In [ ]:
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# CS596
# Liu
# DUE: September 16th, 2019
# Homework Assignment 1
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In [2]:
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# Question 1a
# Straight Line

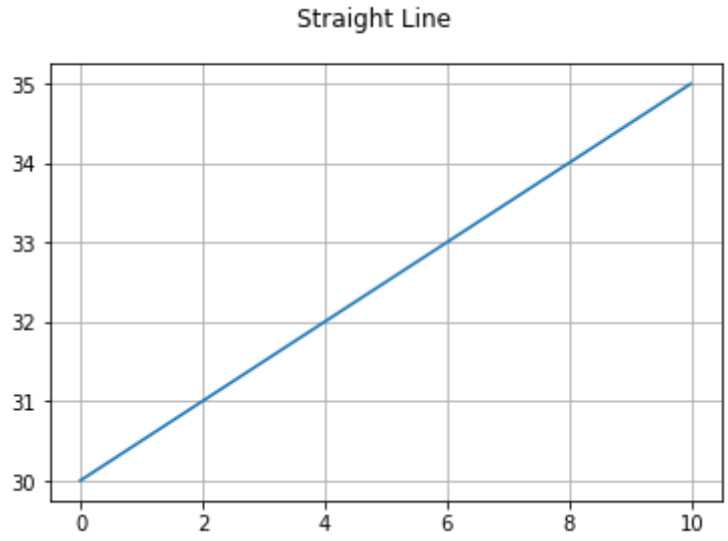
import numpy as np
import matplotlib.pyplot as plt

title = plt.figure()
title.suptitle('Straight Line', fontsize=12)

ax = plt.subplot(111)

# y = b + mx
# b = 30
# m = 0.5
x = np.arange(0.0,10.0,0.01)
y = 30 + 0.5*x

plt.grid()
plt.plot(x, y)
plt.show()
```



In [3]:

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# Question 1b
# Quadratic Function

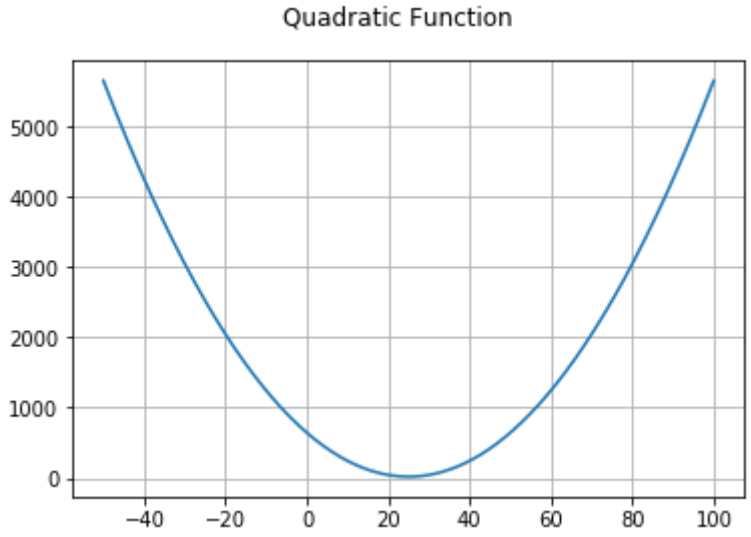
import numpy as np
import matplotlib.pyplot as plt

title = plt.figure()
title.suptitle('Quadratic Function', fontsize=12)

ax = plt.subplot(111)

# y = (x - a)^2 + b
# a = 25
# b = 20
x = np.arange(-50.0,100.0,0.01)
y = (x-25)**2 + 20

plt.grid()
plt.plot(x,y)
plt.show()
```



In [4]:
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# Question 1c
# Log Function

import numpy as np
import matplotlib.pyplot as plt

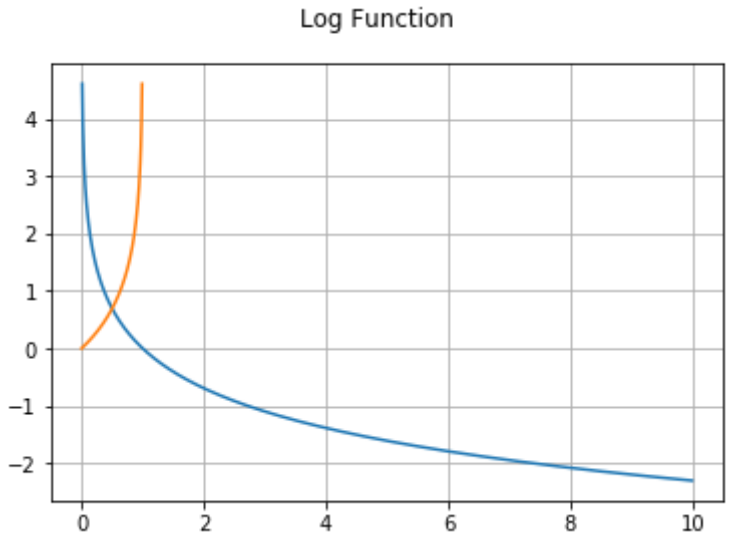
title = plt.figure()
title.suptitle('Log Function', fontsize=12)

ax = plt.subplot(111)

# y = -log(x)
# y = -log(1-x)
# multiple functions
x = np.arange(0, 10.0, 0.01)
a = -1*np.log(x)
b = -1*np.log(1-x)

plt.grid()
plt.plot(x, a)
plt.plot(x, b)
plt.show()
```

```
/Users/Koder/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:
16: RuntimeWarning: divide by zero encountered in log
  app.launch_new_instance()
/Users/Koder/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:
17: RuntimeWarning: divide by zero encountered in log
/Users/Koder/anaconda3/lib/python3.7/site-packages/ipykernel_launcher.py:
17: RuntimeWarning: invalid value encountered in log
```



In [5]:
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# Question 1d
# Sigmoid Function

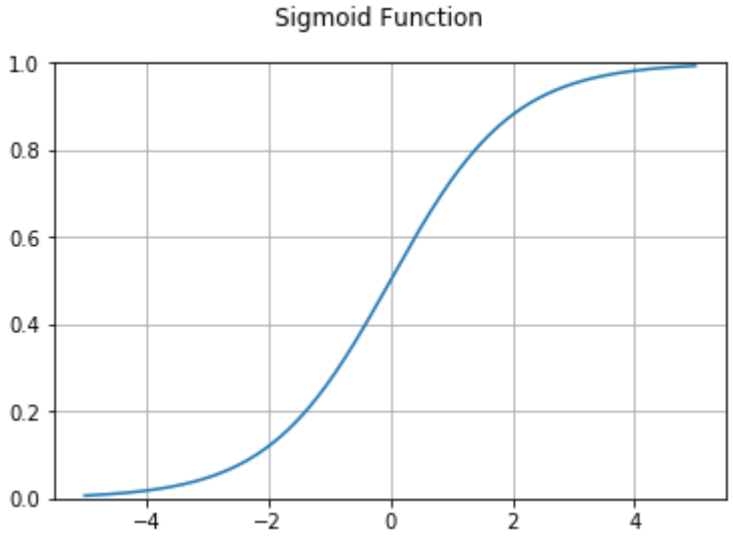
import numpy as np
import matplotlib.pyplot as plt

title = plt.figure()
title.suptitle('Sigmoid Function', fontsize=12)

ax = plt.subplot(111)

# y = 1/(1 + e^-x)
e = np.exp(1)
x = np.arange(-5.0,5.0,0.01)
y = 1/(1+e**-x)

plt.grid()
plt.ylim(0,1)
plt.plot(x,y)
plt.show()
```



In [ ]:
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# Question 2
# Answer: B
# b
# i) supervised learning with discrete predictions;
# ii) supervised learning with discrete predictions;
# iii) unsupervised learning with discrete results;
```

In [8]:
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# Question 3

# Machine Learning Task:
# The machine learning task that I will be describing is deciding and
# classifying whether or not it is hot outside

# Task
# Inputs:
# The inputs that will be taken into account for this task includes
# the temperature, humidity, and overall weather. The temperature gives
# a general value to how hot is it outside, the humidity and weather can
# give a more accurate description on how hot it is outside
# Outputs:
# The outputs for this task is the ultimate choice of deciding whether or
# not it is hot outside after taking all the inputs into account.
# Goal:
# The goal for this task is to decide if it will be nice to go outside
# and attempting to dress accordingly to keep as cool as possible

# Data Preparation (how to collect dataset)
# Training Dataset:
# The training data in this task will be the temperature outside. I can
# collect this data using the Weather app on my phone. For a general rule
# of thumb, if the current temperature is over 80 degrees Farenheit, I
# will consider it hot outside. This data of temperature can give a
# answer to help me decide if it is hot outside, but it will not be the
# most accurate answer.
# Validation Dataset:
# Line the training dataset, I can retrieve this data on the Weather app.
# The validation data in this task will be the humidity and weather
# outside. Humidity can make the current temperature outside feel hotter
# if the humidity at that time is high. So the humidity can affect if it
# is hot for me outside. The weather can also affect the current
# temperature. If the weather is cloudy outside, it will make outside
# feel more cool in a sense. This also includes if it is raining, as it
# can affect how it feels outside. This dataset can give a more fine
# tuned answer to help me decide if it is hot outside.
# Testing Dataset:
# To retrieve the testing dataset, I will retrieve different weather
# recordings from different days and different cities. For example, I
# will use the Saturday forecast from Los Angeles, the Wednesday forecast
# from Chicago, the Monday forecast from San Diego, and the Friday
# forecast from Texax. Then I will use my machine learning task to decide
# if it will be hot outside for me for each forecast. I will compare the
# outputs from each forecast and compare it to the section on the Weather
# App that gives you a temperature reading of how hot it feels using my
# ground-truth label.
# Ground-truth Label:
# The ground-truth label for this task if that if the weather feels 85
# degrees Farenheit or higher, it is hot outside for me.
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In [ ]:
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