# 2.2 Quadratic Functions

**Practice Problem 1:**

Find the vertex of the following quadratic.

$$f\left(x\right)= -x^{2}+4x+1$$

**Practice Problem 2:**

1. Determine whether the graph has a minimum or maximum value.
2. Find the minimum or maximum value.

$$f\left(x\right)=4x^{2}-16x+1000$$

**Practice Problem 3:**

1. Determine whether the graph has a minimum or maximum value.
2. Find the minimum or maximum value.

$$f\left(x\right)=-0.005x^{2}+2x+5$$

**Practice Problem 4:**

Use the Leading Coefficient Test to determine the end behavior of the graphs of each of the following functions.

Part A

$$f\left(x\right)=x^{4}+4x^{2}$$

Part B

$$f\left(x\right)= 2x^{3}(x-1)(x+5)$$

**Practice Problem 5:**

Show the polynomial function $f\left(x\right)=3x^{3}-10x+9$ has a real zero between -3 and -2.

**Answers:**

1. (2, 5)
2. A) Minimum. B) (2, 984)
3. A) Maximum. B) (200, 205).
4. A) Rises to the left and the right. B) Falls to the left and rises to the right.
5. F(-3) =-42; f(-2) = 5 Yes, has real zero