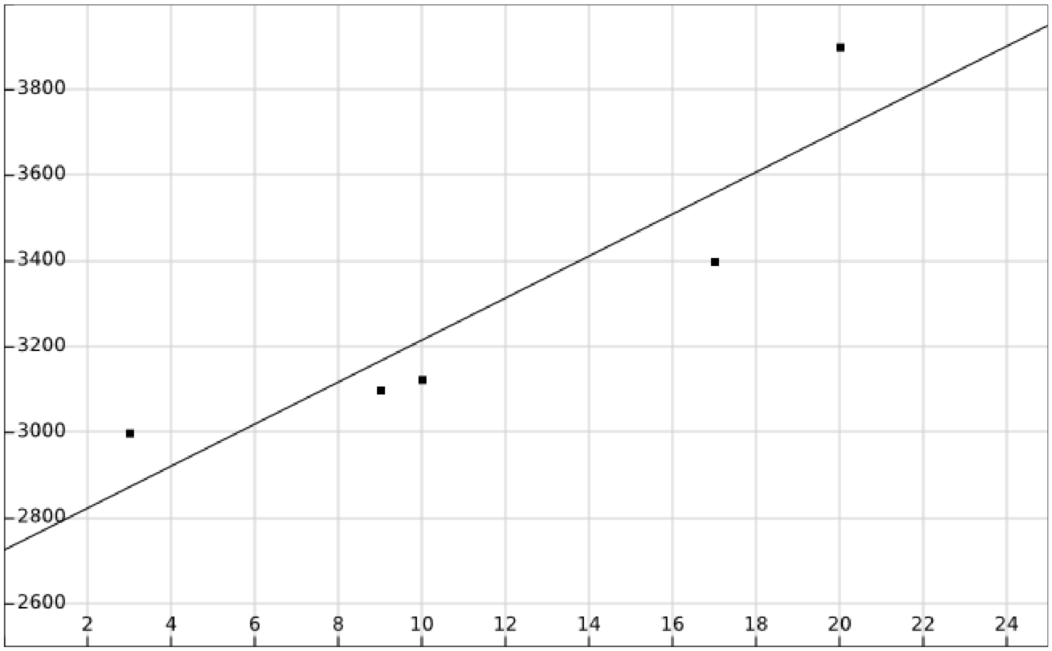
Q1:
I have coded and used the python program added in the appendix A for this example. This program can be made more efficient using external libraries for matrix operations, however, it serves the purpose of this example.

The initial values of w_0 and w_1 were set to zeros, where w_0 and w_1 are the parameters of the hypothesis, and value of alpha was 0.01, where alpha is the learning rate.

The values of w_0 and w_1 after the first five iterations were:

iterations	w_0	w_1
1	33.05	407.9
2	17.6373	94.8119
3	39.3231228	333.9513784
4	32.5736289208	150.124726682
5	47.5831748831	290.261768962

Additionally, I have used 10,000 iterations and the final values of w_0 is 2726.94201042 and w_1 is 48.9879651711. I have plotted them in the following graph as 2726.94 and 48.98 respectively and got the hypothesis shown by the straight line in the following figure. Here the black dots represent the given sets of (x,y).



Q2:

A problem can be predicting the resale value of a car.
The features I'd like to extract are:

1. Producing company
2. Model
3. Year of production
4. Last inspection date
5. Gasoline efficiency
6. Current mileage
7. Number of previous owners
8. Number of accidents

Appendix A:

```
#Gradient descent algorithm for the Exercise 1

x = [17, 20, 3, 10, 9]
y = [3400, 3900, 3000, 3125, 3100]
#y = [34, 39, 30, 31.25, 31]

def getCost(w0, w1, x, y):
    N = len(x)
    error = 0
    for i in range(0, N):
        error += ( w0 + w1 * x[i] - y[i] ) ** 2
    return error / (2 * N)

def gradient(w0, w1, x, y, iterations, alpha):
    N = len(x)
    errorW0 = 0
    errorW1 = 0
    for i in range(0, N):
        errorW0 += (w0 + w1 * x[i] - y[i])
        errorW1 += (w0 + w1 * x[i] - y[i]) * x[i]
    return (w0 - (alpha/N) * errorW0, w1 - (alpha/N) * errorW1)

alpha = 0.01
iterations = 10000
#iterations = 5
w0 = 0
w1 = 0

k=0
while k < iterations:
    cost = getCost(w0, w1, x, y)
    (w0, w1) = gradient(w0, w1, x, y, iterations, alpha)
    print str(k) + " : " +str(cost) + " : " + str(w0) + " : " + str(w1)
    k = k + 1
```