In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

Regression Dataset - Quadratic

Input Feature: X

Target: 5x^2-23x + 47 + some noise

Objective: Train a model to predict target for a given X

In [2]:
```
# Quadratic Function
def quad_func (x):
    return 5*x**2 -23*x
```

In [3]:
```
quad_func(25)
```

Out[3]:
```
2550
```

In [4]:
```
quad_func(1.254)
```

Out[4]:
```
-20.979419999999998
```

In [5]:
```
np.random.seed(5)
x = pd.Series(np.arange(-20,21,0.2))
# Add random noise
y = x.map(quad_func) + np.random.randn(len(x)) * 30

df = pd.DataFrame({'x':x,'y':y})
```

In [6]:
```
df.head()
```

Out[6]:

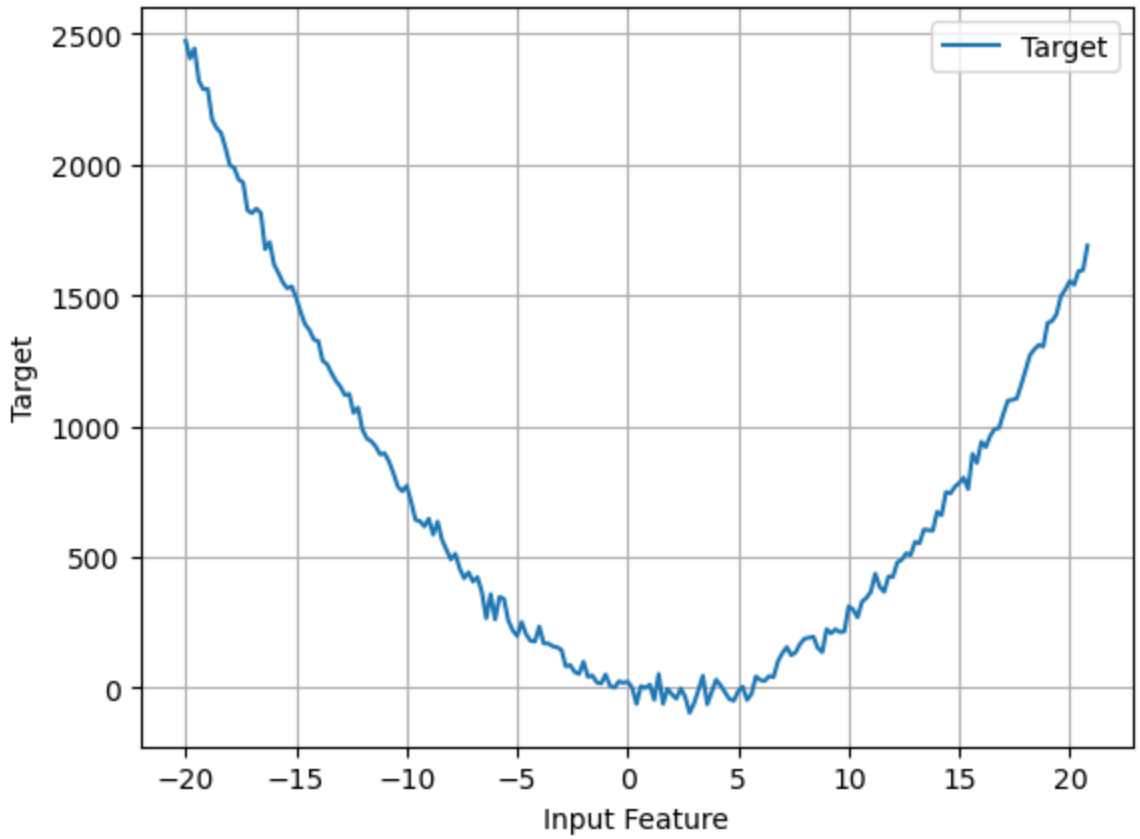
	x	y
0	-20.0	2473.236825
1	-19.8	2405.673895
2	-19.6	2444.523136
3	-19.4	2320.437236
4	-19.2	2288.088295

In [7]:
```
# Correlation will indicate how strongly features are related to the output
df.corr()
```

Out[7]:

	x	y
x	1.000000	-0.339751
y	-0.339751	1.000000

In [8]:
```
plt.plot(df.x,df.y,label='Target')
plt.grid(True)
plt.xlabel('Input Feature')
plt.ylabel('Target')
plt.legend()
plt.show()
```



In [9]:
```
# Save all data
df.to_csv('quadratic_all.csv',index=False,
          columns=['x','y'])
```

SageMaker Convention for Training and Validation files

CSV File Column order: y_noisy, x

Training, Validation files do not have a column header

In [10]:
```
# Training = 70% of the data
# Validation = 30% of the data
# Randomize the datset
```

```
np.random.seed(5)
l = list(df.index)
np.random.shuffle(l)
df = df.iloc[l]
```

In [11]:
```
rows = df.shape[0]
train = int(.7 * rows)
test = rows-train
```

In [12]:
```
rows, train, test
```

Out[12]: (205, 143, 62)

In [13]:
```
# Write Training Set
df[:train].to_csv('quadratic_train.csv',index=False,header=False,columns=['y','x'])
```

In [14]:
```
# Write Validation Set
df[train:].to_csv('quadratic_validation.csv',index=False,header=False,columns=['y',
```

In [ ]:
```

```