Objective: Graph a Quadratic Function based on key features.

Concept   Symmetry of a Quadratic Function

x	$y = x^2$
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

$f(x) = x^2$

axis of symmetry
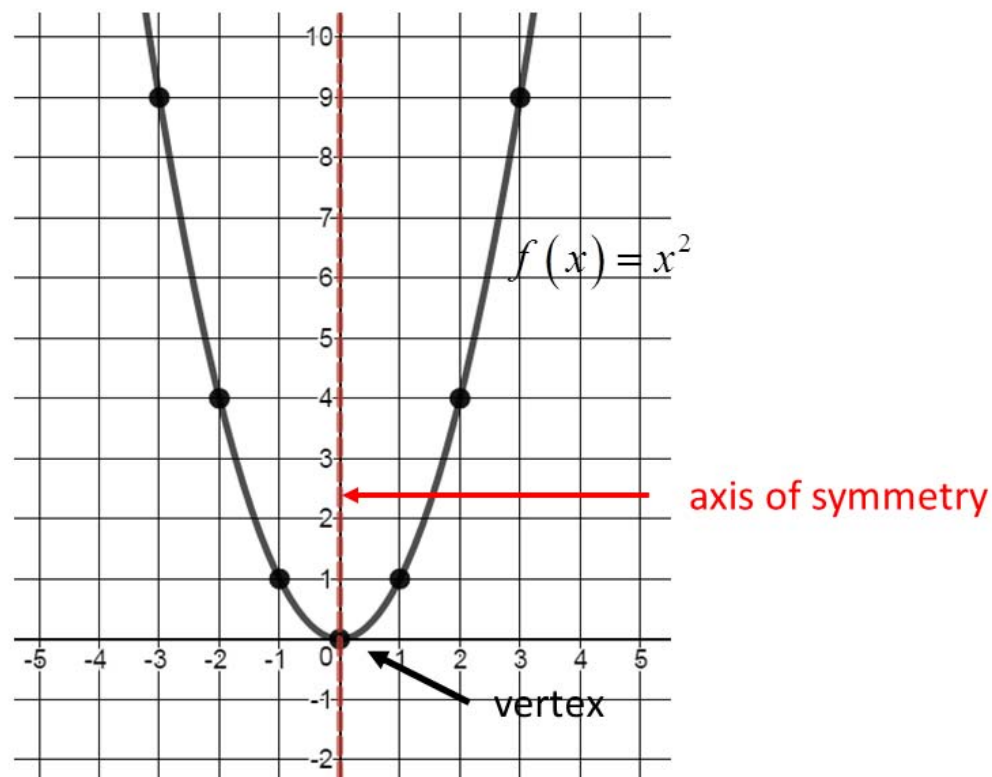
vertex

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Steps to Graph Using Key Features

1. Determine the vertex.
2. Determine whether the vertex is a maximum or minimum.
3. Graph the vertex.
4. Graph the axis of symmetry.
5. Graph all known points.
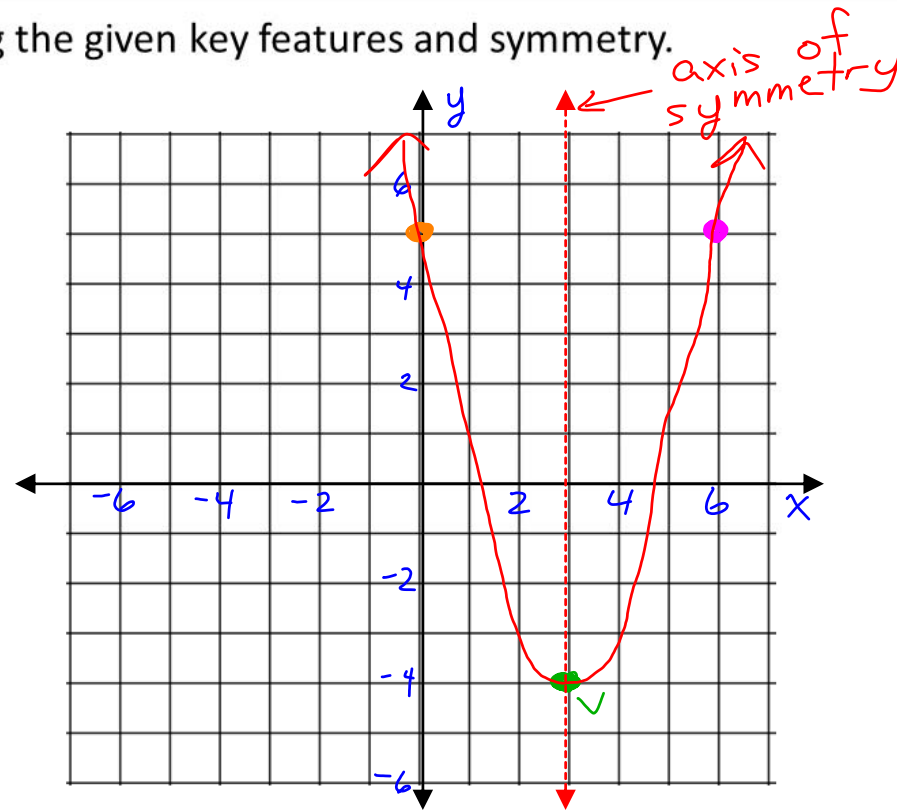6. Reflect known points across the axis of symmetry.
7. Graph the parabola.

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Ex) Graph the quadratic function using the given key features and symmetry.

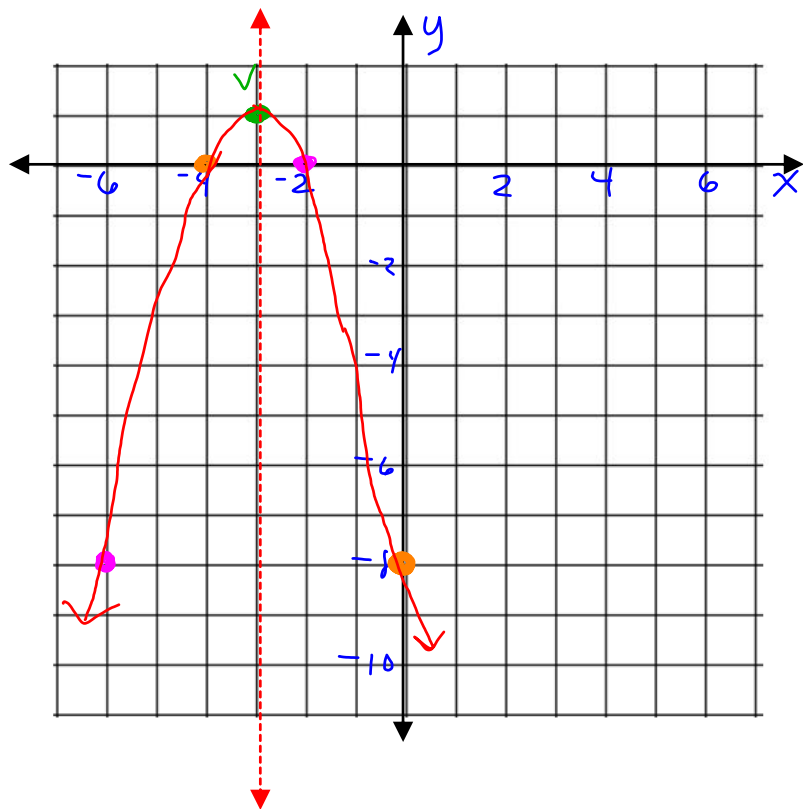increasing over the interval $(3,\infty)$

① minimum is $(3,-4)$ vertex

② passes through $(0,5)$

axis of symmetry

Objective: Graph a Quadratic Function based on key features.

Ex) Graph the quadratic function using the given key features and symmetry.

② x-intercept at -4 $\quad (-4, 0)$

y-intercept at -8 $\quad (0, -8)$

① maximum at $(-3, 1)$ vertex

Objective: Graph a Quadratic Function based on key features.

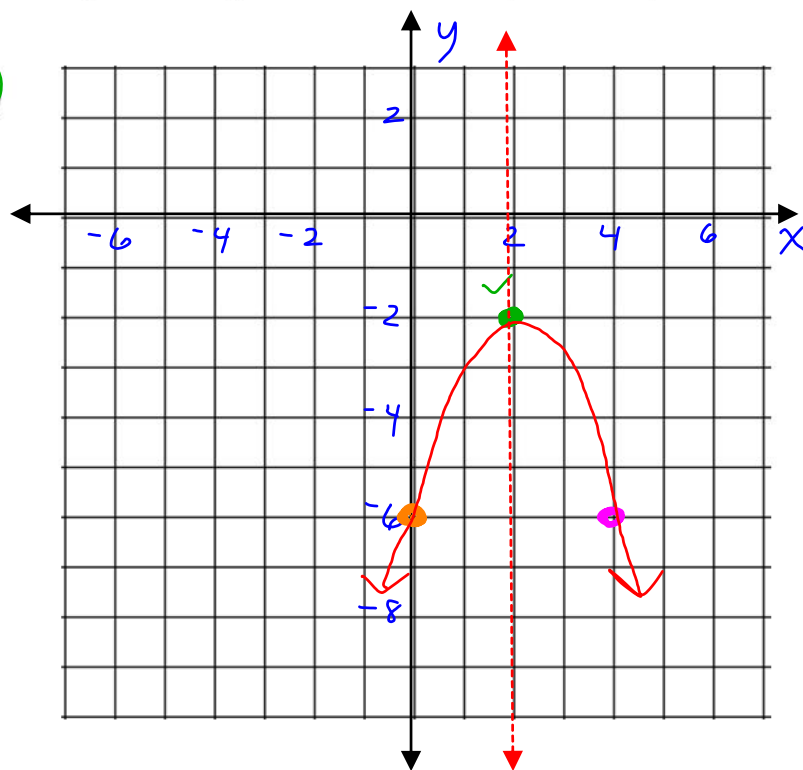Ex) Graph the quadratic function using the given key features and symmetry.

increasing over the interval $(-\infty, 2)$ *x*

range is $(-\infty, -2]$ *y*

② y-intercept at -6

$(0, -6)$

① vertex $(2, -2)$

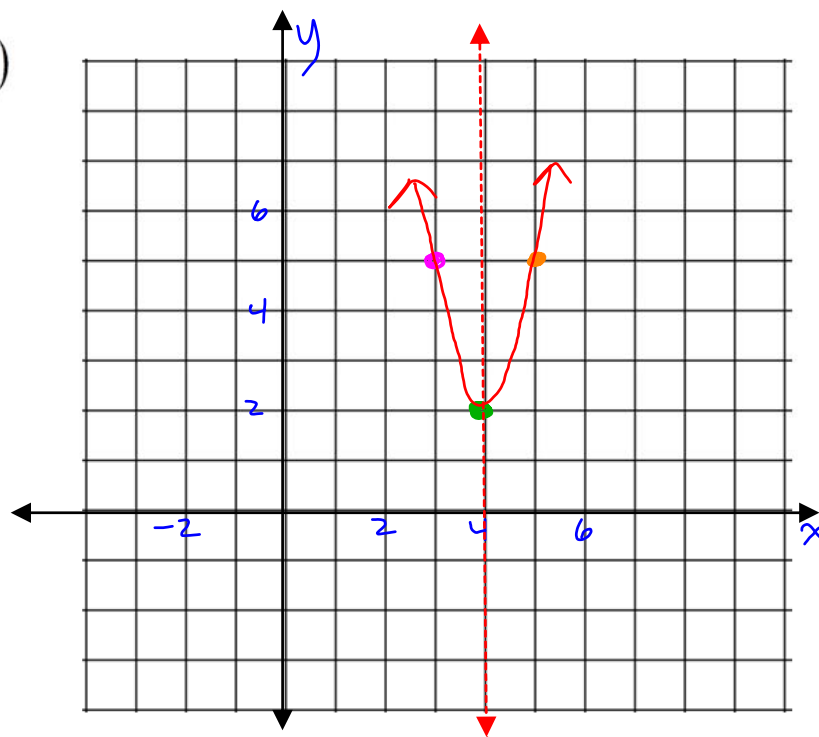Objective: Graph a Quadratic Function based on key features.

Ex) Graph the quadratic function using the given key features and symmetry.

increasing over the interval $(4, \infty)$ x

range is $[2, \infty)$ y

② passes through $(5, 5)$

① vertex $(4, 2)$

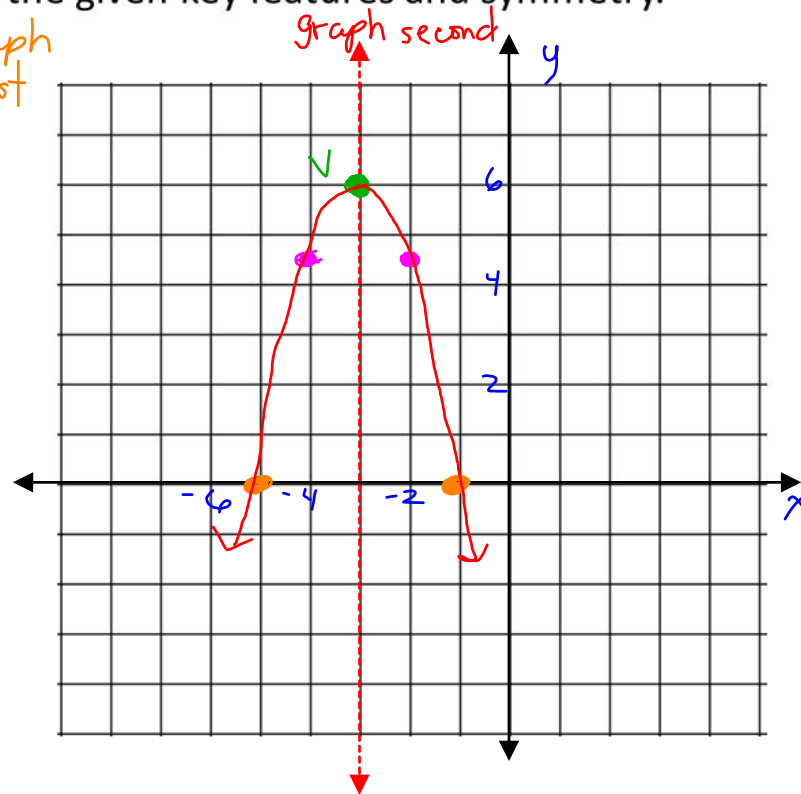Objective: Graph a Quadratic Function based on key features.

Ex) Graph the quadratic function using the given key features and symmetry.

② x-intercepts are -5 and -1 (-5,0) (-1,0) graph first

① the y-coordinate of the vertex is 6

③ passes through $(-4, 4.5)$

graph second

① vertex $(\overset{-3}{?}, 6)$

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Ex) Graph the quadratic function using the given key features and symmetry.

② y-intercept is 7 $(0,7)$

① vertex is $(2,6)$

as $x \to -\infty, f(x) \to +\infty$

as $x \to +\infty, f(x) \to +\infty$