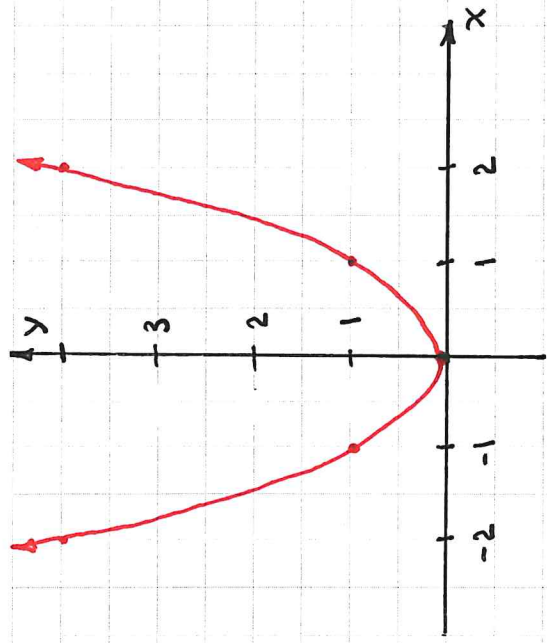


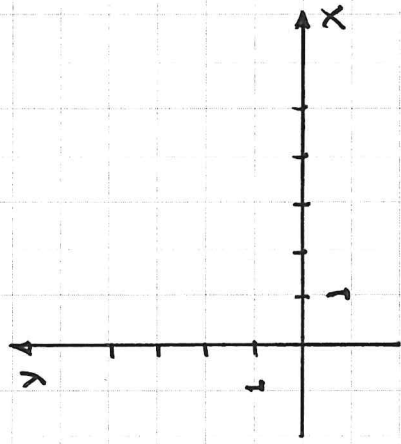
2.1 Quadratic Functions

Recall that $f(x) = x^2$ is one of the parent functions. Its graph is a parabola. The y-axis is its axis of symmetry and its vertex is located at $(0,0)$.



Ex. ① Sketch the graphs of the following functions.

a) $g(x) = (x-3)^2$

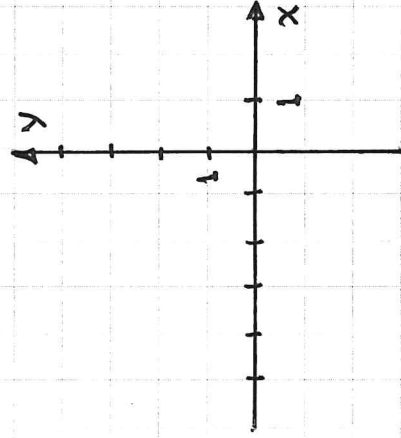


Vertex:

Axis:

x-intercepts:

b) $h(x) = (x+3)^2 - 1$

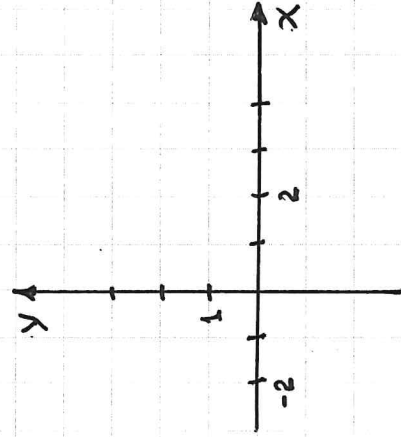


Vertex:

Axis:

x-intercepts:

c) $m(x) = -(x-1)^2 + 4$



Vertex:

Axis:

x-intercepts:

The Quadratic Function $f(x) = a(x-h)^2 + k$ is in Standard Form.

The graph is a parabola with vertex (h, k) and axis of symmetry $x=h$. When $a > 0$ the graph opens upward. When $a < 0$ the graph opens downward.

Ex. ② Simplify: $h(x) = (x+3)^2 - 1$

Solution:

The Quadratic Function $f(x) = ax^2 + bx + c$ is in General Form.

Ex. ③ For the function $f(x) = x^2 - 2x - 3$, find:

a) The coordinates of the vertex.

For $f(x) = ax^2 + bx + c$, the vertex has
x-coordinate and y-coordinate

b) The axis of symmetry :

c) The x-intercepts:

Ex. ④ Write the equation of the parabola $f(x) = -2x^2 - 4x + 5$
in Standard Form.

Ex. ⑤ Write an equation of the parabola with vertex $(3, -2)$
and whose graph passes through the point $(0, 4)$.

Ex. 6 Write a quadratic function whose graph has
x-intercepts at $(4,0)$ and $(-2,0)$.