# MAT102 - College Algebra - Polynomial and Rational Functions

3.1 Quadratic Functions and Applications [1]

Miraj Samarakkody

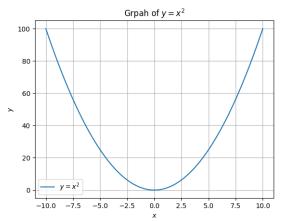
Tougaloo College

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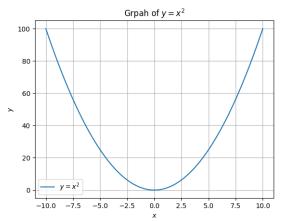
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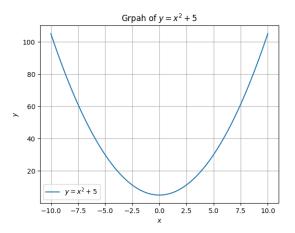
- A function of the form  $f(x) = mx + c \ (m \neq 0)$  is a linear function.
- ► The function defined by  $f(x) = ax^2 + bx + c$  ( $a \neq 0$ ) is called a **quadratic function**.

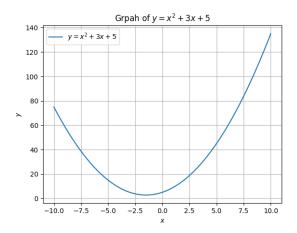
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A function defined by  $f(x) = ax^2 + bx + c$  ( $a \ne 0$ ) is called a **quadratic function**. By completing the square, f(x) can be expressed in **vertex form** as  $f(x) = a(x - h)^2 + k$ .

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- ▶ The axis of symmetry is x = h. This is the vertical line that passes through the vertex.

Give 
$$f(x) = -2(x-1)^2 + 8$$
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1. Determine whether the graph of the parabola opens upward or downward.

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- 5. Sketch the function.

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- 7. Determine the maximum or minimum value of f.

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- 7. Determine the maximum or minimum value of f.
- 8. Write down the domain and range in interval notaion.

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$$f(x) = 3x^2 + 12x + 5$$
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- 3. Identify the x-intercept.

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- 1. Write the function in vertex form.
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- 4. Identify the *y*—intercept.
- 5. Sketch the function.
- 6. Determine the axis of symmetry.
- 7. Determine the minimum or maximum value of f.
- 8. Write the domain and range in interval notation.

#### References



Julie Miller and Donna Gerken.

College Algebra.

McGraw-Hill Education, New York, 2nd edition, 2016.