Example 5: Quadratic Application with Table of Values

A ball was thrown into the air and the path generated the following data:

x	Time (sec)	0	0.25	0.5	0.75	1	1.25	1.5	1.75
y	Height (m)	1	9	11	13	12	11	7	0.5

L_1 L_2

Xmin = 0
Xmax = 2
Ymin = 0
Ymax = 14

a) Determine the quadratic regression equation that best matches this data.

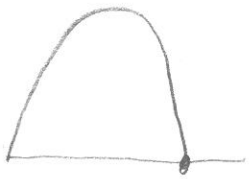
$y = -15.67x^2 + 26.73x + 1.81$

b) What is the maximum height the ball reaches, and when does it reach this maximum height?

max height = 13.21 m 0.85 seconds.

c) How high will the ball be after 0.6 sec?

12.21 meters ← given $X = 0.6$

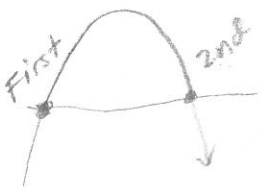


d) How long does it take until the ball hits the ground at the end of the throw?

1.77 seconds ← Need to determine X-int.

e) How long does it take before the ball reaches 5 m in height for the first time?

0.13 seconds ← given $y = 5$



Example 6: Quadratic Application with Verbal Description Given

A company that sells jeans finds that when the jeans are priced at $80 per pair, they can sell 500 pairs. It is estimated that for each $2.00 decrease in price, the company can sell 50 more pairs of jeans.

a) Complete the following table of values.

Number of Pairs Sold	Price (x)	Revenue $ (y)
500	80	40 000
550	78	42900
606	76	45 600
650	74	48100

b) Determine the quadratic regression equation that models the revenue as a function of the price.

$y = -25x^2 + 2500x + 0$

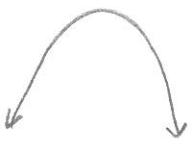
c) Find the price of jeans that will generate the maximum revenue.

$50

d) Determine the maximum revenue.

$62500

L_1 L_2



Xmin = ~~70~~ 0
Xmax = 90
Ymin = 40 000
Ymax = ~~50 000~~ 100,000