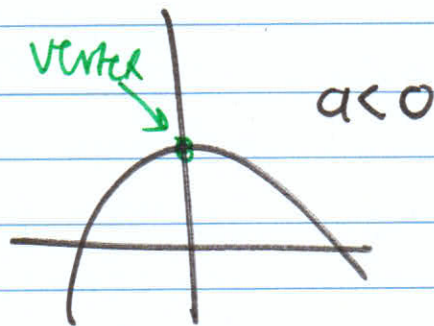
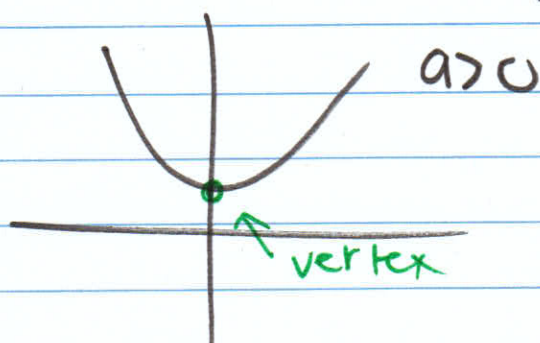


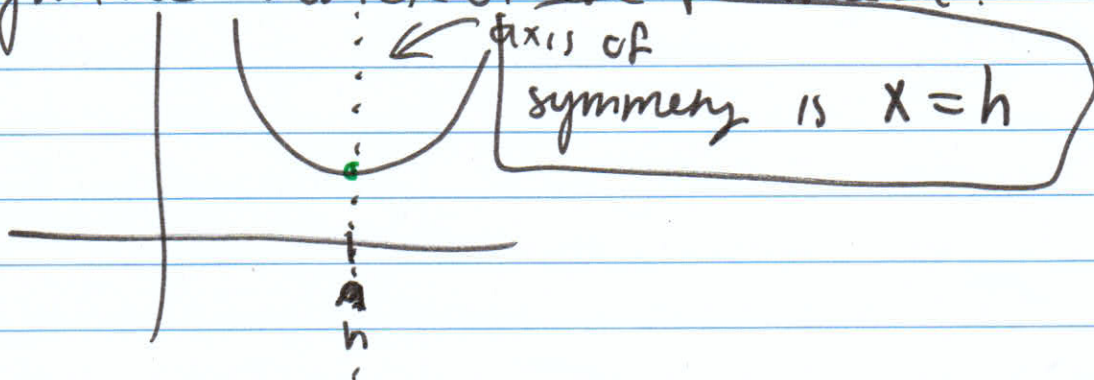
Lecture 10/9/23 + 11/10/23

Defn Parabolas are the graphs of ax^2+bx+c



- Obs: ① If $a > 0$, the vertex of ax^2+bx+c is the lowest point on graph
 ② If $a < 0$, the vertex of ax^2+bx+c is the highest point on the graph.

Defn: Given a parabola ^{given by} $ax^2+bx+c = f(x)$ the axis of symmetry is the vertical line going through the vertex of the parabola.



Ex Given a quadratic ax^2+bx+c we can rewrite so that ~~vertex~~ it is clear what its vertex is (this is why transformations of functions are useful).

(2)

Vertex form. When a quadratic equation is written ~~as~~ in the form

$$y = a(x-h)^2 + k \rightarrow$$

- Start with x^2
- Shift by h left/right
 - Scale by a vertically
 - Shift up/down by k .

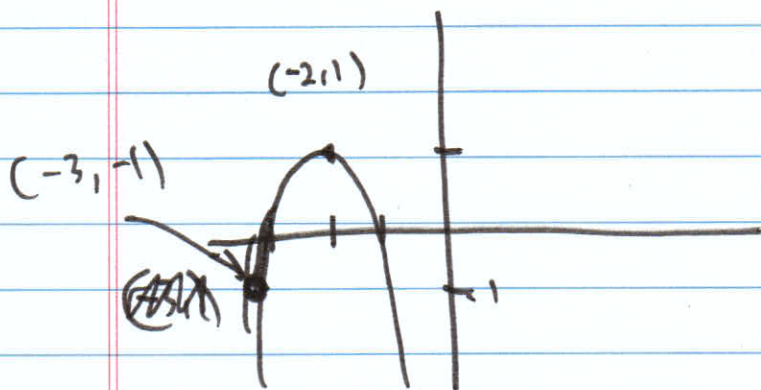
We say it is written in vertex form. The vertex of this quadratic is (h, k) .

Ex: What is the vertex and axis of symmetry of

$$0.5(x-3)^2 + 1$$

$$V = (3, 1) \quad \text{AS is } x = 3$$

Ex: Find a formula for



$$y = a(x+2) + 1$$

Since vertex is $(-2, 1)$
need to find a next.

Let's use the point we
are given!

$$-1 = a(-3+2) + 1 \quad \leftarrow (-3, 1) \text{ is on graph}$$

$$-2 = -a$$

$$a = 2$$

$$y = 2(x+2) + 1$$

Pretty neat!