

EXAMPLE: Graph $f(x) = (x + 2)^2 + 1$ $f(x) = a(x - h)^2 + k$ vertex form vertex (h, k)

Opens up or down?

1 & 2 Determine the vertex and axis of symmetry

<p>1. Vertex</p> $f(x) = (x + 2)^2 + 1$ $f(x) = a(x - h)^2 + k$ $f(x) = (x - (-2))^2 + (1)$ <p>Graph the vertex $(-2, 1)$</p>	<p>2. Axis of symmetry</p> $x = -2$ <p>Graph the axis of symmetry</p>
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3. Y- intercept.
 Substitute $x=0$ into your function $f(0) = (0 + 2)^2 + 1$
 $= (2)^2 + 1$
 $= (4) + 1$
 $= 5$

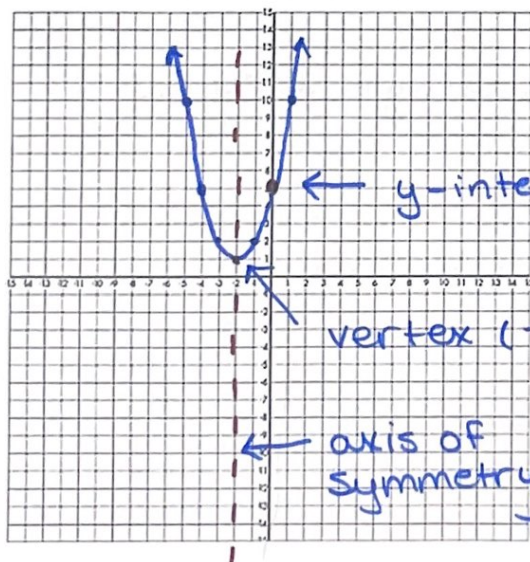
Graph the y-intercept $(0, 5)$

4. Now, choose inputs ($x=$) on the same side of the axis of symmetry as the y-intercept. Calculate the y value.

$f(-1) = (-1 + 2)^2 + 1$ $= (1)^2 + 1$ $= 1 + 1$ $= 2$ <p>$(-1, 2)$</p>	$f(1) = (1 + 2)^2 + 1$ $= (3)^2 + 1$ $= 9 + 1$ $= 10$
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Then reflect points

5. On the graph of your function, label the Key Features on your Graph.



no x-intercepts

← y-intercept $(0, 5)$

vertex $(-2, 1)$

← axis of symmetry $x = -2$

D: All Real numbers

R: $y \geq 1$

PRACTICE

Graph $f(x) = -(x - 4)^2$ $f(x) = a(x - h)^2 + k$ vertex form

Opens up or down **negative**

Determine the vertex and axis of symmetry

<p>6. Vertex</p> $f(x) = -(x - 4)^2$ $(4, 0)$	<p>7. Axis of symmetry</p> $x = 4$
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<p>8. Y- intercept.</p> <p>Substitute $x=0$ into your function $f(0) = -(0 - 4)^2$</p> $= -(-4)^2$ $= -(16)$ $= -16$ $(0, -16)$

9. Choose inputs ($x=$) on the same side of the axis of symmetry as the y-intercept. Calculate the y value.

$f(3) = -(3 - 4)^2$ $= -(-1)^2$ $= -(1)$ $= -1$ $(3, -1)$	$f(2) = -(2 - 4)^2$ $= -(-2)^2$ $= -4$ $(2, -4)$
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10. On the graph of your function, label the Key Features on your Graph.

