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

Simple Regression Dataset - Straight Line

Input Feature: X

Target: 5*X + 8 + some noise

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

In [8]:
```
# Straight Line Function
def straight_line(x):
    return 5*x + 8
```

In [9]:
```
straight_line(25)
```

Out[9]:
```
133
```

In [10]:
```
straight_line(1.254)
```

Out[10]:
```
14.27
```

In [11]:
```
np.random.seed(5)

samples = 150
x = pd.Series(np.arange(0,150))
y = x.map(straight_line) + np.random.randn(samples)*10
```

In [12]:
```
df = pd.DataFrame({'x':x,'y':y})
```

In [13]:
```
df.head()
```

Out[13]:

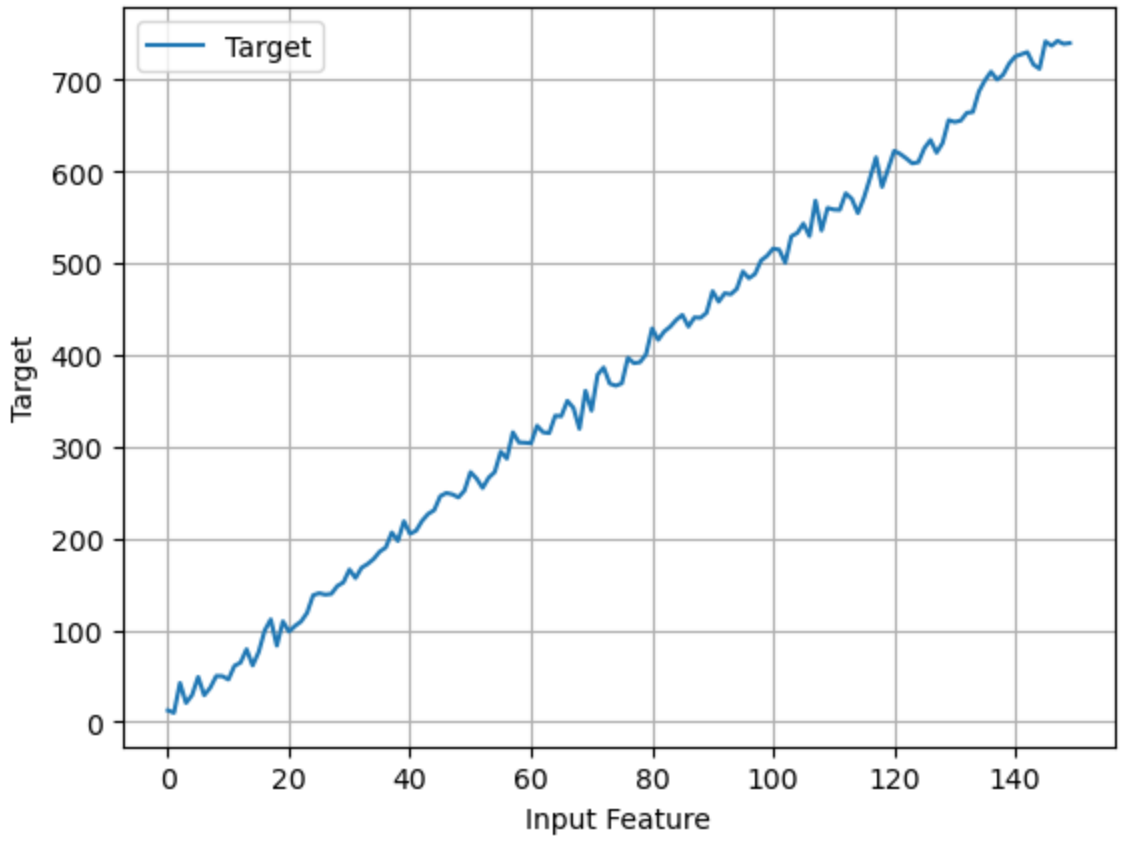
	x	y
0	0	12.412275
1	1	9.691298
2	2	42.307712
3	3	20.479079
4	4	29.096098

In [14]:
```
# Correlation will indicate how strongly features are related to the output
df.corr()
```

Out[14]:

	x	y
x	1.000000	0.998871
y	0.998871	1.000000

In [15]:
```
plt.plot(df.x,df.y,label='Target')
plt.grid(True)
plt.xlabel('Input Feature')
plt.ylabel('Target')
plt.legend()
plt.show()
```



In [16]:
```
# Save all data
df.to_csv('linear_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 [17]:
```
# 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 [18]:
```
df.head()
```

Out[18]:

	x	y
82	82	425.457270
134	134	687.275162
114	114	554.643782
42	42	219.007382
109	109	560.269533

In [19]:
```
rows = df.shape[0]
train = int(.7 * rows)
test = rows - train
```

In [20]:
```
print(rows, train, test)
```

```
150 105 45
```

In [21]:
```
# Write Training Set
df[:train].to_csv('linear_train.csv',index=False,header=False,columns=['y','x'])
```

In [22]:
```
# Write Validation Set
df[train:].to_csv('linear_validation.csv',index=False,header=False,columns=['y','x'
```

In [ ]: