Loading Data

The csvloader module supports loading information from the provided csv files. The script below prints basic information about the data.

In [19]:

```
from core.loaders.csvloader import csvloader;

path_test_data = './data/test.csv'
path_train_data = './data/train.csv'
path_ideal_data = './data/ideal.csv'

def load_data(path, label):
    data_importer = csvloader.CSVLoader(path, label)
    data_importer.read_csv()
    return data_importer

def print_csv_info(path, label):
    loader = load_data(path, label)
    loader.print_csv_info()

print_csv_info(path_test_data, 'test.csv')
print_csv_info(path_train_data, 'train.csv')
print_csv_info(path_ideal_data, 'ideal.csv')
```

```
file information for test.csv: {"size": 200, "shape": [100, 2], "dimensions": 2, "type": "float64"}
file information for train.csv: {"size": 2000, "shape": [400, 5], "dimensions": 2, "type": "float64"}
file information for ideal.csv: {"size": 20400, "shape": [400, 51], "dimensions": 2, "type": "float64"}
```

Cleaning Data

The csvcleanser module cleans and prepares the data for analysis. It removes any NA entries and prepares a sorted data set by the first column. Values that are 2* standard deviations from the mean are considered outliers.

In [20]:

```
from core.cleanser.csvcleanser import csvcleanser;

def print_cleansing_info(path, label):
    loader = load_data(path, label)
    data_cleanser = csvcleanser.CSVCleanser(loader.csv_data, loader.label)
    data_cleanser.print_cleansing_info()

print_cleansing_info(path_test_data, 'test.csv')
print_cleansing_info(path_train_data, 'train.csv')
print_cleansing_info(path_ideal_data, 'ideal.csv')
```

```
cleaning file information for test.csv: {"columns_with_na": [], "num_columns": 2, "sorted_by_index": 0, "remove
d_duplicated": 0}
cleaning file information for train.csv: {"columns_with_na": [], "num_columns": 5, "sorted_by_index": 0, "remov
ed_duplicated": 0}
cleaning file information for ideal.csv: {"columns_with_na": [], "num_columns": 51, "sorted_by_index": 0, "remo
ved_duplicated": 0}
```

Training Data

We need to find the best fit for the 4 y columns in the training data against the 50 ideal functions provided. We use the least squared error method defined in out core.stats module to find the 4 best fit ideal functions out of the 50.

In [21]:

```
from core.stats import stats
import matplotlib.pyplot as plt
import json

stat = stats.Stat()

train_data_importer = load_data(path_train_data, 'train.csv')
train_data_cleanser = csvcleanser.CSVCleanser(train_data_importer.csv_data, train_data_importer.label)
#remove outliers
train_data_cleanser.removeOutliers(1)
trainData = train_data_cleanser.df

ideal_data_importer = load_data(path_ideal_data, 'ideal.csv')
ideal_data_cleanser = csvcleanser.CSVCleanser(ideal_data_importer.csv_data, ideal_data_importer.label)
idealData = ideal_data_cleanser.df

best_fit = stat.leastSquare(trainData[0].to_numpy(), trainData, idealData)
print(best_fit)
```

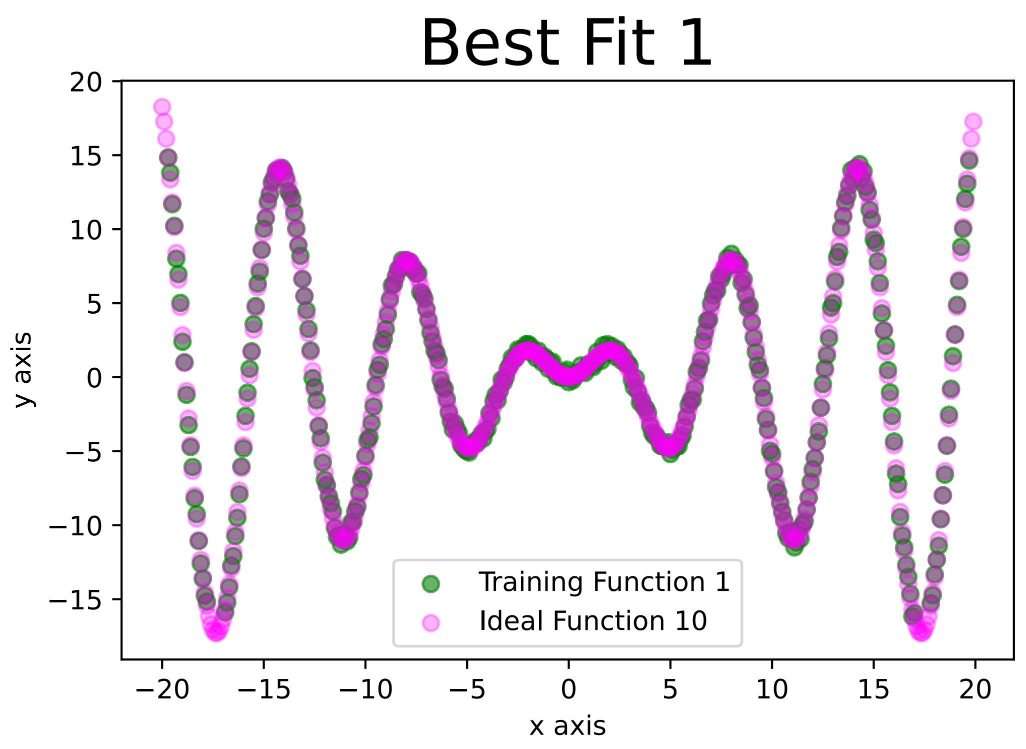
```
{"1": 10, "2": 26, "3": 8, "4": 25}
```

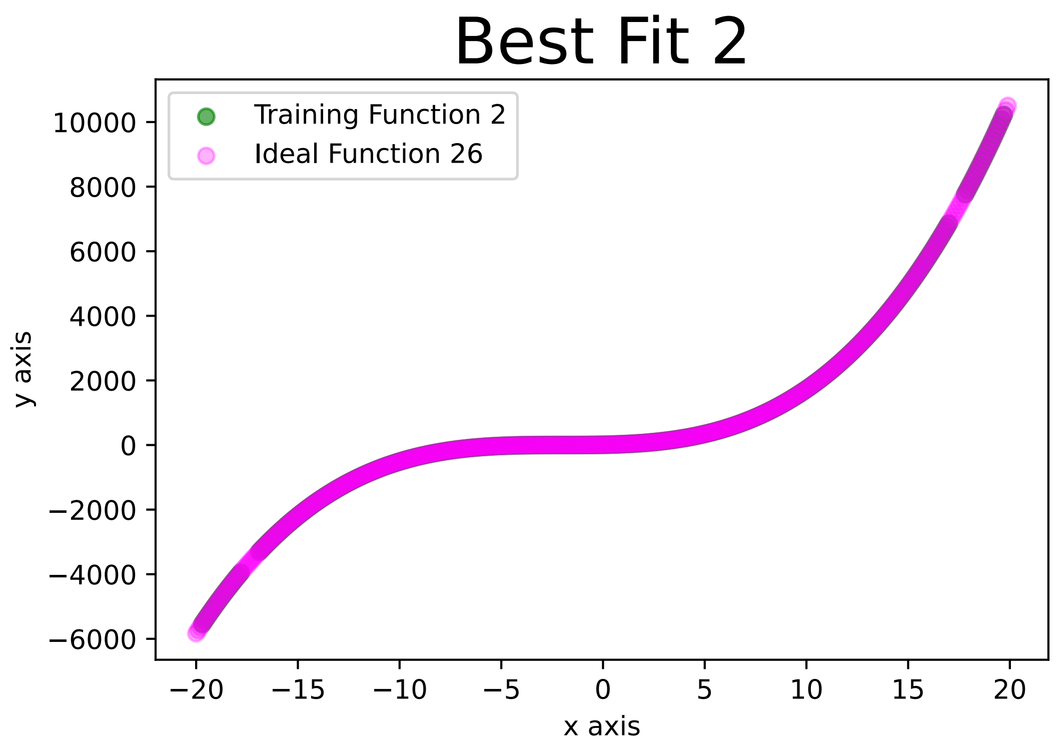
Plot of train functions against the selected ideal functions

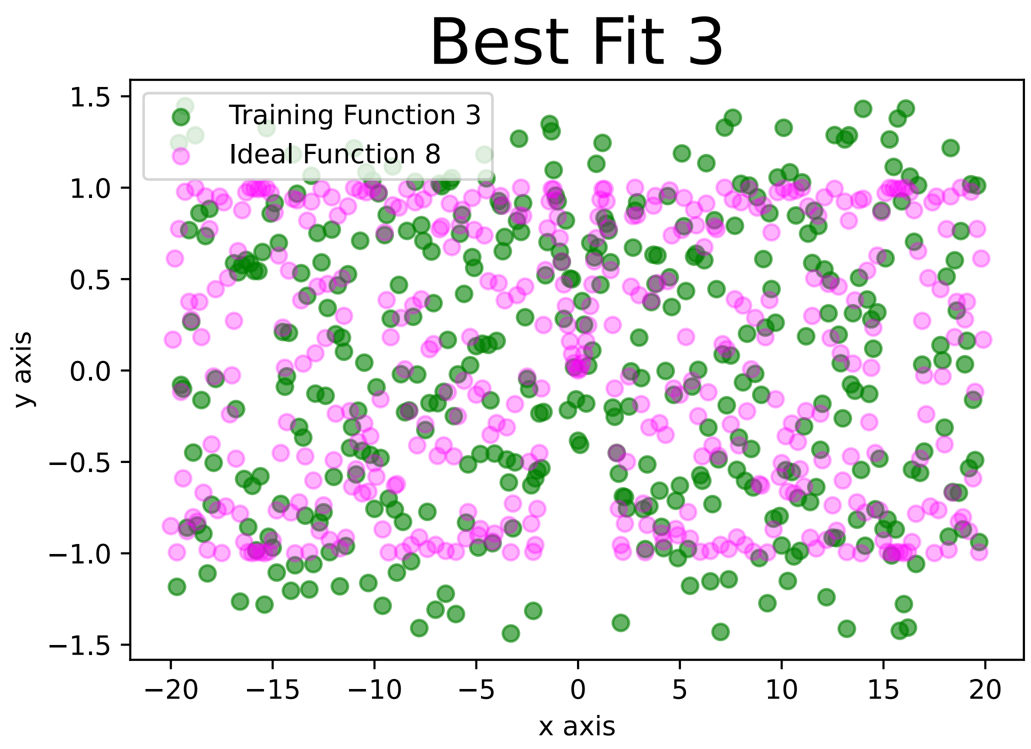
In [22]:

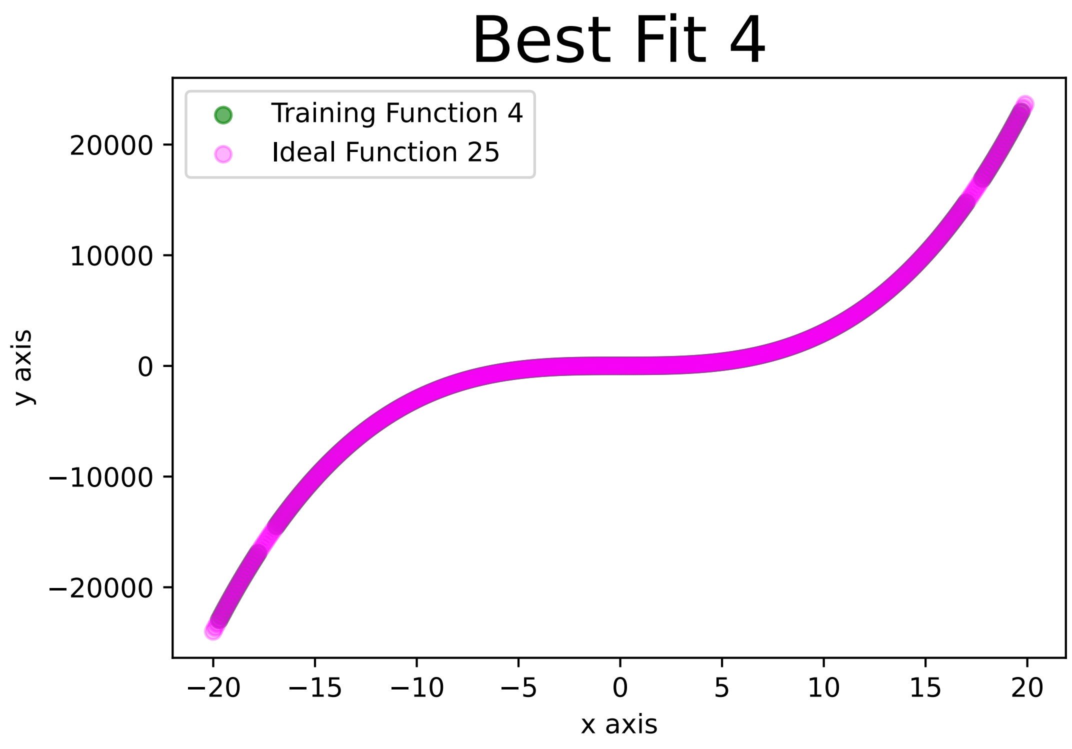
```
fit = json.loads(best_fit)
for key in fit:
    yTrain = trainData[int(key)]
    yIdeal = idealData[fit[key]]
    plt.scatter(y = yTrain, x = trainData[0], alpha = 0.6, color='green')
    plt.scatter(y = yIdeal, x = idealData[0], color = 'magenta', alpha = 0.3)

    plt.xlabel("x axis")
    plt.ylabel("y axis")
    plt.legend(labels=['Training Function {}'.format(key), 'Ideal Function {}'.format(fit[key])])
    plt.title('Best Fit {}'.format(key), size=24)
    plt.show()
```


Best Fit 1
x axis
y axis
Training Function 1
Ideal Function 10


Best Fit 2
x axis
y axis
Training Function 2
Ideal Function 26


Best Fit 3
x axis
y axis
Training Function 3
Ideal Function 8


Best Fit 4
x axis
y axis
Training Function 4
Ideal Function 25