

1) A jewelry maker would like to increase his profit by raising the price of his jade earrings. However, he knows that if he raises the price too high, he won't sell as many earrings and his profit will decrease.

The jewelry maker's business consultant develops the equation $P = 50s - s^2$ to predict the monthly profit, P , for a sales price, s . A table of a few data points are shown below.

s (\$)	0	10	20	30	40	50	60
P (\$)	0	400	600	600	400	0	-600

- a) When the jewelry maker charges \$10 for his earrings, how much profit does he make?

- b) When the jewelry maker charges \$15 for his earrings, how much profit does he make? Hint: use the equation.

- c) What price will bring the maximum profit? How do you know?

- d) What is the maximum profit? Hint: use your answer from **question c** and the equation.

- e) When the jewelry maker charges \$60 for his earrings, how much profit does he make? Explain what this means in the context of the problem.

f) If you were looking at the parabola, what graph key feature would have answered **question c**? (circle one)

y – intercept x – intercepts Line of Symmetry y value of Vertex

g) If you were looking at the parabola, what graph key feature would have answered **question d**? (circle one)

y – intercept x – intercepts Line of Symmetry y value of Vertex

2) The highest dive in the Olympic Games is from a 10-meter platform. The height above water, h (meters), of a diver t seconds after leaving the platform can be estimated by the equation $h = 10 + 4.9t - 4.9t^2$. A table with some of their data points is shown below.

Time (t)	Height (h)
0	10
0.2	10.784
0.4	11.176
0.6	11.176
0.8	10.784
1.0	10
1.2	8.824
1.4	7.256
1.6	5.296
1.8	2.944
2.0	0.2
2.2	-2.936

a) Approximately when will the diver hit the water's surface? How did you find this answer by using your table?

b) How could you find the answer to **question a** by using a graph? What key feature would help you?

c) After how many seconds will the diver be at their max height? How do you know?

d) What is the maximum height reached by the diver? Hint: Use your answer to **question c** and the equation.

e) After 2.2 seconds, the height is negative. Why would that make sense in the context of this problem?