

Example 5: Quadratic Application with Table of Values

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

$x = L1$
 $y = L2$

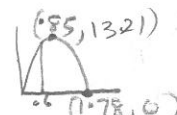
Time (sec)	0	0.25	0.5	0.75	1	1.25	1.5	1.75
Height (m)	1	9	11	13	12	11	7	0.5

Window

$x - \min = 0$
 $x - \max = 2$
 $y - \min = -3$
 $y - \max = 15$

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

$y = -15.67x^2 + 26.726x + 1.8125$



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

Vertex (0.85, 13.21)

13.21 metres

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

2nd Trace $x = 0.6$ $y = 12.2$

12.21 metres

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

1.78 m

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

$y = 5$ 2nd Trace intersect $x = 0.13$

0.13 seconds it will take to reach a height of 5 metres

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 $L1$	Revenue \$ $L2$
500	80	$500 \times 80 = 40\,000$
550	$80 - 2 = 78$	$78 \times 550 = 42\,900$
600	$78 - 2 = 76$	$600 \times 76 = 45\,600$
650	$76 - 2 = 74$	$650 \times 74 = 48\,100$
700	$74 - 2 = 72$	$700 \times 72 = 50\,400$
750	$72 - 2 = 70$	$750 \times 70 = 52\,500$
800	$70 - 2 = 68$	$800 \times 68 = 54\,400$
850	$68 - 2 = 66$	$850 \times 66 = 56\,100$
900	$66 - 2 = 64$	$900 \times 64 = 57\,600$
950	$64 - 2 = 62$	$950 \times 62 = 58\,900$
1000	$62 - 2 = 60$	$1000 \times 60 = 60\,000$
1050	$60 - 2 = 58$	$1050 \times 58 = 60\,900$
1100	$58 - 2 = 56$	$1100 \times 56 = 61\,600$
1150	$56 - 2 = 54$	$1150 \times 54 = 62\,100$
1200	$54 - 2 = 52$	$1200 \times 52 = 62\,400$
1250	$52 - 2 = 50$	$1250 \times 50 = 62\,500$
1300	$50 - 2 = 48$	$1300 \times 48 = 62\,400$
1350	$48 - 2 = 46$	$1350 \times 46 = 62\,100$
1400	$46 - 2 = 44$	$1400 \times 44 = 61\,600$
1450	$44 - 2 = 42$	$1450 \times 42 = 60\,900$
1500	$42 - 2 = 40$	$1500 \times 40 = 60\,000$
1550	$40 - 2 = 38$	$1550 \times 38 = 58\,900$
1600	$38 - 2 = 36$	$1600 \times 36 = 57\,600$
1650	$36 - 2 = 34$	$1650 \times 34 = 56\,100$
1700	$34 - 2 = 32$	$1700 \times 32 = 54\,400$
1750	$32 - 2 = 30$	$1750 \times 30 = 52\,500$
1800	$30 - 2 = 28$	$1800 \times 28 = 50\,400$
1850	$28 - 2 = 26$	$1850 \times 26 = 48\,100$
1900	$26 - 2 = 24$	$1900 \times 24 = 45\,600$
1950	$24 - 2 = 22$	$1950 \times 22 = 42\,900$
2000	$22 - 2 = 20$	$2000 \times 20 = 40\,000$

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.

Vertex (50, 62500) \rightarrow x value

\$50

d) Determine the maximum revenue.

y-value of Vertex

\$62500 is the max. revenue

