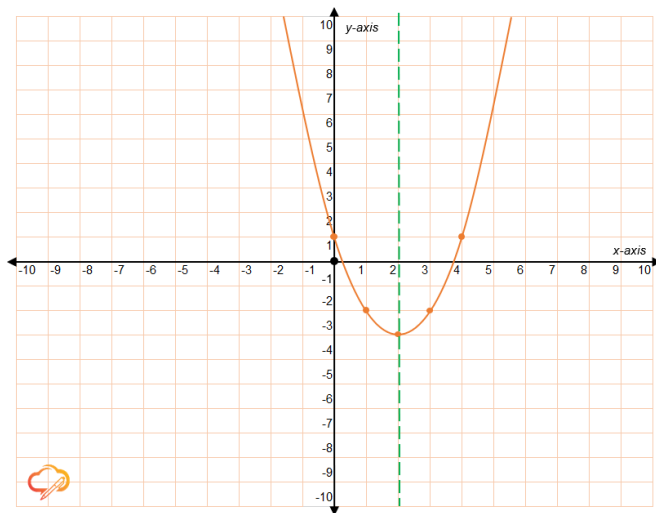


Graphing Parabolas (Standard Form)

Parabolas

Parabolas are symmetrical, open U-shaped curves.



The function or equation of a parabola can be expressed using two forms:

STANDARD FORM

$$y = ax^2 + bx + c$$

where a parabola with a positive "a" value curves up and a negative "a" curves down. "a" values also affect steepness.

VERTEX FORM

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

where (h, k) is the vertex point

Graphing using STANDARD FORM

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

STEP ONE: Write what you know.

$$a = 1 \quad b = -4 \quad c = 1$$

The parabola will curve up as "a" is positive in this equation.

STEP TWO: Find the axis of symmetry using the formula $x = -b/2a$

$$x = \frac{-b}{2a} = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$$

The vertex lies on this axis.

We now have the x-value of the vertex.

STEP THREE: Fill in a table of values using two points around the vertex x-value to get five coordinate pairs.

x	0	1	2	3	4
y	1	-2	-3	-2	1

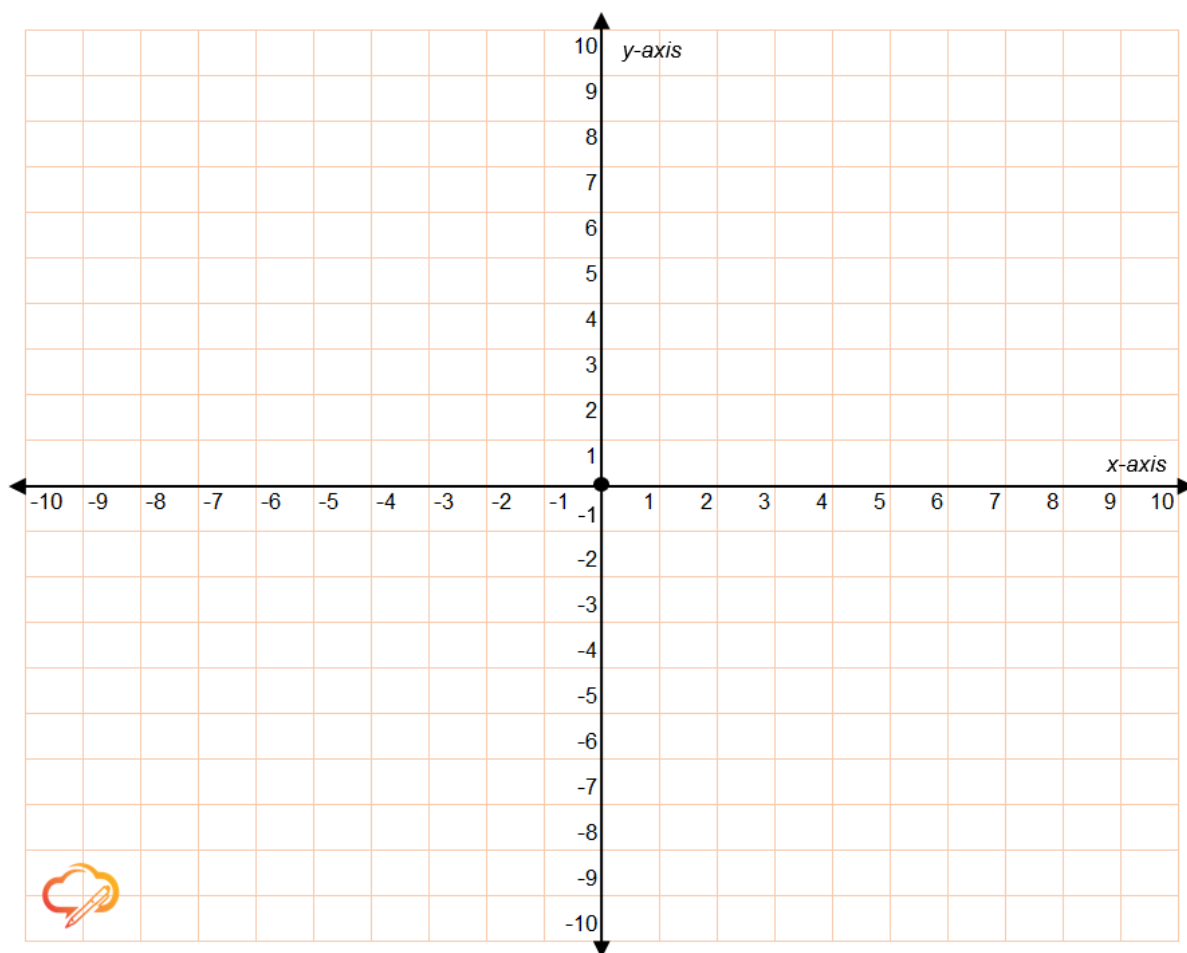
The vertex is therefore (2, -3).

STEP FOUR: Graph the parabola using these points (see graph above).

Instructions: Complete Steps 1 to 3 for the parabolas below.

1	$y = x^2 + 2x + 2$	2	$y = x^2 + 6x - 1$
3	$y = \frac{1}{2}x^2 - 6x + 12$	4	$y = -\frac{1}{2}x^2 - 3x + 1$

Instructions: Graph the parabolas on the Cartesian plane below.

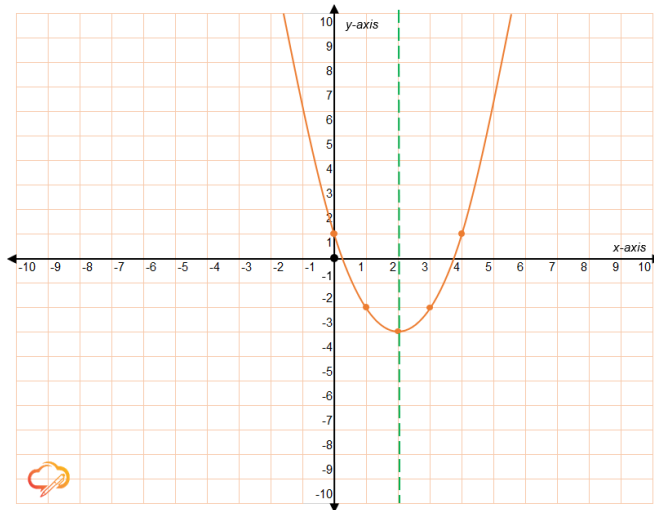




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STEP FOUR: Graph the parabola using these points (see graph above).



Instructions: Complete Steps 1 to 3 for the parabolas below.

1	$y = x^2 - 8x + 11$	2	$y = -2x^2 + 4x - 3$
3	$y = \frac{1}{4}x^2 - 3x + 1$	4	$y = -\frac{1}{2}x^2 - x + 9$



Instructions: Graph the parabolas on the Cartesian plane below.

