

Parametric equations of a Parabola.

The simplest and the best form of representing the coordinates of a point on the parabola $y^2 = 4ax$ is $(at^2, 2at)$ because these coordinates satisfy the equation $y^2 = 4ax$ for all values of t . The equations $x = at^2, y = 2at$ taken together are called the parametric equations of the parabola $y^2 = 4ax$, t being the parameter.

The following table gives the parametric coordinates of a point on four standard forms of the parabola and their parametric equation.

Parabola	$y^2 = 4ax$	$y^2 = -4ax$	$x^2 = 4ay$	$x^2 = -4ay$
Parametric Coordinates	$(at^2, 2at)$	$(-at^2, 2at)$	$(2at, at^2)$	$(2at, -at^2)$
Parametric Equations	$x = at^2$ $y = 2at$	$x = -at^2$ $y = 2at$	$x = 2at$ $y = at^2$	$x = 2at,$ $y = -at^2$

Note: The parametric equation of parabola $(y - k)^2 = 4a(x - h)$ are $x = h + at^2$ and $y = k + 2at$