3_Plotting

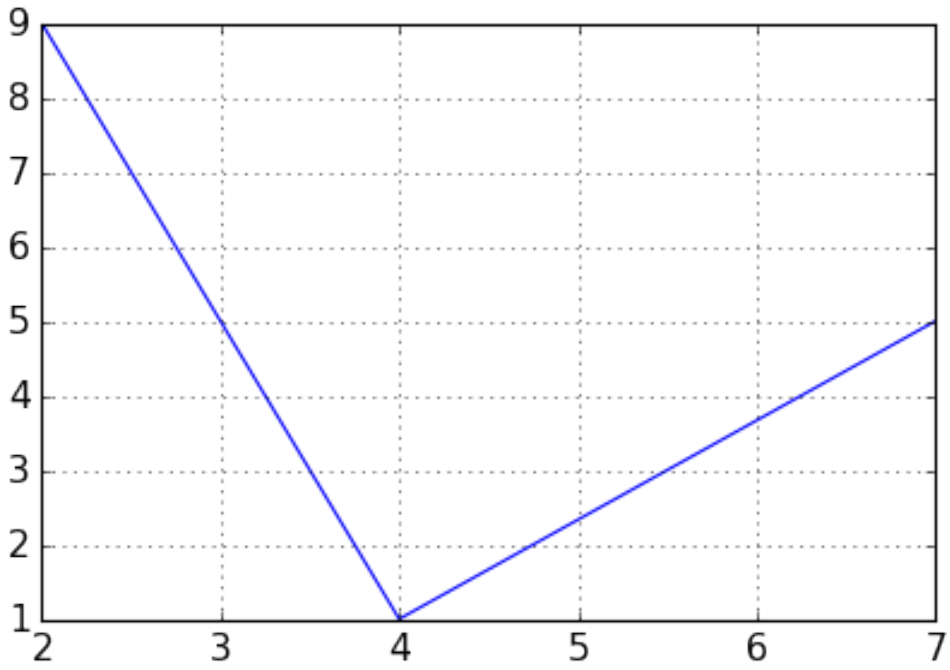
January 24, 2018

This notebook contains a rough introduction to basic plotting in Python.
Last Modified: Jan 23 2017 Humans Responsible: The Prickly Pythons

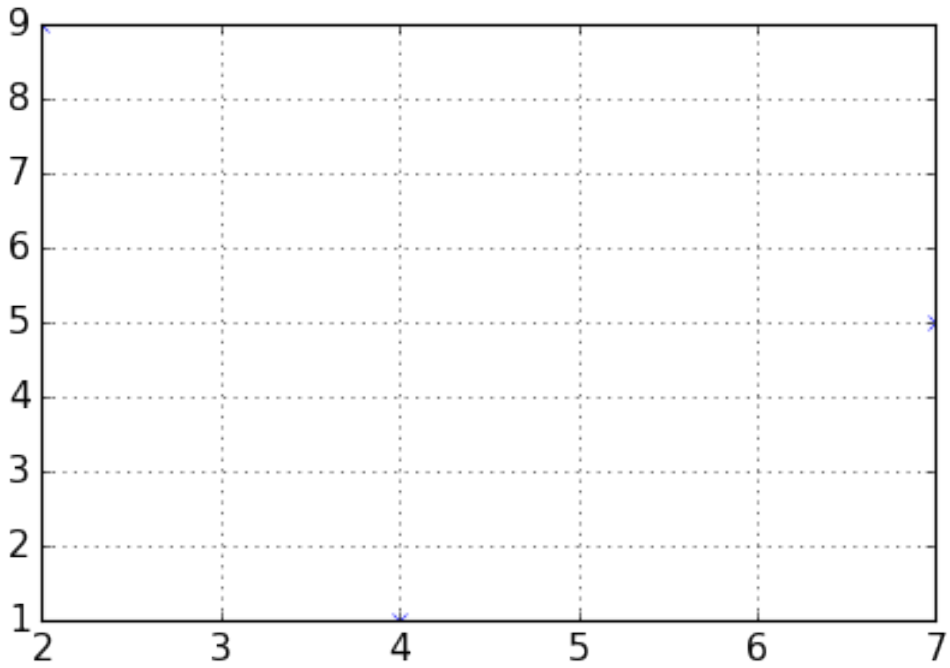
In [8]:
```
%matplotlib inline
# (the above is to plot directly in this notebook)
```

In [10]:
```
import matplotlib as mpl
import matplotlib.pyplot as plt
import numpy as np
```

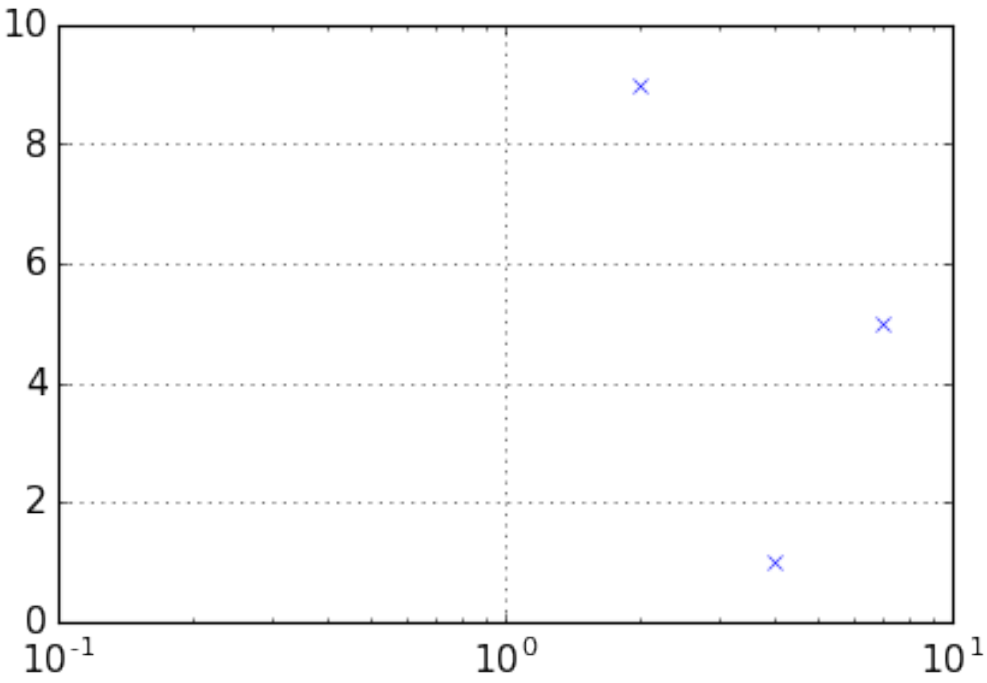
In [14]:
```
# Set up a figure window and plot (object-oriented programming)
fig = plt.figure()
ax1 = fig.add_subplot(111)
x = np.array([2,4,7])
y = np.array([9,1,5])
ax1.plot(x, y)
ax1.grid()
plt.show()
```



In [15]:
```
# Let's change from default blue lines to crosses:
fig = plt.figure()
ax1 = fig.add_subplot(111)
ax1.plot(x, y, 'x')
ax1.grid()
plt.show()
```



In [16]:
```
# Change to logarithmic axes and put some limits on xy axes:
fig = plt.figure()
ax1 = fig.add_subplot(111)
ax1.plot(x, y, 'x')
ax1.set_xscale('log')
ax1.set_xlim([0.1,10])
ax1.set_ylim([0,10])
ax1.grid()
plt.show()
```



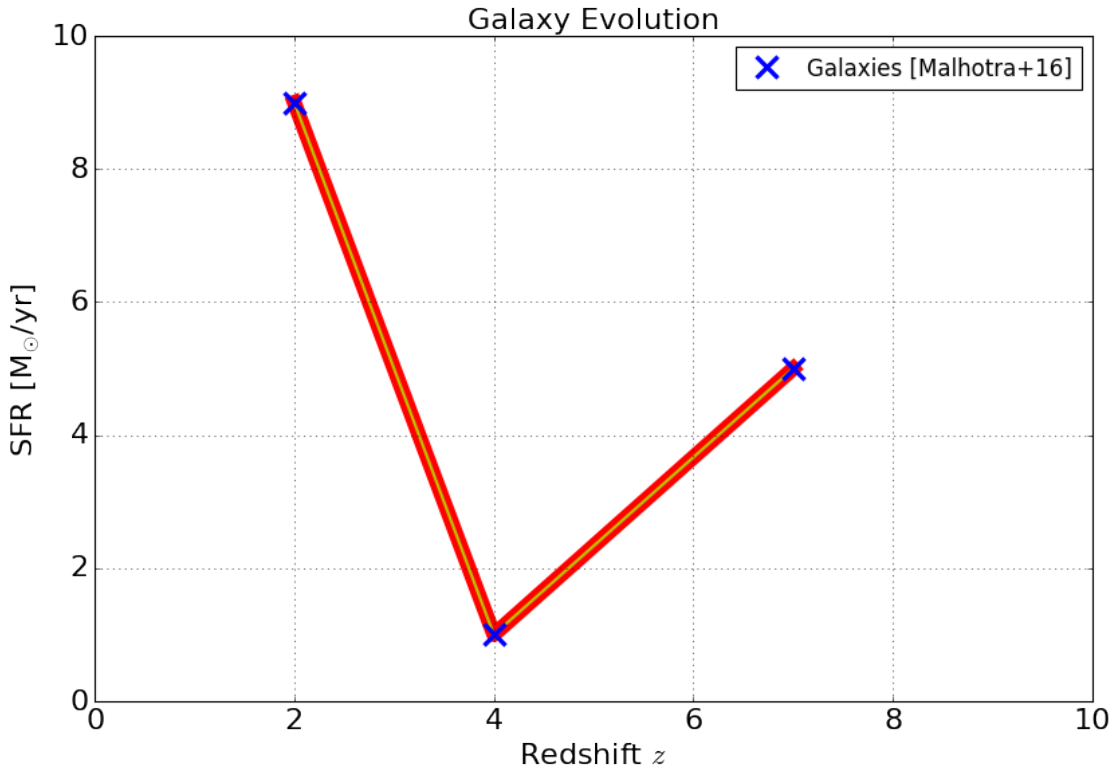
In [17]:
```
# You could have the axis limit go from 0, even if log(0) is - infinity
np.log10(0)
```

```
//anaconda/lib/python3.4/site-packages/ipykernel/__main__.py:2: RuntimeWarning: divide by zero e
  from ipykernel import kernelapp as app
```

Out[17]: -inf

In [19]:
```
# Here is a more 'polished' version:
fontsize = 20
mpl.rcParams['xtick.labelsize'] = fontsize
mpl.rcParams['ytick.labelsize'] = fontsize
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(111)
ax1.plot(x, y, 'r', lw=10) # LineWidth = 2
ax1.plot(x, y, 'y', lw=2) # LineWidth = 2
ax1.plot(x, y, 'x', ms=15, mew=3, label='Galaxies [Malhotra+16]') # MarkerSize = 8, Mar
# Set limits on axes
ax1.set_xlim([0,10])
ax1.set_ylim([0,10])
ax1.set_title('Galaxy Evolution', fontsize=fontsize)
ax1.set_xlabel('Redshift $z$', fontsize=fontsize)
ax1.set_ylabel('SFR [M$_{\odot}$/yr]', fontsize=fontsize)
ax1.legend(numpoints=1, fontsize=15, loc='upper right')
```

```
ax1.grid()
plt.show(block=False)
```

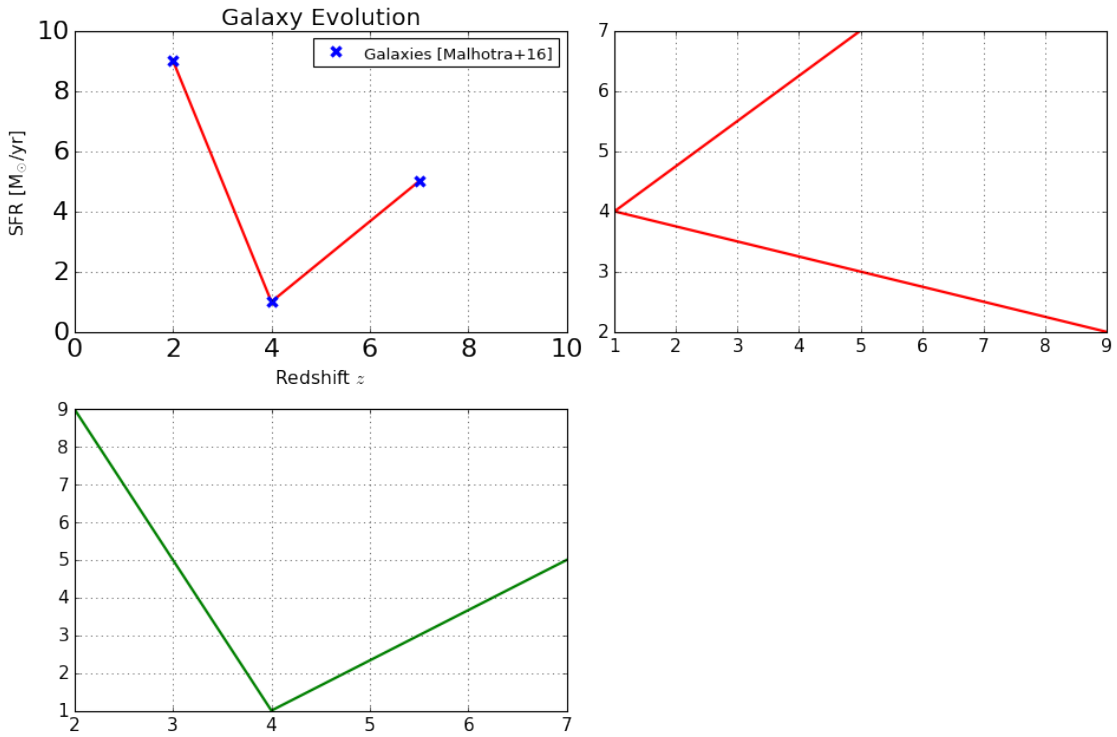


In [20]:
```
# More than one plot in a figure: add_subplot
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(221)
ax1.plot(x, y,'r', lw=2) # LineWidth = 2
ax1.plot(x, y,'x', ms=8, mew=3, label='Galaxies [Malhotra+16]') # MarkerSize = 8, Marke
# Set limits on axes
ax1.set_xlim([0,10])
ax1.set_ylim([0,10])
ax1.set_title('Galaxy Evolution', fontsize=18)
ax1.set_xlabel('Redshift $z$', fontsize=14)
ax1.set_ylabel('SFR [M$_{\odot}$/yr]', fontsize=14)
ax1.legend(numpoints=1)
ax1.grid()
mpl.rcParams['xtick.labelsize'] = 14
mpl.rcParams['ytick.labelsize'] = 14

ax2 = fig.add_subplot(222)
ax2.plot(y, x, 'r', lw=2) # LineWidth = 2
ax2.grid()
```

```
ax3 = fig.add_subplot(223)
ax3.plot(x, y, 'g', lw=2) # LineWidth = 2
ax3.grid()

plt.tight_layout()
plt.show(block=False)
```



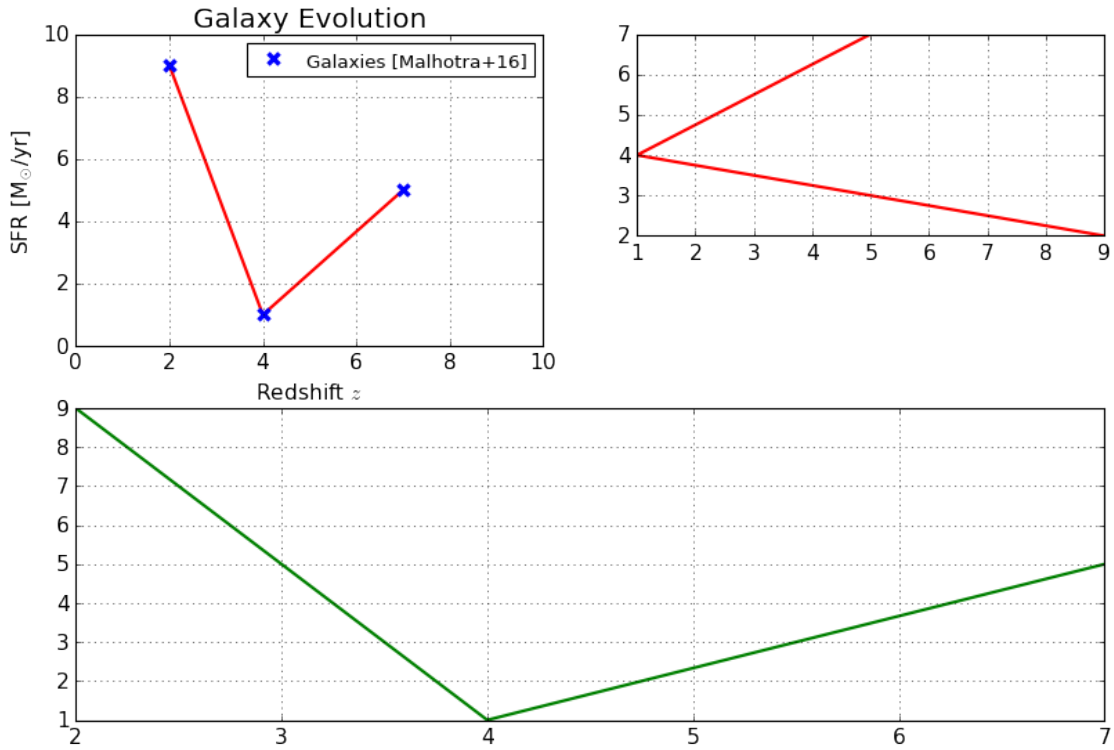
In [22]:
```
# More than one plot in a figure: add_subplot
fig = plt.figure(figsize=(12,8))
ax1 = fig.add_subplot(221)
ax1.plot(x, y, 'r', lw=2) # LineWidth = 2
ax1.plot(x, y, 'x', ms=8, mew=3, label='Galaxies [Malhotra+16]') # MarkerSize = 8, Mark
# Set limits on axes
ax1.set_xlim([0,10])
ax1.set_ylim([0,10])
ax1.set_title('Galaxy Evolution', fontsize=18)
ax1.set_xlabel('Redshift $z$', fontsize=14)
ax1.set_ylabel('SFR [M$_{\odot}$/yr]', fontsize=14)
ax1.legend(numpoints=1)
ax1.grid()
mpl.rcParams['xtick.labelsize'] = 14
mpl.rcParams['ytick.labelsize'] = 14

ax2 = fig.add_subplot(322)
```

```
ax2.plot(y, x, 'r', lw=2) # LineWidth = 2
ax2.grid()

ax3 = fig.add_subplot(212)
ax3.plot(x, y, 'g', lw=2) # LineWidth = 2
ax3.grid()

#plt.savefig('test.png',dpi=200)
plt.show(block=False)
```



In [ ]:

In [ ]:

In [ ]:

In [ ]: