

Parabolas

Standard Form

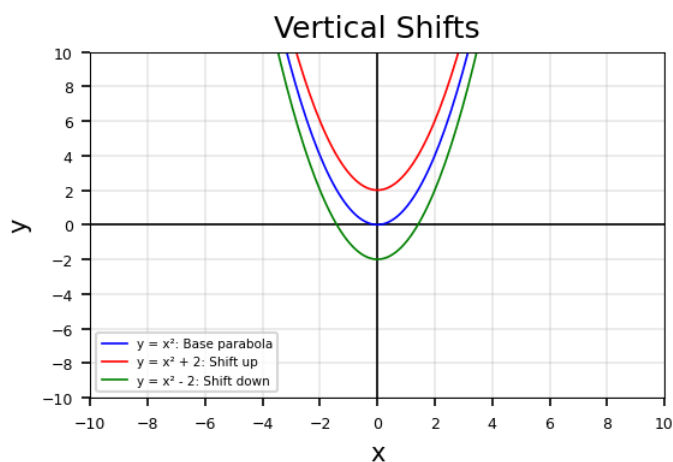
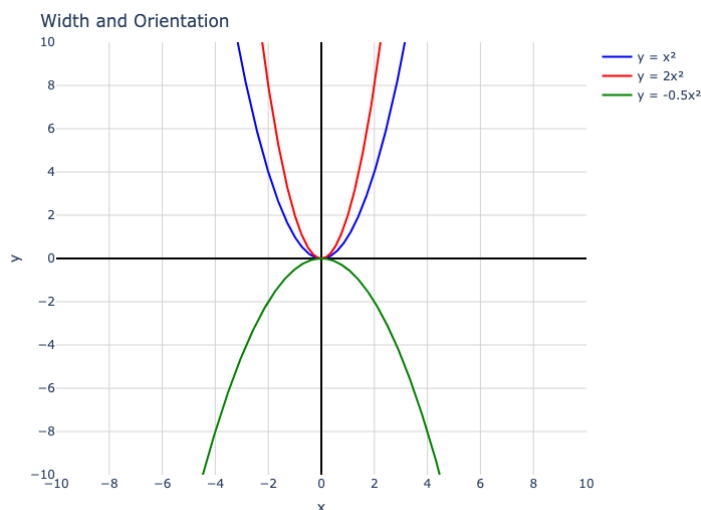
$$f(x) = ax^2 + bx + c$$

The coefficient a determines both width and direction:

- $a > 0$: Opens upward
- $a < 0$: Opens downward
- $|a| > 1$: Narrower
- $|a| < 1$: Wider

The constant term c controls vertical position:

- $c > 0$: shift up
- $c < 0$: shift down



Vertex Form

$$f(x) = a(x - h)^2 + k$$

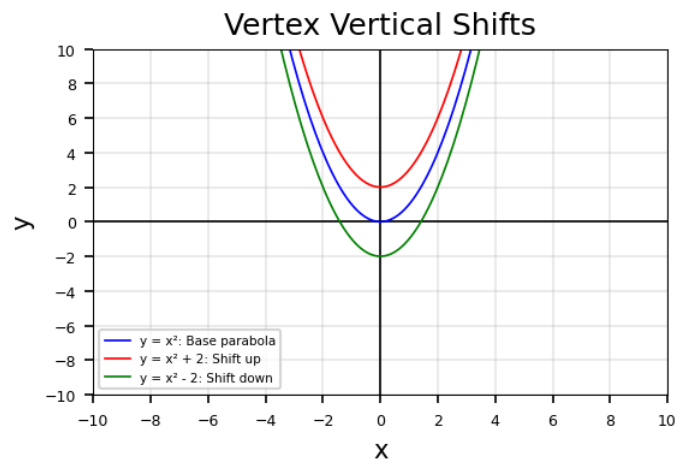
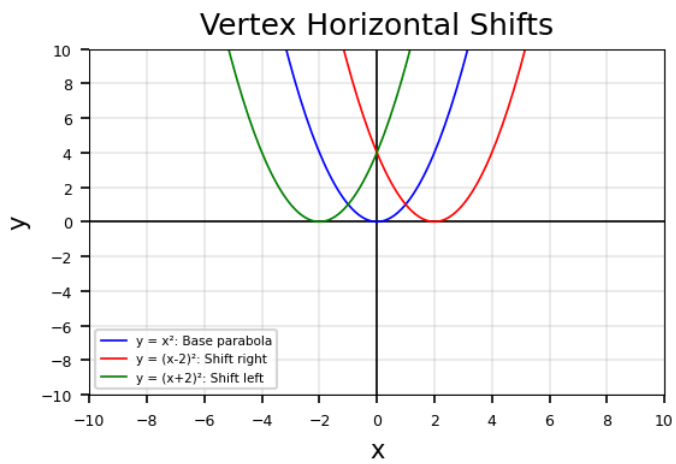
- h controls **horizontal shift**
 - $h > 0$: shift right
 - $h < 0$: shift left
- k is the **vertical position** of the vertex
 - $k > 0$: shift up
 - $k < 0$: shift down

Try it out!

Explore more

Parabolas appear in many real-world applications. Check out how they are used in:

- **Bridges and Architecture**: Learn how parabolic shapes provide structural efficiency in suspension bridges and architectural designs.
- **Projectile Motion**: Discover how parabolas describe the path of objects moving under gravity.



- **Antennas and Satellite Dishes:** Explore how parabolic reflectors focus signals in communication systems.