

# Quadratic Functions

## Application: Quadratic functions

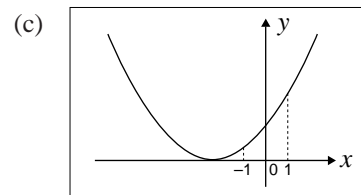
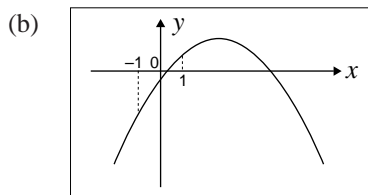
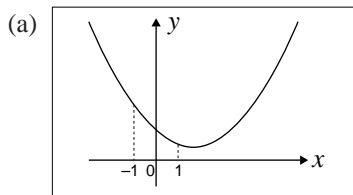
**Objective:** The goal here is to provide an understanding of the role of coefficients in quadratic functions, and to plan classes that provide the basis for further progress by teaching how to interpret graphic coordinates.

### Sample Classroom Session

Investigate relationship between the roles of coefficients and coordinates  $(x, y)$ , while grasping the graphic characteristics of quadratic functions.

Obtain the following from the graphs for the quadratic function  $y = ax^2 + bx + c$ .

- (1) Sign of  $a$                       (2) Sign of  $b$                       (3) Sign of  $c$   
(4) Sign of  $b^2 - 4ac$               (5) Sign of  $a + b + c$               (6) Sign of  $a - b + c$



Make appropriate substitutions for each coefficient to produce the graphs shown above.

Memorize which coefficients are appropriate for input.

Consider which values should be read for (4), (5), (6).

Use TRACE to provide an understanding of changes in the coordinates  $(x, y)$ .

### Further Development

The instructor can also use graphs other than (a), (b), and (c) to have the students consider changes in the coefficients and the resulting changes in coordinates.

### Expansion

Introduce the concept that solution of a quadratic equation can be obtained by reading the  $x$ -axis.

Use ZOOM and graph analysis (G-SOLV.)