AE588 Assignment 1

1.1

In [13]:
```python
# import required modules

from typing import Callable

import matplotlib.pyplot as plt
import numpy as np
```

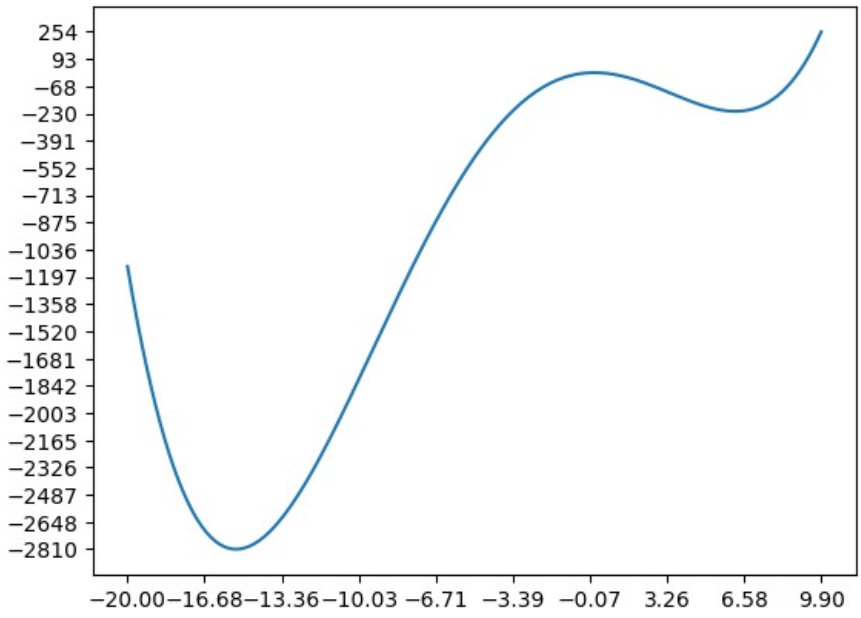
In [14]:
```python
# define constants
# RANGE = (5, 10, 0.1)
RANGE = (-20, 10, 0.1)
```

In [15]:
```python
# function from the problem
def function1(x: float) -> float:
    return 1/12*pow(x, 4) + pow(x, 3) - 16*pow(x, 2) + 4*x + 12
```

In [16]:
```python
# another function to prepare the data that is going to be plotted
def prep_data(function: Callable[[float], float], range: tuple[float, float, float]) -> tuple[list[float], list
    data: tuple[list[float], list[float]] = ([], [])
    for x in np.arange(range[0], range[1], range[2]):
        data[0].append(x)
        data[1].append(function(x))
    return data
```

In [17]:
```python
# simple function to plot data
def plot_data(data: tuple[list[float], list[float]]) -> None:
    plt.plot(data[0], data[1])
    plt.xticks(np.linspace(min(data[0]), max(data[0]), 15))
    plt.yticks(np.linspace(min(data[1]), max(data[1]), 20))
    plt.show()
```

In [18]:
```python
# main function so this can run outside of a jupyter notebook
if __name__ == "__main__":
    data = prep_data(function1, RANGE)
    plot_data(data)
```



local minimum = -230 at x = 6.5

global minimum = -2810 at x = -15