```
/opt/anaconda3/bin/python /Users/nickusich/Documents/ML/Homework/HW2/HW2.py

Q1:
     14.14

Q2:
     -11.690000000000001

Q3:
     1.3699999999999999

Q4:
     -0.4699999999999998

Q5:
     2.8569999999999993

Q6:
     -3.7199999999999998

Q7:
     [[-3.72  0.12  0.24]
 [-1.86  0.06  0.12]
 [ 0.   -0.   -0.  ]
 [ 0.31 -0.01 -0.02]
 [-3.72  0.12  0.24]]

Q8:
     -2987.2000000000003

Q9:
     -2.7744444444444456

Q10:
     [ 8.8684 -4.502  -3.0041 -5.5886]


Loss:
      [0.125]

Gradient of Loss:
      [[ 0.    ]
 [-0.0001]]

Optimal Weights:
      [[0.5002]
 [0.4996]]


Loss:
      [0.1201]

Gradient of Loss:
      [[-0.0025]
 [ 0.0107]
 [-0.0098]]

Optimal Weights:
      [[ 0.6124]
 [-1.781 ]
 [ 1.8467]]
Coefficients (lowest degree first): [ 2.6364 -2.6455  0.8182]


DERIVATIVE 1:
     AUTOGRAD ANSWER:  [3. 4.]
        MY_ANSWER:    [3. 4.]


DERIVATIVE 2:
     AUTOGRAD ANSWER:  [12. 21.]
        MY_ANSWER:    [12. 21.]


DERIVATIVE 3:
     AUTOGRAD ANSWER:  [36. 54. 72.]
        MY_ANSWER:    [36. 54. 72.]


DERIVATIVE 4:
     AUTOGRAD ANSWER:  [1. 2. 3.]
        MY_ANSWER:    [1. 2. 3.]


DERIVATIVE 5:
     AUTOGRAD ANSWER:
 [396.5333 502.1333]
        MY_ANSWER:
 [396.5333 502.1333]

```

```
 91
 92 DERIVATIVE 6:
 93      AUTOGRAD ANSWER:
 94  [[0. 0. 0.]
 95  [0. 0. 0.]]
 96         MY_ANSWER:
 97  [[0. 0. 0.]
 98  [0. 0. 0.]]
 99
100
101 DERIVATIVE 7:
102      AUTOGRAD ANSWER:
103  [0. 0. 0.]
104         MY_ANSWER:
105  [0. 0. 0.]
106
107
108 DERIVATIVE 8:
109      AUTOGRAD ANSWER:
110  [0.1966]
111         MY_ANSWER:
112  [0.1966]
113
114
115 DERIVATIVE 9:
116      AUTOGRAD ANSWER:
117  [0. 0. 0.]
118         MY_ANSWER:
119  [0. 0. 0.]
120
121
122 DERIVATIVE 10:
123      AUTOGRAD ANSWER:
124  [-1. nan  1.]
125         MY_ANSWER:
126  ['-1.0' 'DOES NOT EXIST' '1.0']
127
128
129 DERIVATIVE 11:
130      AUTOGRAD ANSWER:
131  [0.9535 0.0953 0.286 ]
132         MY_ANSWER:
133  [0.9535 0.0953 0.286 ]
134
135
136 DERIVATIVE 13 (Skipped 12):
137      AUTOGRAD ANSWER:
138  [136. 119.  27.]
139         MY_ANSWER:
140  [136. 119.  27.]
141
142
143 DERIVATIVE 14:
144      AUTOGRAD ANSWER:
145  1.3333333333333333
146         MY_ANSWER:
147  1.3333333333333333
148
149
150 DERIVATIVE 15:
151      AUTOGRAD ANSWER:
152  39.25
153         MY_ANSWER:
154  39.25
155
156
157 DERIVATIVE 16:
158      AUTOGRAD ANSWER:
159  10.446075663466967
160         MY_ANSWER:
161  10.446075663466967
162
163
164 DERIVATIVE 17:
165      AUTOGRAD ANSWER:
166  [-0.25   -1.     -0.5    -5.     -0.1429]
167         MY_ANSWER:
168  [-0.25   -1.     -0.5    -5.     -0.1429]
169
170
171 Loss:
172       [37.3051]
173
174 Gradient of Loss:
175       [[-0.]
176  [-0.]]
177
178 Optimal Weights:
179       [[2.3135]
180  [4.279 ]]
```

```
181
182
183 Happiness prediction for 15.0 hours of time with loved ones:
184      [[6.3017]]
185
186 Process finished with exit code 0
187
```