

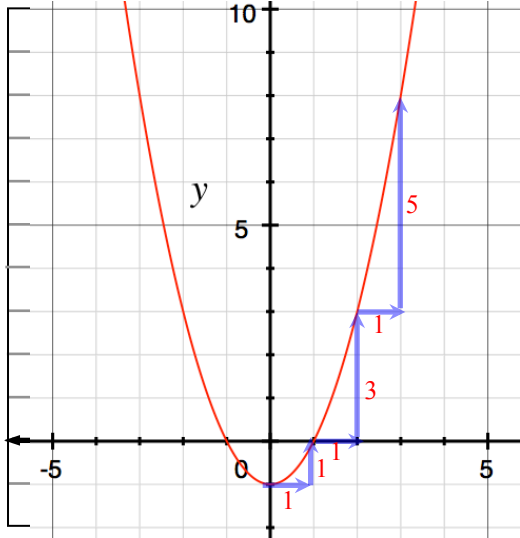
5.1 Characteristics of Parabolas

Solutions

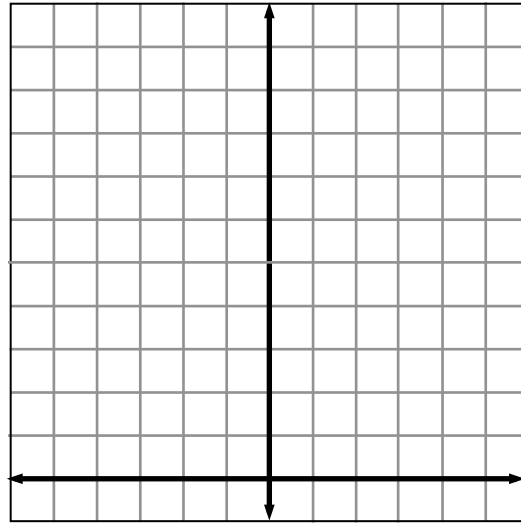
Determine the vertex, the axis of symmetry, and the graph of each equation

1. $y = x^2 - 1 = (x - 0)^2 - 1$
 vertex: $(0, -1)$
 axis: $x = 0$

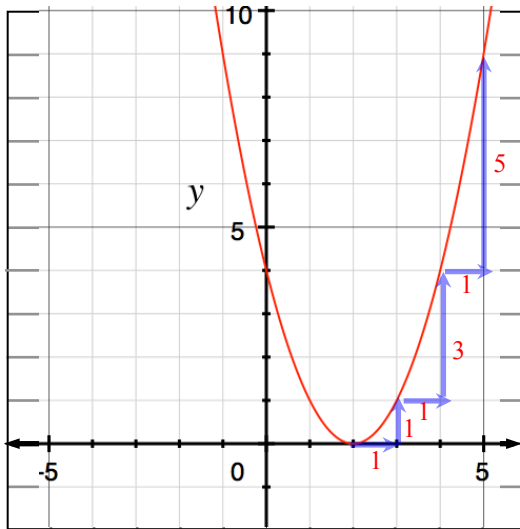
$y = a(x - h)^2 + k$
 Vertex: (h, k) Axis: $x = h$



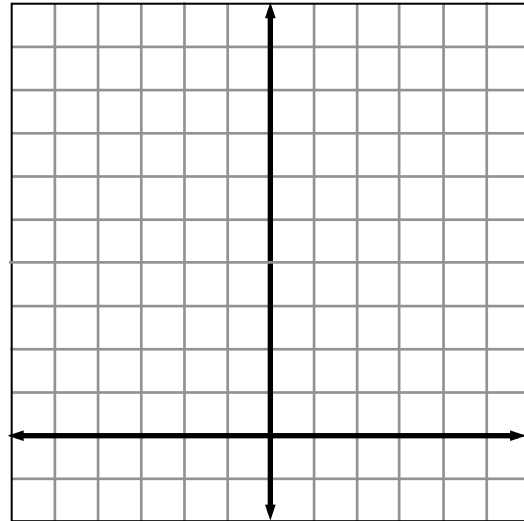
2. $y = x^2 + 2$
 vertex:
 axis:



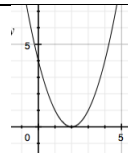
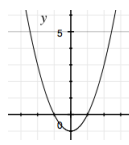
3. $y = (x - 2)^2 = (x - 2)^2 + 0$
 vertex: $(2, 0)$
 axis: $x = 2$



4. $y = (x - 1)^2$
 vertex:
 axis:



Answers: 1. $(0, -1), x = 0,$; 3. $(2, 0), x = 2,$

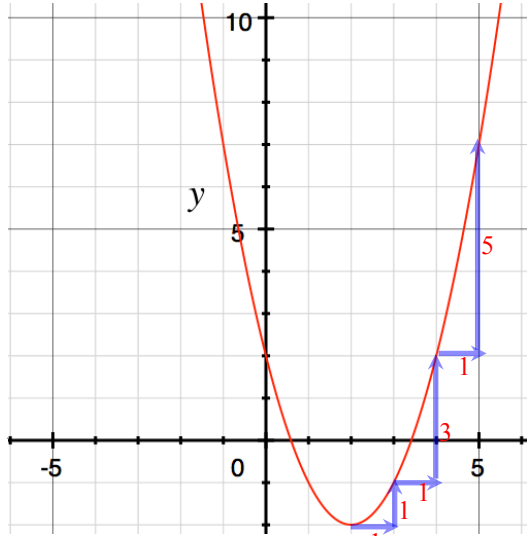


Determine the vertex, the axis of symmetry, and the graph of each equation

5. $y = (x - 2)^2 - 2$

vertex: $(2, -2)$

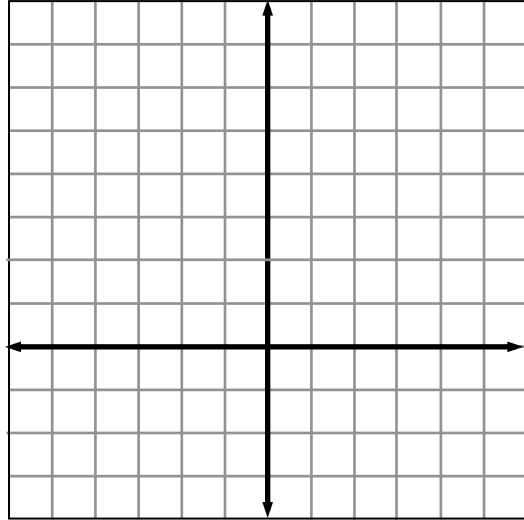
axis: $x = 2$



6. $y = (x + 1)^2 - 3$

vertex:

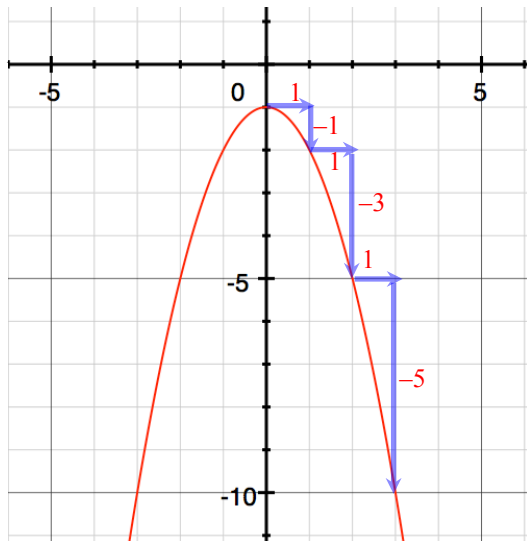
axis:



7. $y = -x^2 - 1 = -(x - 0)^2 - 1$

vertex: $(0, -1)$

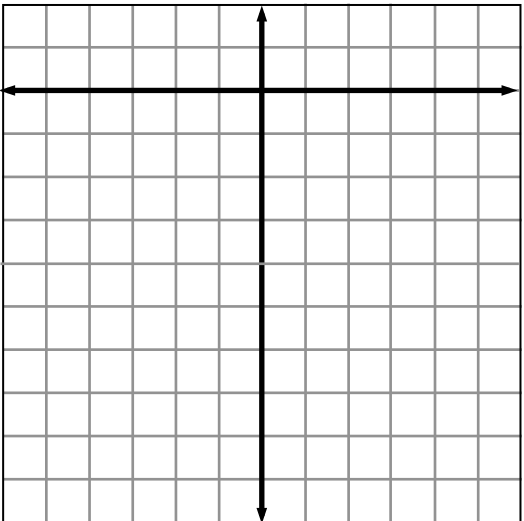
axis: $x = 0$



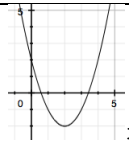
8. $y = -x^2 + 2$

vertex:

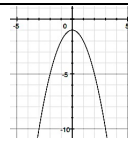
axis:



Answers: 5. $(2, -2)$, $x = 2$,



; 7. $(0, -1)$, $x = 0$,

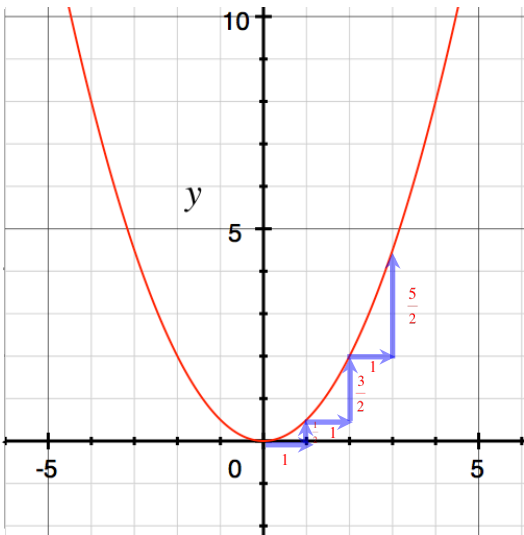


Solve and graph the solution set.

9. $y = \frac{1}{2}x^2 = \frac{1}{2}(x-0)^2 + 0$

vertex: $(0, 0)$

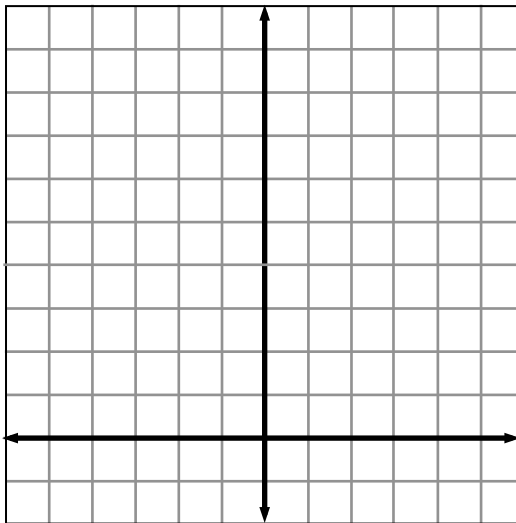
axis: $x = 0$



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

vertex:

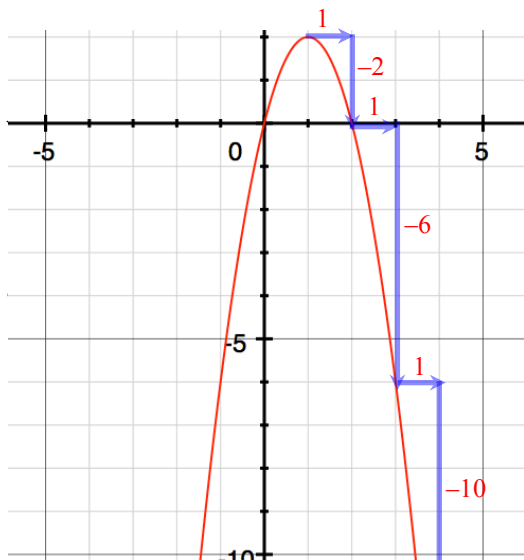
axis:



11. $y = -2(x-1)^2 + 2$

vertex: $(1, 2)$

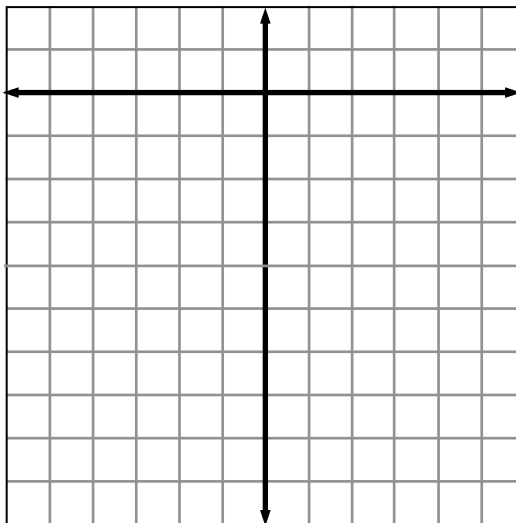
axis: $x = 1$



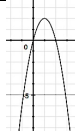
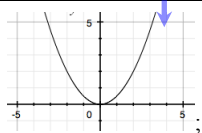
12. $y = -2(x+1)^2 + 1$

vertex:

axis:



Answers: 9. $(0, 0), x = 0$; 11. $(1, 2), x = 1$;

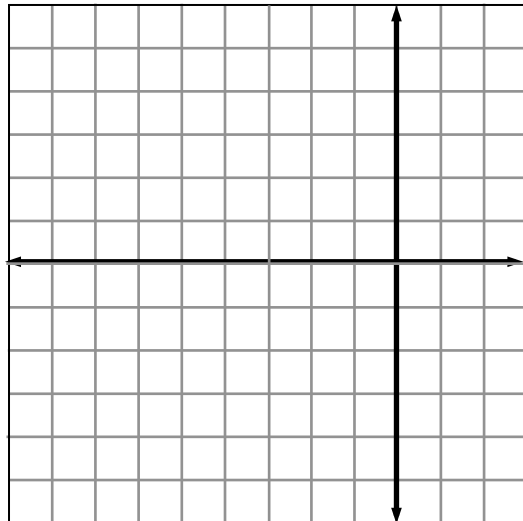
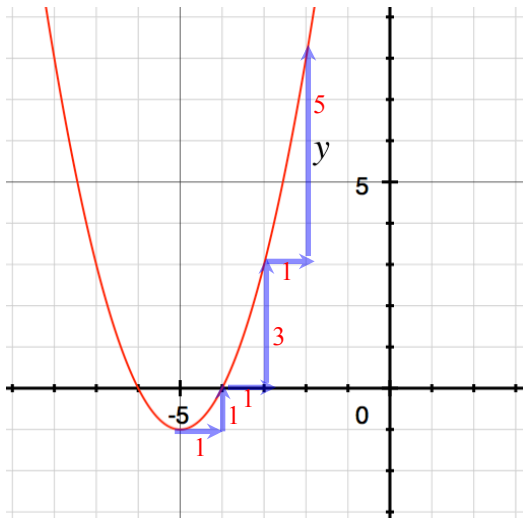


Write each equation in the form $y = a(x - h)^2 + k$ by completing the square. Then graph the parabola.

13. $y = x^2 + 10x + 24$
 $y = x^2 + 10x + 25 - 25 + 24$
 $y = (x + 5)^2 - 25 + 24$
 $y = (x + 5)^2 - 1$

Vertex: $(-5, -1)$

14. $y = x^2 + 8x + 10$



Answer: 13. Vertex: $(-5, -1)$

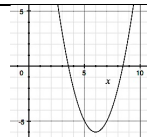
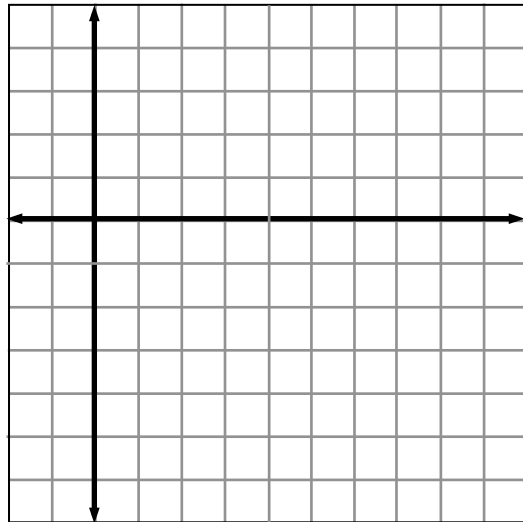
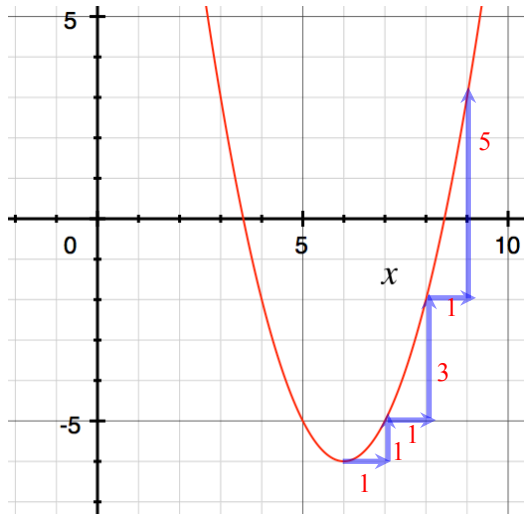


Change the equation to the form $y = a(x - h)^2 + k$ by completing the square. Then graph the parabola.

15. $y = x^2 - 12x + 30$
 $y = x^2 - 12x + 36 - 36 + 30$
 $y = (x - 6)^2 - 36 + 30$
 $y = (x - 6)^2 - 6$

Vertex: $(6, -6)$

16. $y = x^2 - 4x - 1$



Answer: 15. Vertex: $(6, -6)$,