

Vertex Form

10th Grade

The form that hands you the graph without any working at all.

In $y = a(x - h)^2 + k$, the vertex is at (h, k) and a controls the direction and width.

$$y = a(x - h)^2 + k \rightarrow \text{vertex } (h, k)$$

$$y = (x - 3)^2 + 2$$

vertex $(3, 2)$

The minus in the form means h is $+3$.

$$y = (x + 4)^2 - 1$$

vertex $(-4, -1)$

$x + 4$ is $x - (-4)$, so $h = -4$.

$$a > 0$$

opens up, minimum

The vertex is the lowest point.

$$a < 0$$

opens down, maximum

The vertex is the highest point.

THE COMMON MISTAKE

✗ $y = (x + 4)^2$ has vertex $(4, 0)$

✓ vertex is $(-4, 0)$

The form is $x - h$. To get $x + 4$, h must be -4 .

Standard form gives you c , the y -intercept. Vertex form gives you the vertex. Convert to whichever you need.