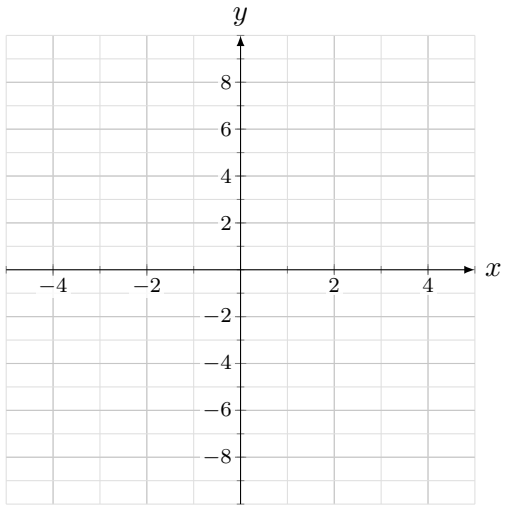
Warmup: Sketching by the Step Pattern

Adapted from Principles of Mathematics 10, McGraw-Hill Ryerson, 2007.

Work alone or with a partner. No table of values: start at the vertex, use the step pattern on the right of it, then mirror those points on the left. Then answer the questions below each grid.

1. $y = 2x^2 - 1$



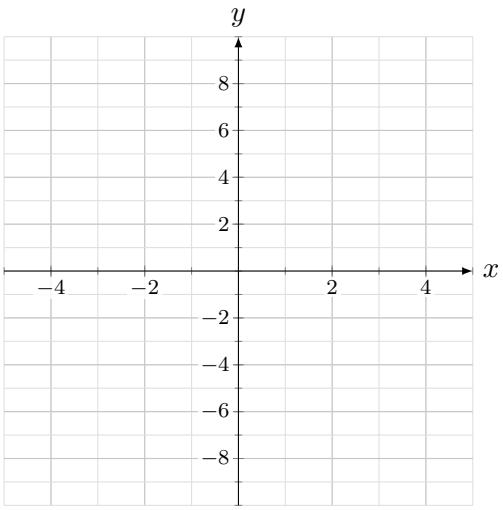
Vertex _____

Steps from the vertex _____

Opens _____

Maximum or minimum value _____

2. $y = -\frac{1}{2}x^2 + 4$



Vertex _____

Steps from the vertex _____

Opens _____

Maximum or minimum value _____

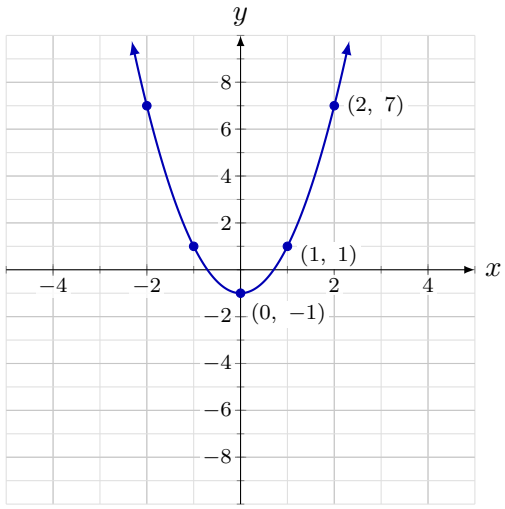
3. Check. Choose one point you plotted on each sketch, other than the vertex. Substitute its x-value into the equation to check its y-value.

Warmup: Sketching by the Step Pattern — Answers

Adapted from Principles of Mathematics 10, McGraw-Hill Ryerson, 2007.

The step points are marked on each sketch. A sketch through these points, joined with a smooth curve, is complete.

1. $y = 2x^2 - 1$



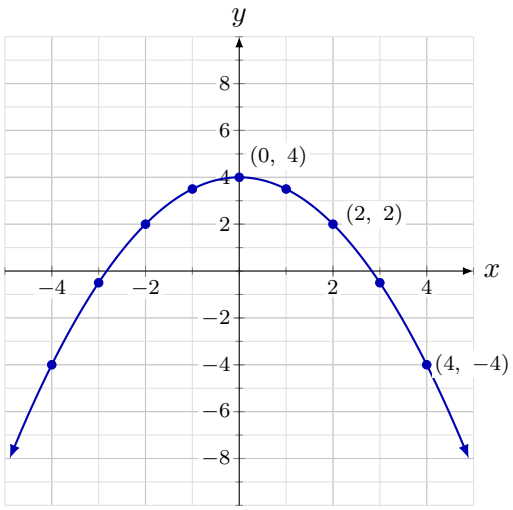
Vertex $(0,\ -1)$

Steps from the vertex up 2, up 6 (that is, $1a$ and $3a$ with $a = 2$)

Opens upward, since $a = 2 > 0$

Maximum or minimum value minimum value -1

2. $y = -\frac{1}{2}x^2 + 4$



Vertex $(0,\ 4)$

Steps from the vertex down 0.5, 1.5, 2.5, 3.5

Opens downward, since $a = -\frac{1}{2} < 0$

Maximum or minimum value maximum value 4

3. Check. Choose one point you plotted on each sketch, other than the vertex. Substitute its x-value into the equation to check its y-value.

For example, $(2,\ 7)$ on $y = 2x^2 - 1$: $2(2)^2 - 1 = 8 - 1 = 7$. And $(2,\ 2)$ on $y = -\frac{1}{2}x^2 + 4$: $-\frac{1}{2}(2)^2 + 4 = -2 + 4 = 2$.