Taller 6

Métodos Computacionales para Políticas Públicas - URosario

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Instrucciones:

- Guarde una copia de este *Jupyter Notebook* en su computador, idealmente en una carpeta destinada al material del curso.
- Modifique el nombre del archivo del *notebook*, agregando al final un guión inferior y su nombre y apellido, separados estos últimos por otro guión inferior. Por ejemplo, mi *notebook* se llamaría: mcpp_taller6_santiago_matallana
- Marque el *notebook* con su nombre y e-mail en el bloque verde arriba. Reemplace el texto "[Su nombre acá]" con su nombre y apellido. Similar para su e-mail.
- Desarrolle la totalidad del taller sobre este *notebook*, insertando las celdas que sea necesario debajo de cada pregunta. Haga buen uso de las celdas para código y de las celdas tipo *markdown* según el caso.
- Recuerde salvar periódicamente sus avances.
- Cuando termine el taller:
  1. Descárguelo en PDF. Si tiene algún problema con la conversión, descárguelo en HTML.
  2. Suba todos los archivos a su repositorio en GitHub, en una carpeta destinada exclusivamente para este taller, antes de la fecha y hora límites.

(Todos los ejercicios tienen el mismo valor.)

Resuelva la parte 1 de [este documento (http://www.math.pitt.edu/~sussmanm/3040Summer14/exercisesII.pdf)](http://www.math.pitt.edu/~sussmanm/3040Summer14/exercisesII.pdf).

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

In [15]:
```
#1
x=2
#2
def cuadrado (a):
    y=a**2
    print (y)
cuadrado (x)

def cubo (a):
    y=a**3
    print (y)
cubo (x)
```

```
4
8
```

In [66]:
```
#3
theta= 45
#4
np.sin(theta)
```

Out[66]: 0.85090352453411844

In [67]:
```
np.cos(theta)
#el angulo theta fue definido en grados, en radianes seria apartir de pi veces el radio de una circunferencia.
```

Out[67]: 0.52532198881772973

In [68]:
```
#5
meshPoints = np.linspace(-1,1, 500)
print(meshPoints)
```

```
[-1.         -0.99599198 -0.99198397 -0.98797595 -0.98396794 -0.97995992
 -0.9759519  -0.97194389 -0.96793587 -0.96392786 -0.95991984 -0.95591182
 -0.95190381 -0.94789579 -0.94388778 -0.93987976 -0.93587174 -0.93186373
 -0.92785571 -0.9238477  -0.91983968 -0.91583166 -0.91182365 -0.90781563
 -0.90380762 -0.8997996  -0.89579158 -0.89178357 -0.88777555 -0.88376754
 -0.87975952 -0.8757515  -0.87174349 -0.86773547 -0.86372745 -0.85971944
 -0.85571142 -0.85170341 -0.84769539 -0.84368737 -0.83967936 -0.83567134
 -0.83166333 -0.82765531 -0.82364729 -0.81963928 -0.81563126 -0.81162325
 -0.80761523 -0.80360721 -0.7995992  -0.79559118 -0.79158317 -0.78757515
 -0.78356713 -0.77955912 -0.7755511  -0.77154309 -0.76753507 -0.76352705
 -0.75951904 -0.75551102 -0.75150301 -0.74749499 -0.74348697 -0.73947896
 -0.73547094 -0.73146293 -0.72745491 -0.72344689 -0.71943888 -0.71543086
 -0.71142285 -0.70741483 -0.70340681 -0.6993988  -0.69539078 -0.69138277
 -0.68737475 -0.68336673 -0.67935872 -0.6753507  -0.67134269 -0.66733467
 -0.66332665 -0.65931864 -0.65531062 -0.65130261 -0.64729459 -0.64328657
 -0.63927856 -0.63527054 -0.63126253 -0.62725451 -0.62324649 -0.61923848
 -0.61523046 -0.61122244 -0.60721443 -0.60320641 -0.5991984  -0.59519038
 -0.59118236 -0.58717435 -0.58316633 -0.57915832 -0.5751503  -0.57114228
 -0.56713427 -0.56312625 -0.55911824 -0.55511022 -0.5511022  -0.54709419
 -0.54308617 -0.53907816 -0.53507014 -0.53106212 -0.52705411 -0.52304609
 -0.51903808 -0.51503006 -0.51102204 -0.50701403 -0.50300601 -0.498998
 -0.49498998 -0.49098196 -0.48697395 -0.48296593 -0.47895792 -0.4749499
 -0.47094188 -0.46693387 -0.46292585 -0.45891784 -0.45490982 -0.4509018
 -0.44689379 -0.44288577 -0.43887776 -0.43486974 -0.43086172 -0.42685371
 -0.42284569 -0.41883768 -0.41482966 -0.41082164 -0.40681363 -0.40280561
 -0.3987976  -0.39478958 -0.39078156 -0.38677355 -0.38276553 -0.37875752
 -0.3747495  -0.37074148 -0.36673347 -0.36272545 -0.35871743 -0.35470942
 -0.3507014  -0.34669339 -0.34268537 -0.33867735 -0.33466934 -0.33066132
 -0.32665331 -0.32264529 -0.31863727 -0.31462926 -0.31062124 -0.30661323
 -0.30260521 -0.29859719 -0.29458918 -0.29058116 -0.28657315 -0.28256513
 -0.27855711 -0.2745491  -0.27054108 -0.26653307 -0.26252505 -0.25851703
 -0.25450902 -0.250501   -0.24649299 -0.24248497 -0.23847695 -0.23446894
 -0.23046092 -0.22645291 -0.22244489 -0.21843687 -0.21442886 -0.21042084
 -0.20641283 -0.20240481 -0.19839679 -0.19438878 -0.19038076 -0.18637275
 -0.18236473 -0.17835671 -0.1743487  -0.17034068 -0.16633267 -0.16232465
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 -0.13426854 -0.13026052 -0.12625251 -0.12224449 -0.11823647 -0.11422846
 -0.11022044 -0.10621242 -0.10220441 -0.09819639 -0.09418838 -0.09018036
 -0.08617234 -0.08216433 -0.07815631 -0.0741483  -0.07014028 -0.06613226
 -0.06212425 -0.05811623 -0.05410822 -0.0501002  -0.04609218 -0.04208417
 -0.03807615 -0.03406814 -0.03006012 -0.0260521  -0.02204409 -0.01803607
 -0.01402806 -0.01002004 -0.00601202 -0.00200401  0.00200401  0.00601202
  0.01002004  0.01402806  0.01803607  0.02204409  0.0260521   0.03006012
  0.03406814  0.03807615  0.04208417  0.04609218  0.0501002   0.05410822
  0.05811623  0.06212425  0.06613226  0.07014028  0.0741483   0.07815631
  0.08216433  0.08617234  0.09018036  0.09418838  0.09819639  0.10220441
  0.10621242  0.11022044  0.11422846  0.11823647  0.12224449  0.12625251
  0.13026052  0.13426854  0.13827655  0.14228457  0.14629259  0.1503006
  0.15430862  0.15831663  0.16232465  0.16633267  0.17034068  0.1743487
  0.17835671  0.18236473  0.18637275  0.19038076  0.19438878  0.19839679
  0.20240481  0.20641283  0.21042084  0.21442886  0.21843687  0.22244489
  0.22645291  0.23046092  0.23446894  0.23847695  0.24248497  0.24649299
  0.250501    0.25450902  0.25851703  0.26252505  0.26653307  0.27054108
  0.2745491   0.27855711  0.28256513  0.28657315  0.29058116  0.29458918
  0.29859719  0.30260521  0.30661323  0.31062124  0.31462926  0.31863727
  0.32264529  0.32665331  0.33066132  0.33466934  0.33867735  0.34268537
  0.34669339  0.3507014   0.35470942  0.35871743  0.36272545  0.36673347
  0.37074148  0.3747495   0.37875752  0.38276553  0.38677355  0.39078156
  0.39478958  0.3987976   0.40280561  0.40681363  0.41082164  0.41482966
  0.41883768  0.42284569  0.42685371  0.43086172  0.43486974  0.43887776
  0.44288577  0.44689379  0.4509018   0.45490982  0.45891784  0.46292585
  0.46693387  0.47094188  0.4749499   0.47895792  0.48296593  0.48697395
  0.49098196  0.49498998  0.498998    0.50300601  0.50701403  0.51102204
  0.51503006  0.51903808  0.52304609  0.52705411  0.53106212  0.53507014
  0.53907816  0.54308617  0.54709419  0.5511022   0.55511022  0.55911824
  0.56312625  0.56713427  0.57114228  0.5751503   0.57915832  0.58316633
  0.58717435  0.59118236  0.59519038  0.5991984   0.60320641  0.60721443
  0.61122244  0.61523046  0.61923848  0.62324649  0.62725451  0.63126253
  0.63527054  0.63927856  0.64328657  0.64729459  0.65130261  0.65531062
  0.65931864  0.66332665  0.66733467  0.67134269  0.6753507   0.67935872
  0.68336673  0.68737475  0.69138277  0.69539078  0.6993988   0.70340681
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  0.75551102  0.75951904  0.76352705  0.76753507  0.77154309  0.7755511
  0.77955912  0.78356713  0.78757515  0.79158317  0.79559118  0.7995992
  0.80360721  0.80761523  0.81162325  0.81563126  0.81963928  0.82364729
  0.82765531  0.83166333  0.83567134  0.83967936  0.84368737  0.84769539
  0.85170341  0.85571142  0.85971944  0.86372745  0.86773547  0.87174349
  0.8757515   0.87975952  0.88376754  0.88777555  0.89178357  0.89579158
  0.8997996   0.90380762  0.90781563  0.91182365  0.91583166  0.91983968
  0.9238477   0.92785571  0.93186373  0.93587174  0.93987976  0.94388778
  0.94789579  0.95190381  0.95591182  0.95991984  0.96392786  0.96793587
  0.97194389  0.9759519   0.97995992  0.98396794  0.98797595  0.99198397
  0.99599198  1.        ]
```
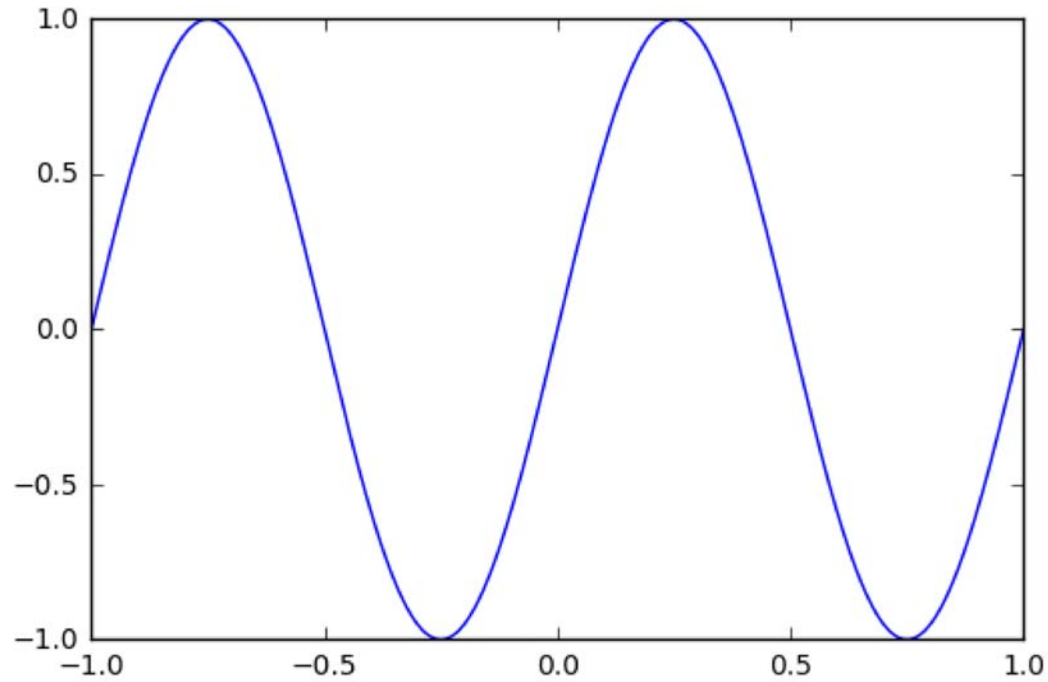

In [69]:
```
#6
#como esta en base 0 el 52 toma la posición 53
meshPoints[52]
```

Out[69]: -0.79158316633266534

In [84]:
```
#7
import math
pi= math.pi
%matplotlib inline
plt.plot(meshPoints,np.sin(2* pi *meshPoints))
```

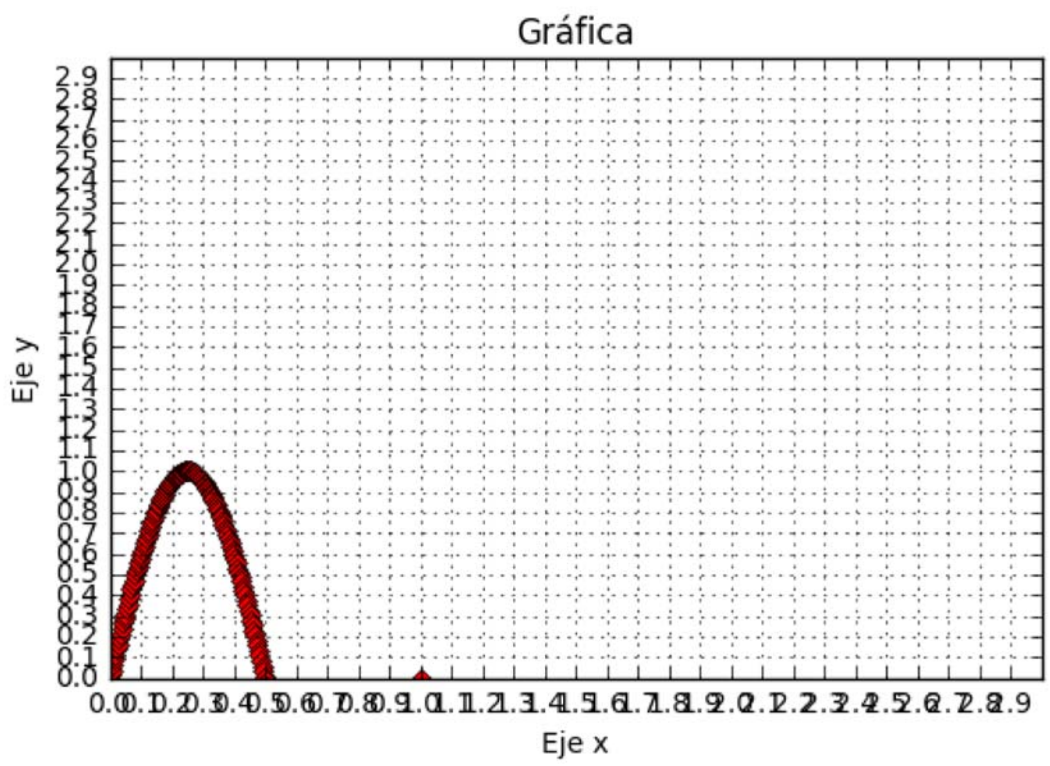
Out[84]: [<matplotlib.lines.Line2D at 0xa522c91a20>]



Resuelva los ejercicios de las secciones 4.1, 5.1, 6.1, 7.4 y 8.5 de [este documento (http://www.python-academy.com/download/pycon2012/matplotlib_handout.pdf)](http://www.python-academy.com/download/pycon2012/matplotlib_handout.pdf).

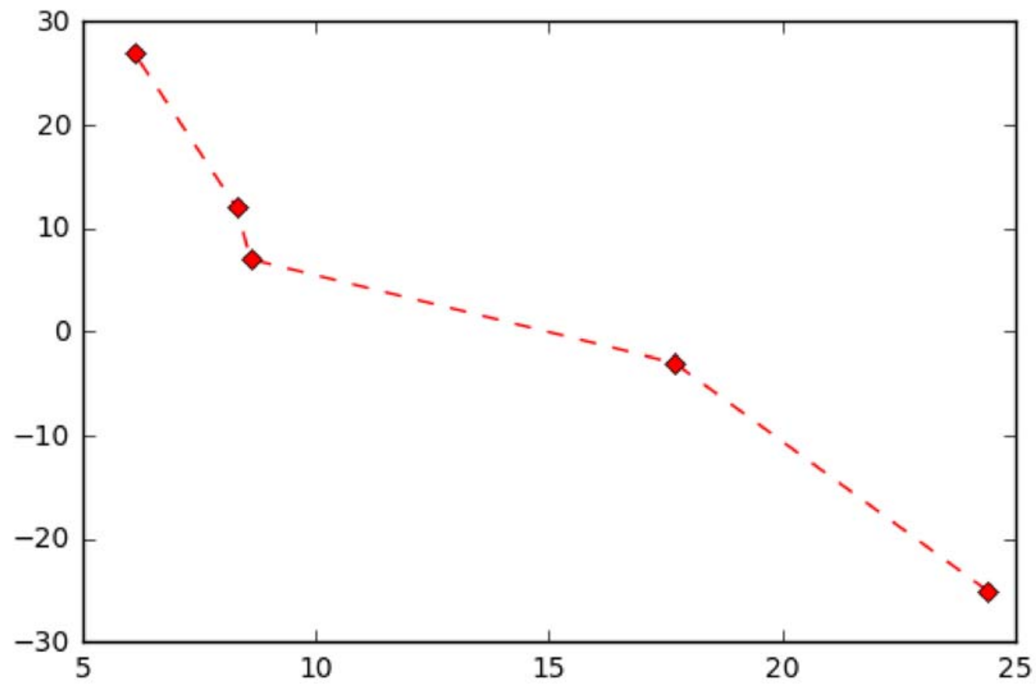
In [344]:
```
#4.1
#1. Plot a simple graph of a sinus function in the range 0 to 3 with a step size of 0.01.
#2. Make the line red. Add diamond-shaped markers with size of 5.
#3. Add a legend and a grid to the plot.
plt.title("Gráfica")
plt.xlabel("Eje x")
plt.ylabel("Eje y")
plt.grid()
plt.xlim(0, 3)
plt.ylim(0, 3)
plt.xticks(np.arange(0, 3, 0.1))
plt.yticks(np.arange(0, 3, 0.1))
plt.plot(meshPoints,np.sin(2* pi *meshPoints), "rD",markersize=5)
#Dado el rango tan ampli0 y el step size tan pequeño no son claros los puntos de los ejes,
#ni la forma de de diamante de los marcadores
```

Out[344]: [<matplotlib.lines.Line2D at 0xa52e091ef0>]



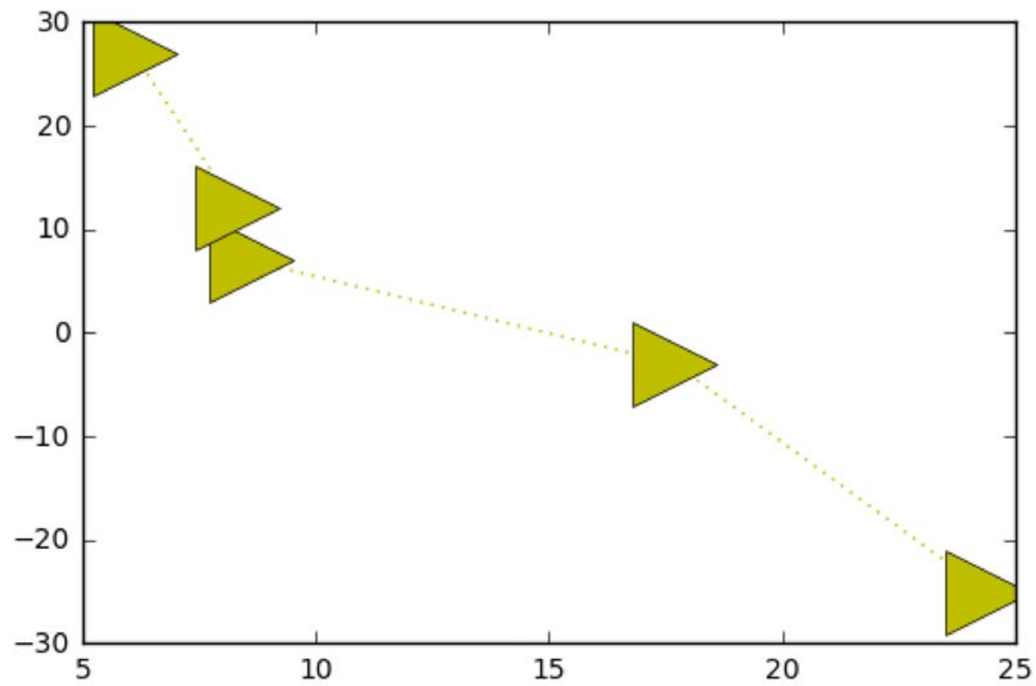
In [345]:
```
#5.1
#Apply different line styles to a plot. Change line color and thickness as well as the size and the kind of
#the marker. Experiment with different styles.
x = [24.4, 17.7, 8.6, 8.3, 6.1]
y = [-25,-3,7,12,27]
plt.plot(x,y, "r--D",markersize=5)
```

Out[345]: [<matplotlib.lines.Line2D at 0xa52f3490f0>]



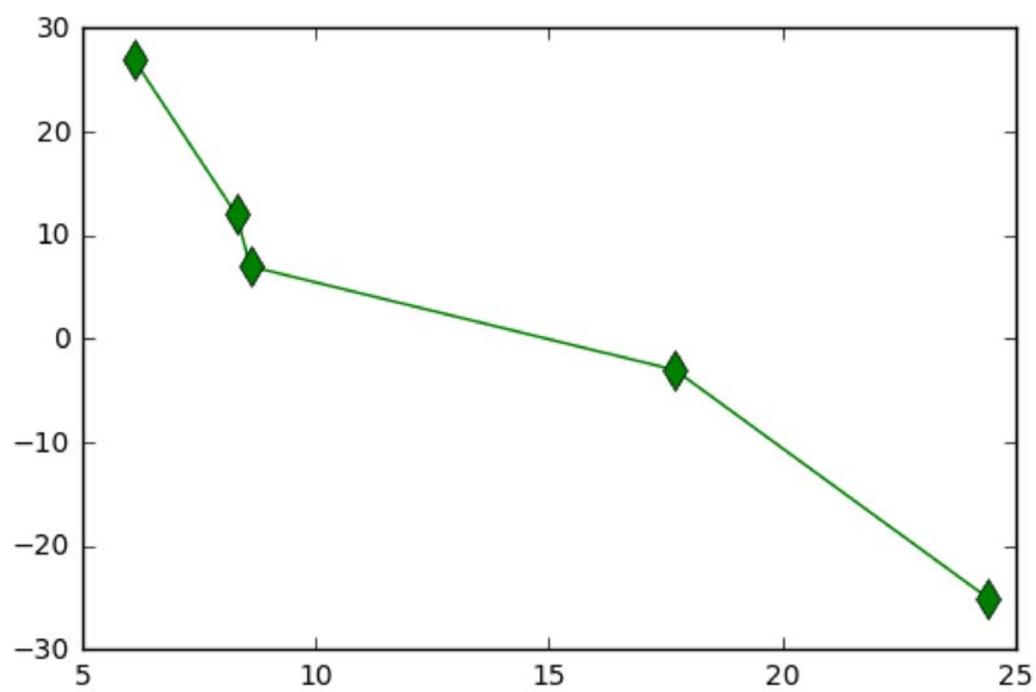
In [346]:
```
plt.plot(x,y, "y:>",markersize=30)
```

Out[346]: [<matplotlib.lines.Line2D at 0xa52f4e5588>]



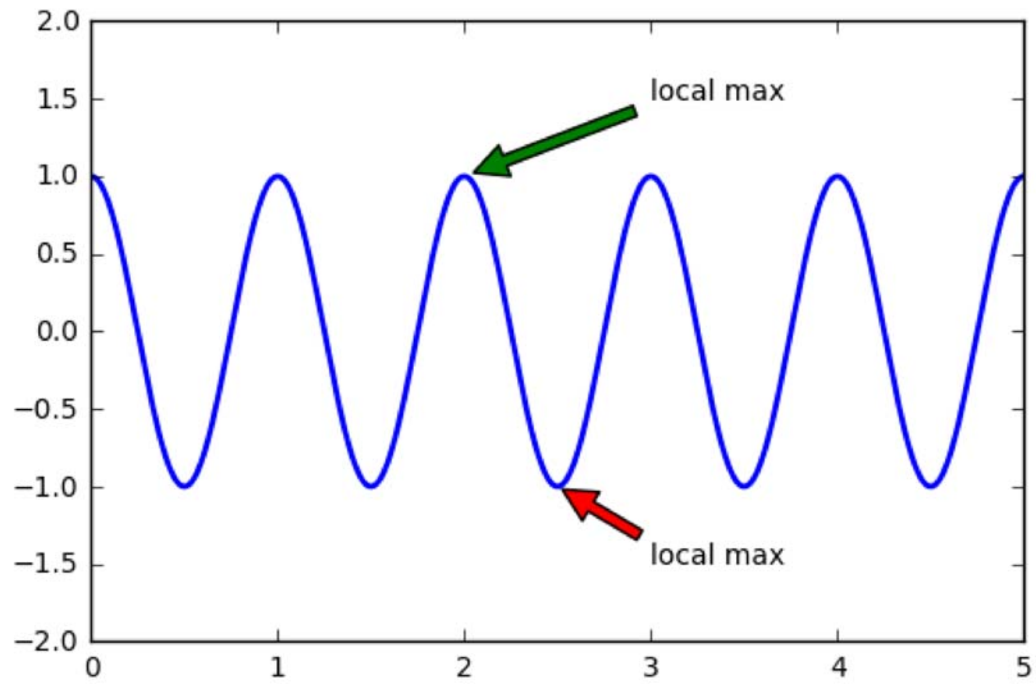
In [292]:
```
plt.plot(x,y, "g-d",markersize=10)
```

Out[292]: [<matplotlib.lines.Line2D at 0xa530af0780>]



In [343]:

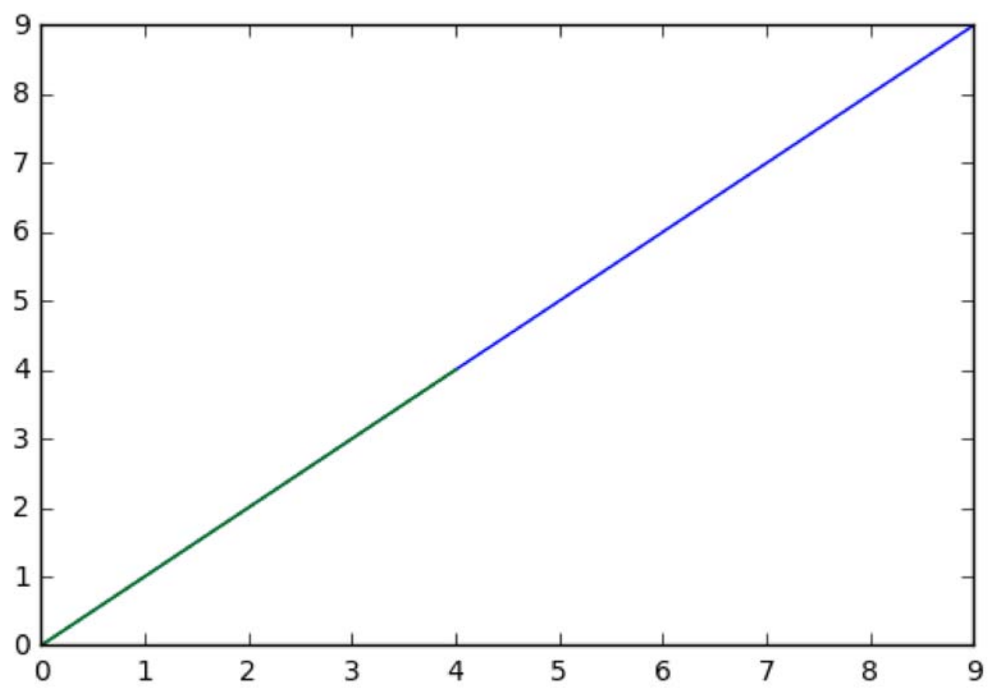
```
#6.1
#Annotate a line at two places with text. Use green and red arrows and align it according to figure
# points and data.
fig = plt.figure()
ax = fig.add_subplot(111)

t = np.arange(0.0, 5.0, 0.01)
s = np.cos(2*np.pi*t)
line, = ax.plot(t, s, lw=2)

ax.annotate('local max', xy=(2, 1), xytext=(3, 1.5),
            arrowprops=dict(facecolor='green', shrink=0.05),
            )
ax.annotate('local max', xy=(2.5, -1), xytext=(3, -1.5),
            arrowprops=dict(facecolor='red', shrink=0.05),
            )

ax.set_ylim(-2,2)
plt.show()
```



In [354]:

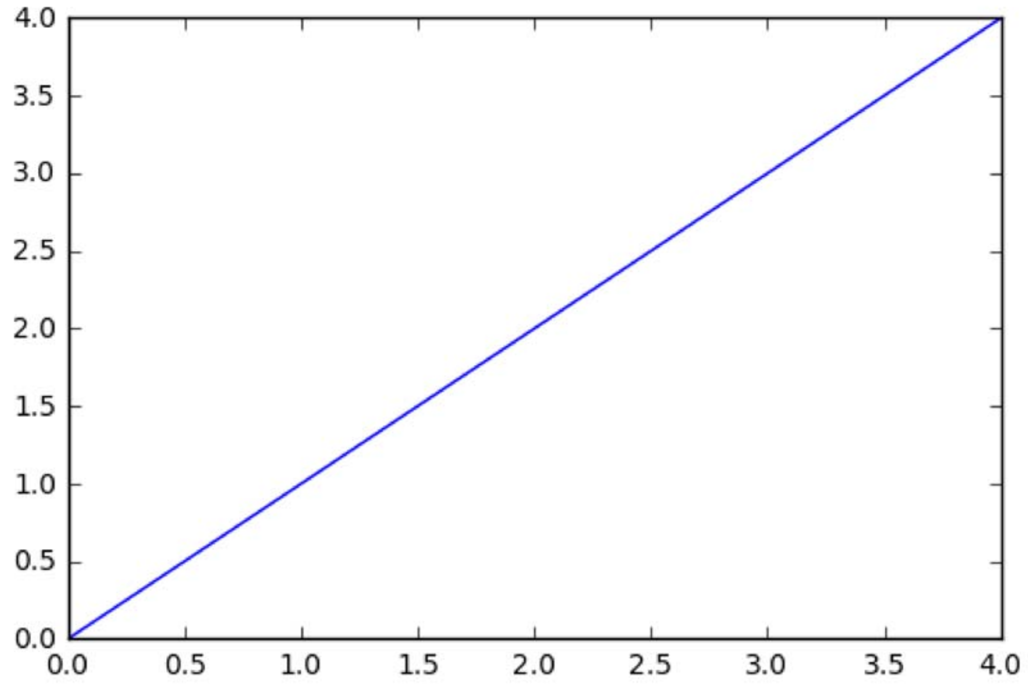
```
#8.5
#1. Draw two figures, one 5 by 5, one 10 by 10 inches.
#2. Add four subplots to one figure. Add labels and ticks only to the outermost axes.
#3. Place a small plot in one bigger plot.
plt.plot(range(10))
plt.plot(range(5))
```

Out[354]: [<matplotlib.lines.Line2D at 0xa531d5a470>]



In [355]:
```
plt.plot(range(5))
```

Out[355]: [<matplotlib.lines.Line2D at 0xa53329c7f0>]



In [ ]:

In [ ]: