Sec 5-1: Quadratic Function

A function is a quadratic if the largest exponent is 2.

Standard Form of a Quadratic Function

$y = ax^2 + bx + c$

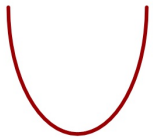
Quadratic Term | Linear Term | Constant

$y = ax^2 + bx + c$

The graph of a quadratic function is a PARABOLA

Parabola that opens up:

$a > 0$

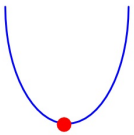


Parabola that opens down:

$a < 0$

The VERTEX of a parabola is

The lowest point if the parabola opens up.

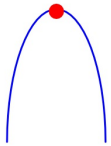


$a > 0$

Minimum

or

The hightest point if the parabola opens down.

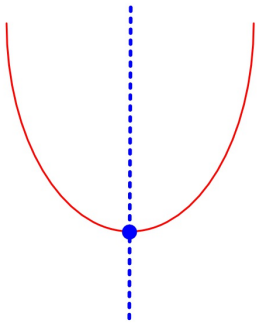


$a < 0$

Maximum

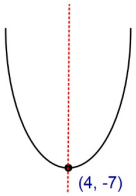
Every parabola has a Line of Symmetry (LOS).

The LOS is a vertical line that passes through the vertex.



If the the vertex of a parabola is (4, -7) what is the equation of the Line of Symmetry?

The Line of Symmetry is a Vertical line passing through the Vertex



Line of Symmetry - LOS

x = 4

Use this equation of a quadratic.

$y = x^2 - 4x + 7$

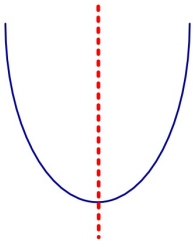
The Line of Symmetry is x = 2

What are the coordinates of the vertex?

(2 ,) To find the y-coordinate just replace x in the equation with 2 and find the value of y.

$y = 2x^2 - 8x + 1$

LOS: x = 2



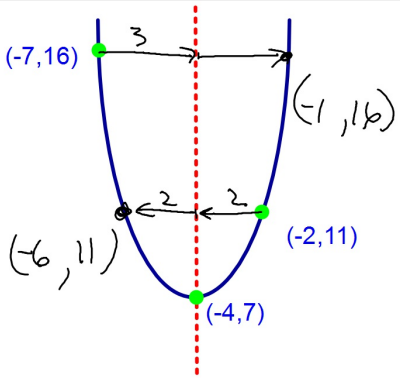
(2,-7)

State the minimum value of this quadratic function.

The value of a function is what Y = -7

When does this minimum value occur?

When a certain value occurs is what X = 2



State the coordinates of two more points on this parabola.

Use the Line of Symmetry

Real-Life Data can sometimes be modeled with mathematical functions.

Scatter plots on the graphing calculator.

x (year)	2005	2006	2007	2008	2009
y (sales)	12	19	29	37	45

Linear Regression:
finding the equation of the of best fit.

Doing a Linear Regression on the graphing calculator.

$y = 8.4x - 16830.4$

Correlation: relationship between two quantities

Positive Correlation

As x increases,
y increases

Pos Slope

Negative Correlation

As x increases,
y decreases

Neg Slope

No Correlation

No relationship between quantities

Strong Correlation

Weak Correlation

r Correlation Coefficient

r > 0 positive correlation
r = 1 Perfect positive correlation

r < 0 negative correlation
r = -1 Perfect negative correlation

The closer r is to ±1 the better the fit.

The closer |r| is to 1 the better the fit.

For Us:

We will use the correlation coefficient for comparison only.

Don't have a graphing calculator?

- Borrow one
- The internet -- My blog
- Spreadsheet software (Excel)