790
Iteration 69, loss = 0.37218543
Iteration 70, loss = 0.37388630
Iteration 71, loss = 0.37360177
Iteration 72, loss = 0.37562989
Iteration 73, loss = 0.37112405
Iteration 74, loss = 0.37162921
Iteration 75, loss = 0.36900391
Iteration 76, loss = 0.36847795
Iteration 77, loss = 0.37216744
Iteration 78, loss = 0.36938488
Iteration 79, loss = 0.37018136
Iteration 80, loss = 0.36664311
Iteration 81, loss = 0.36751157
Iteration 82, loss = 0.36640704
Iteration 83, loss = 0.36333911
Iteration 84, loss = 0.36725859
Iteration 85, loss = 0.36586639
Iteration 86, loss = 0.36527276
Iteration 87, loss = 0.36556635
Iteration 88, loss = 0.36239507
Iteration 89, loss = 0.36412961
Iteration 90, loss = 0.36114335
Iteration 91, loss = 0.36123707
Iteration 92, loss = 0.36670090
Iteration 93, loss = 0.36332013
Iteration 94, loss = 0.36131415
Iteration 95, loss = 0.37216902
Iteration 96, loss = 0.35904379
Iteration 97, loss = 0.36006422
Iteration 98, loss = 0.36134738
Iteration 99, loss = 0.36002079
Iteration 100, loss = 0.35960793
Iteration 101, loss = 0.35821108
Iteration 102, loss = 0.36012427
Iteration 103, loss = 0.35757455
Iteration 104, loss = 0.36081691
Iteration 105, loss = 0.35554398
Iteration 106, loss = 0.35453547
Iteration 107, loss = 0.35836477
Iteration 108, loss = 0.35712609
Iteration 109, loss = 0.35884003
Iteration 110, loss = 0.35476539
Iteration 111, loss = 0.35998030
Iteration 112, loss = 0.35428941
Iteration 113, loss = 0.35539212
Iteration 114, loss = 0.35615940
Iteration 115, loss = 0.35751309
Iteration 116, loss = 0.35361565
Iteration 117, loss = 0.35336714
Training loss did not improve more than tol=0.001000 for 10 consecutive epoch
s. Stopping.
```

```
In [71]: #Se visualizan los resultados con sus parámetros  
listarn
```

```
Out[71]: [(0.7555532314128396, 1, 0),  
(0.7596446795930015, 1, 5),  
(0.7575405785064648, 1, 10),  
(0.7540335155051079, 1, 15),  
(0.7568393709776096, 1, 20),  
(0.7748421804560104, 6, 0),  
(0.7709851972616131, 6, 5),  
(0.7785837084431321, 6, 10),  
(0.784194052245361, 6, 15),  
(0.7788179683574805, 6, 20),  
(0.775777716256353, 11, 0),  
(0.77717978952837, 11, 5),  
(0.7867659895892078, 11, 10),  
(0.790506902362081, 11, 15),  
(0.7958851053212614, 11, 20),  
(0.7784661341645561, 16, 0),  
(0.7902735994476744, 16, 5),  
(0.789690171268811, 16, 10),  
(0.7837276514879641, 16, 15),  
(0.7846619568598098, 16, 20),  
(0.7774147330141056, 21, 0),  
(0.7845463649382565, 21, 5),  
(0.7827928676161473, 21, 10),  
(0.7838446105522915, 21, 15),  
(0.7859494635673541, 21, 20)]
```

```
In [81]: #Se selecciona el algoritmo con mayor éxito que corresponde a 11 neuronas en l  
a primera capa y 20 de la segunda,  
#se entrena el algoritmo con estos parámetros  
mlp = MLPClassifier(hidden_layer_sizes=(11,20), max_iter=150, alpha=1e-4,  
                    solver='sgd', verbose=10, tol=1e-3, random_state=1,  
                    learning_rate_init=.1)  
mlp.fit(X_train, y_train)
```


Iteration 1, loss = 0.54648781
Iteration 2, loss = 0.48170512
Iteration 3, loss = 0.47362029
Iteration 4, loss = 0.46697209
Iteration 5, loss = 0.46240416
Iteration 6, loss = 0.45672951
Iteration 7, loss = 0.45359013
Iteration 8, loss = 0.45130488
Iteration 9, loss = 0.44794495
Iteration 10, loss = 0.44604369
Iteration 11, loss = 0.44533843
Iteration 12, loss = 0.44316912
Iteration 13, loss = 0.44290305
Iteration 14, loss = 0.44174281
Iteration 15, loss = 0.44040961
Iteration 16, loss = 0.44074390
Iteration 17, loss = 0.43955283
Iteration 18, loss = 0.43806750
Iteration 19, loss = 0.43753164
Iteration 20, loss = 0.43603000
Iteration 21, loss = 0.43817312
Iteration 22, loss = 0.43559504
Iteration 23, loss = 0.43475610
Iteration 24, loss = 0.43454189
Iteration 25, loss = 0.43545511
Iteration 26, loss = 0.43510760
Iteration 27, loss = 0.43117240
Iteration 28, loss = 0.43257591
Iteration 29, loss = 0.43159867
Iteration 30, loss = 0.43275776
Iteration 31, loss = 0.43010802
Iteration 32, loss = 0.42927066
Iteration 33, loss = 0.42747652
Iteration 34, loss = 0.42704301
Iteration 35, loss = 0.42872877
Iteration 36, loss = 0.42433952
Iteration 37, loss = 0.42523379
Iteration 38, loss = 0.42415774
Iteration 39, loss = 0.42405888
Iteration 40, loss = 0.42321521
Iteration 41, loss = 0.42123496
Iteration 42, loss = 0.42033521
Iteration 43, loss = 0.42166364
Iteration 44, loss = 0.41960108
Iteration 45, loss = 0.41944556
Iteration 46, loss = 0.41790571
Iteration 47, loss = 0.41798181
Iteration 48, loss = 0.41819516
Iteration 49, loss = 0.41635248
Iteration 50, loss = 0.41638175
Iteration 51, loss = 0.41683574
Iteration 52, loss = 0.41479569
Iteration 53, loss = 0.41464017
Iteration 54, loss = 0.41440543
Iteration 55, loss = 0.41301130
Iteration 56, loss = 0.41297696
Iteration 57, loss = 0.41312007

Iteration 58, loss = 0.41090053
Iteration 59, loss = 0.41200847
Iteration 60, loss = 0.41242900
Iteration 61, loss = 0.41125033
Iteration 62, loss = 0.41388744
Iteration 63, loss = 0.41002286
Iteration 64, loss = 0.40937967
Iteration 65, loss = 0.40850543
Iteration 66, loss = 0.40917834
Iteration 67, loss = 0.41061948
Iteration 68, loss = 0.40847958
Iteration 69, loss = 0.40618282
Iteration 70, loss = 0.40601720
Iteration 71, loss = 0.40812025
Iteration 72, loss = 0.40453660
Iteration 73, loss = 0.40451523
Iteration 74, loss = 0.40171720
Iteration 75, loss = 0.40092842
Iteration 76, loss = 0.39859113
Iteration 77, loss = 0.39962760
Iteration 78, loss = 0.39701391
Iteration 79, loss = 0.39595245
Iteration 80, loss = 0.39699812
Iteration 81, loss = 0.39654638
Iteration 82, loss = 0.39380948
Iteration 83, loss = 0.39341679
Iteration 84, loss = 0.39218841
Iteration 85, loss = 0.39157822
Iteration 86, loss = 0.39030128
Iteration 87, loss = 0.38820736
Iteration 88, loss = 0.38623571
Iteration 89, loss = 0.38943341
Iteration 90, loss = 0.38711470
Iteration 91, loss = 0.38772559
Iteration 92, loss = 0.38450659
Iteration 93, loss = 0.38477822
Iteration 94, loss = 0.38415983
Iteration 95, loss = 0.38277044
Iteration 96, loss = 0.38435036
Iteration 97, loss = 0.38337757
Iteration 98, loss = 0.38463756
Iteration 99, loss = 0.38284522
Iteration 100, loss = 0.38214263
Iteration 101, loss = 0.38023909
Iteration 102, loss = 0.38429145
Iteration 103, loss = 0.38230047
Iteration 104, loss = 0.37955369
Iteration 105, loss = 0.38315899
Iteration 106, loss = 0.38215827
Iteration 107, loss = 0.38286015
Iteration 108, loss = 0.37899333
Iteration 109, loss = 0.37966822
Iteration 110, loss = 0.38026994
Iteration 111, loss = 0.37998314
Iteration 112, loss = 0.38241143
Training loss did not improve more than tol=0.001000 for 10 consecutive epochs. Stopping.

```
Out[81]: MLPClassifier(activation='relu', alpha=0.0001, batch_size='auto', beta_1=0.9,
                      beta_2=0.999, early_stopping=False, epsilon=1e-08,
                      hidden_layer_sizes=(11, 20), learning_rate='constant',
                      learning_rate_init=0.1, max_iter=150, momentum=0.9,
                      n_iter_no_change=10, nesterovs_momentum=True, power_t=0.5,
                      random_state=1, shuffle=True, solver='sgd', tol=0.001,
                      validation_fraction=0.1, verbose=10, warm_start=False)
```

```
In [82]: #Se calcula el porcentaje de éxito de las redes neuronales con los datos de prueba
yres=mlp.predict(X_test)
resultado=accuracy_score(y_test,yres)
resultado
```

```
Out[82]: 0.8111266947171576
```

Se observa que el valor que minimiza el error corresponde a una red neuronal con 11 neuronas en la primera capa y 20 en la segunda, con un nivel de éxito de 81.11%, en los datos de prueba.

Finalmente el último modelo utilizado corresponde a un algoritmo de boosting (Adaboost), basado en un clasificador debil (Árboles de decisión), el numero de modelos iterativos del clasificador debil entrenado se utilizó como parametro en un gridsearch entre 30 y 80, con el fin de no utilizar algoritmos que tardaran mucho en su ejecución. El valor de particiones k para la validación cruzada se mantuvo en 5 para este caso.

```
In [74]: #Se entrena el algoritmo variando el número de iteraciones en el clasificador debil
from sklearn.ensemble import AdaBoostClassifier
itera=np.linspace(30,80,8)
listab=[]
for i in itera:
    i=int(i)
    abc = AdaBoostClassifier(n_estimators=i,learning_rate=1)
    model = abc.fit(X_train, y_train)
    scoresBoost = cross_val_score(model, X_train, y_train, cv=5)
    print(scoresBoost)
    listab.append((np.mean(scoresBoost),i))
```

```
[0.75745178 0.75394506 0.7685564 0.74284044 0.7380117 ]
[0.75452951 0.75452951 0.76329632 0.74634717 0.74035088]
[0.75920514 0.75102279 0.75862069 0.74517826 0.74093567]
[0.75452951 0.74751607 0.75394506 0.74634717 0.74269006]
[0.75160725 0.75569842 0.76154296 0.74576271 0.74619883]
[0.75336061 0.75803624 0.7597896 0.74810053 0.74210526]
[0.7521917 0.75160725 0.75745178 0.74926943 0.74444444]
[0.75803624 0.75160725 0.75862069 0.74985389 0.74327485]
```

```
In [75]: #Se observan los porcentajes de éxito por cada parámetro  
listab
```

```
Out[75]: [(0.7521610767616489, 30),  
(0.7518106780686373, 37),  
(0.7509925114754546, 44),  
(0.7490055745246614, 51),  
(0.7521620337615909, 58),  
(0.7522784459688087, 65),  
(0.7509929216182869, 72),  
(0.752278582683086, 80)]
```

```
In [76]: #Se selecciona el de mejor porcentaje de éxito (el último que se corrió), con  
80 iteraciones, y se calcula el éxito en los datos de prueba  
yres=model.predict(X_test)  
resultado=accuracy_score(y_test,yres)  
resultado
```

```
Out[76]: 0.748013090229079
```

El mejor algoritmo encontrado corresponde a 80 parametros del algoritmo Adaboost con arboles de decisión con un porcentaje de éxito del 74.80%. Podría encontrarse probablemente mayor éxito al aumentar los parametros, pero esto complicaria el modelo lo cual tampoco es deseable en el alcance de este proyecto.

De esta manera se encontró un algoritmo que permite predecir la probabilidad de compra de cartera con mayor éxito (81.11%) corresponde a redes neuronales con 11 neuronas en la primera capa y 20 en la segunda, el cual puede ser usado con el modelo encontrado y la función predict de sklearn (model.predict)

De otro lado se encuentra que los tres algoritmos analizados presentaron un porcentaje de exito muy similar, sin embargo podría ser mejor si no se limitaran las iteraciones por algoritmo.

```

In [77]: #Se grafica el resultado de SVM de la clasificación teniendo en cuenta solamente los dos primeros componentes principales
from sklearn.svm import SVC
import numpy as np
import matplotlib.pyplot as plt
from sklearn import svm, datasets

# Select 2 features / variable for the 2D plot that we are going to create.
X = X_test[:, :2] # we only take the first two features.
y = y_test

def make_meshgrid(x, y, h=.02):
    x_min, x_max = x.min() - 1, x.max() + 1
    y_min, y_max = y.min() - 1, y.max() + 1
    xx, yy = np.meshgrid(np.arange(x_min, x_max, h), np.arange(y_min, y_max, h))
    return xx, yy

def plot_contours(ax, clf, xx, yy, **params):
    Z = clf.predict(np.c_[xx.ravel(), yy.ravel()])
    Z = Z.reshape(xx.shape)
    out = ax.contourf(xx, yy, Z, **params)
    return out

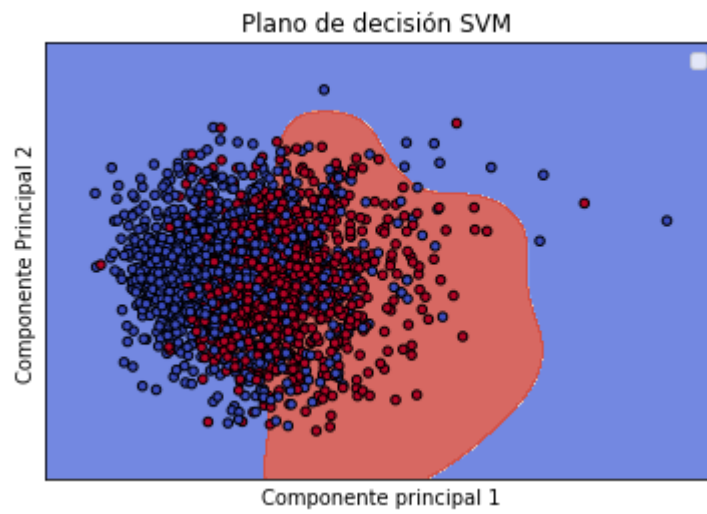
model = svm.SVC(kernel='rbf', C=1, gamma=0.562, max_iter=5000)
clf2 = model.fit(X, y)

fig, ax = plt.subplots()
# title for the plots
title = ('Plano de decisión SVM ')
# Set-up grid for plotting.
X0, X1 = X[:, 0], X[:, 1]
xx, yy = make_meshgrid(X0, X1)

plot_contours(ax, clf2, xx, yy, cmap=plt.cm.coolwarm, alpha=0.8)
ax.scatter(X0, X1, c=y, cmap=plt.cm.coolwarm, s=20, edgecolors='k')
ax.set_ylabel('Componente Principal 2')
ax.set_xlabel('Componente principal 1')
ax.set_xticks(())
ax.set_yticks(())
ax.set_title(title)
ax.legend()
plt.show()

```

No handles with labels found to put in legend.



In [78]: *#Se grafica el resultado de Adaboost de la clasificación teniendo en cuenta solamente los dos primeros componentes principales*

```

plot_colors = "br"
plot_step = 0.02
class_names = "AB"
X=X_test
Y=y_test
plt.figure(figsize=(10, 5))

# Plot the decision boundaries
plt.subplot(121)
x_min, x_max = X[:, 0].min() - 1, X[:, 0].max() + 1
y_min, y_max = X[:, 1].min() - 1, X[:, 1].max() + 1
xx, yy = np.meshgrid(np.arange(x_min, x_max, plot_step),
                     np.arange(y_min, y_max, plot_step))

Z = model.predict(np.c_[xx.ravel(), yy.ravel()])
Z = Z.reshape(xx.shape)
cs = plt.contourf(xx, yy, Z, cmap=plt.cm.Paired)
plt.axis("tight")

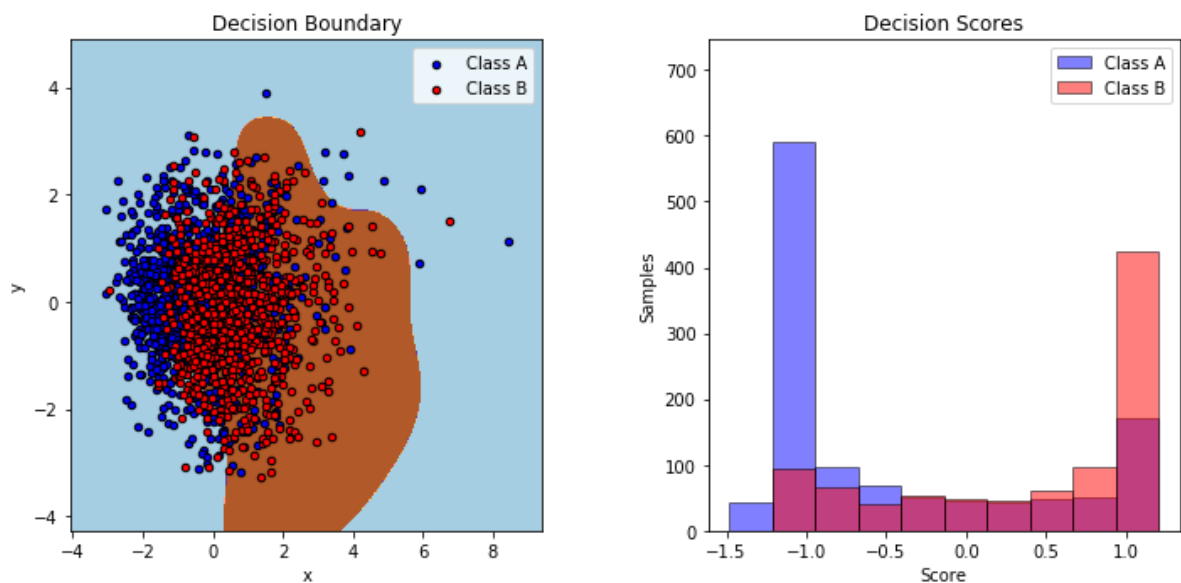
# Plot the training points
for i, n, c in zip(range(2), class_names, plot_colors):
    idx = np.where(y == i)
    plt.scatter(X[idx, 0], X[idx, 1],
                c=c, cmap=plt.cm.Paired,
                s=20, edgecolor='k',
                label="Class %s" % n)
plt.xlim(x_min, x_max)
plt.ylim(y_min, y_max)
plt.legend(loc='upper right')
plt.xlabel('x')
plt.ylabel('y')
plt.title('Decision Boundary')

# Plot the two-class decision scores
twoclass_output = model.decision_function(X[:,0:2])
plot_range = (twoclass_output.min(), twoclass_output.max())
plt.subplot(122)
for i, n, c in zip(range(2), class_names, plot_colors):
    plt.hist(twoclass_output[y == i],
             bins=10,
             range=plot_range,
             facecolor=c,
             label='Class %s' % n,
             alpha=.5,
             edgecolor='k')
x1, x2, y1, y2 = plt.axis()
plt.axis((x1, x2, y1, y2 * 1.2))
plt.legend(loc='upper right')
plt.ylabel('Samples')
plt.xlabel('Score')
plt.title('Decision Scores')

plt.tight_layout()

```

```
plt.subplots_adjust(wspace=0.35)
plt.show()
```



```
In [79]: X[:,0:2]
```

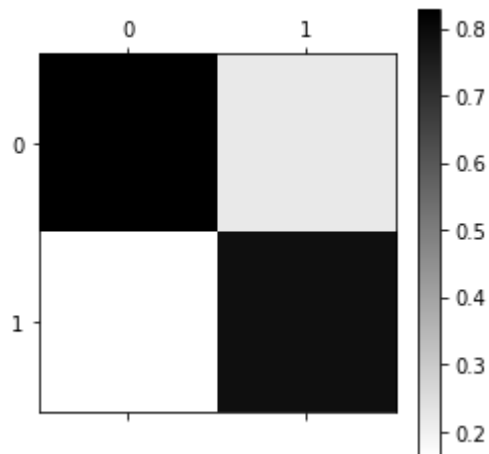
```
Out[79]: array([[ 0.22017971, -0.40727634],
 [ 0.45584715, -0.41267795],
 [ 0.80830393, -0.57353652],
 ...,
 [ 2.06118114, -0.9452237 ],
 [-0.3934939 ,  0.09924267],
 [ 1.57808447, -0.40133891]])
```

```
In [101]: from sklearn.metrics import confusion_matrix
aa=confusion_matrix(y_test, mlp.predict(X_test))
df_conf_norm = aa / aa.sum(axis=1)
```



```
In [105]: import matplotlib.pyplot as plt
def plot_confusion_matrix(df_confusion, title='Confusion matrix', cmap=plt.cm.
gray_r):
    plt.matshow(df_confusion, cmap=cmap) # imshow
    #plt.title(title)
    plt.colorbar()
    #plt.tight_layout()

plot_confusion_matrix(df_conf_norm )
```



```
In [106]: df_conf_norm
```

```
Out[106]: array([[0.82850041, 0.222103 ],
                 [0.16321458, 0.78862661]])
```

```
In [ ]:
```