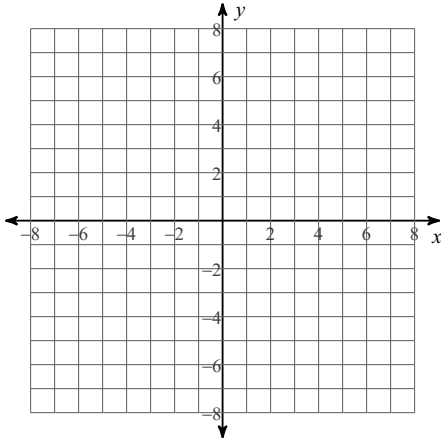


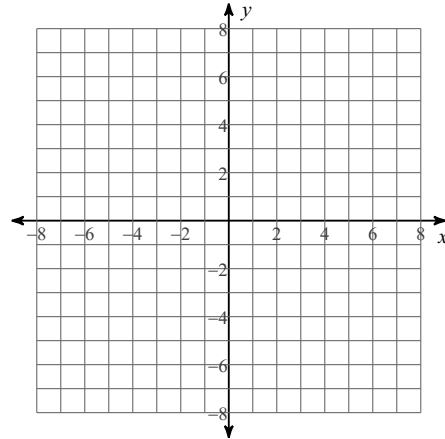
## Parabolas

Identify the vertex, axis of symmetry, direction of opening, and min/max value of each. Then sketch the graph.

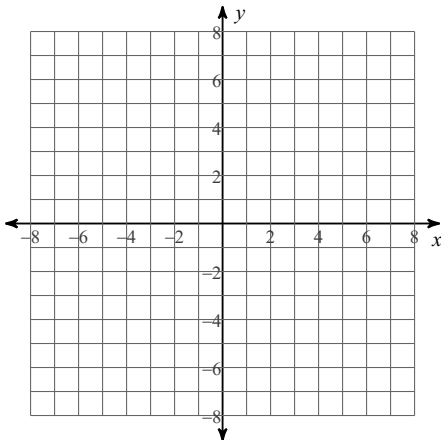
1)  $y = -2(x + 6)^2 - 6$



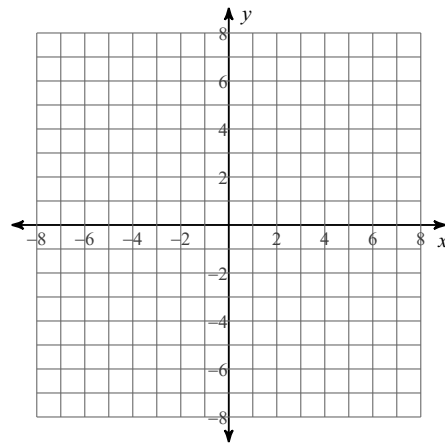
2)  $y = -(x + 4)^2 - 6$



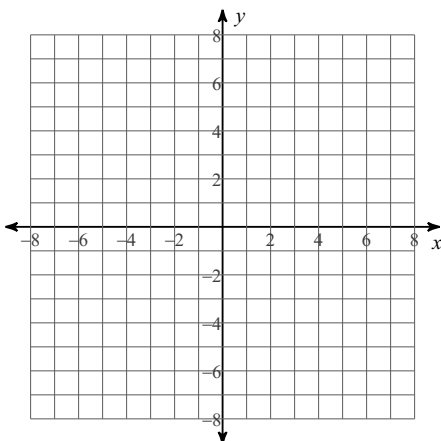
3)  $y = -3(x + 4)^2 - 4$



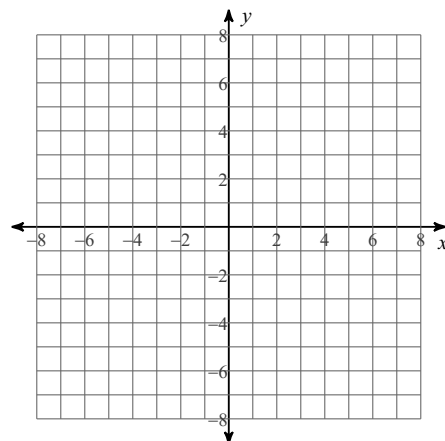
4)  $y = -\frac{1}{3}x^2 + 5$



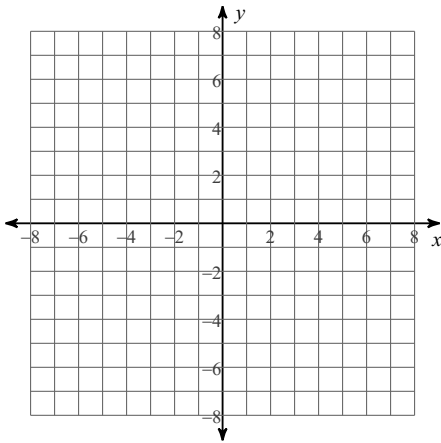
5)  $y = -(x - 1)^2 - 5$



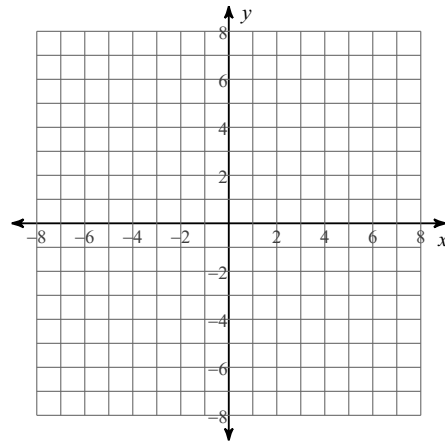
6)  $y = (x + 3)^2$



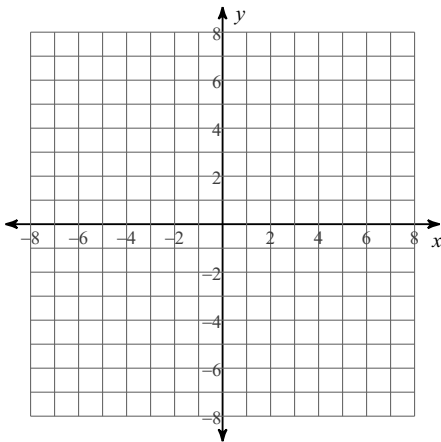
$$7) y = (x + 6)^2 - 6$$



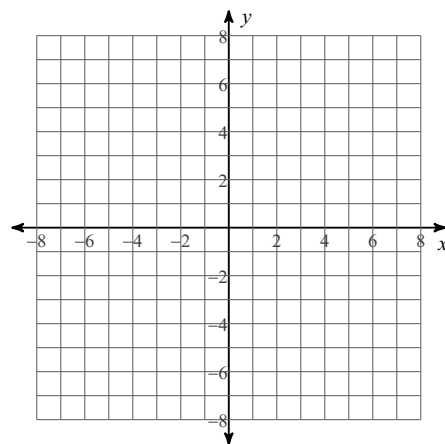
$$8) y = -(x - 6)^2 - 2$$



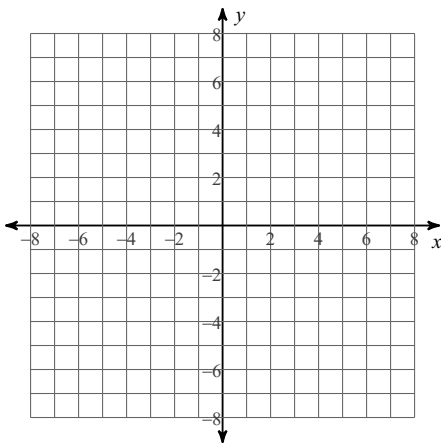
$$9) y = -2(x + 3)^2 - 3$$



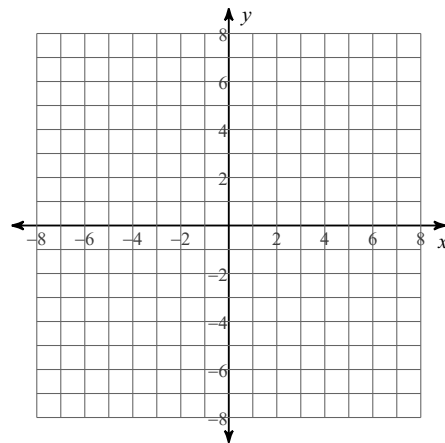
$$10) y = \frac{1}{2}(x - 3)^2 + 5$$



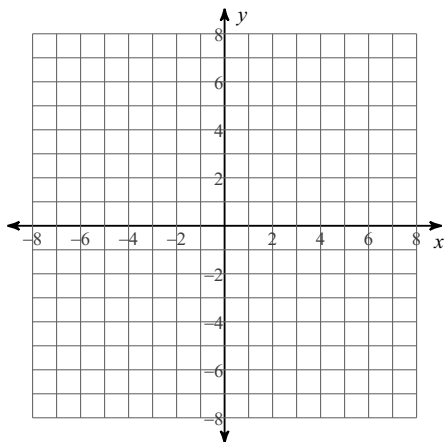
$$11) y = (x + 4)^2 - 4$$



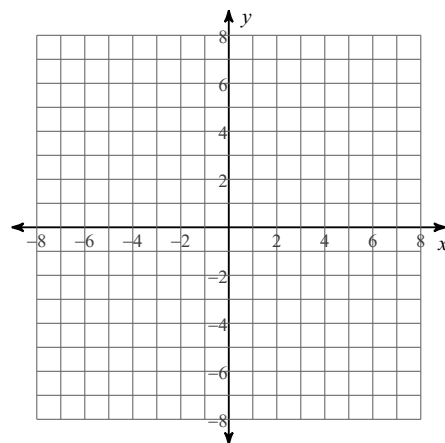
$$12) y = -(x - 6)^2 - 1$$



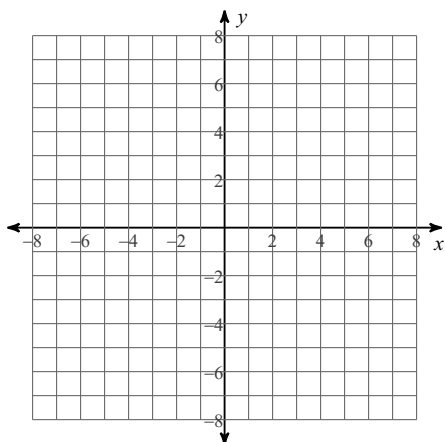
$$13) y = \frac{1}{3}(x - 3)^2 - 3$$



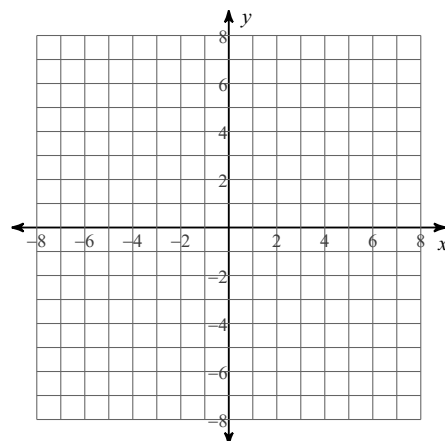
$$14) y = (x - 5)^2 + 4$$



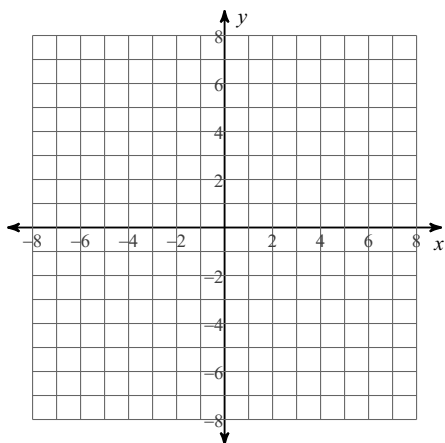
$$15) y = (x + 3)^2 + 4$$



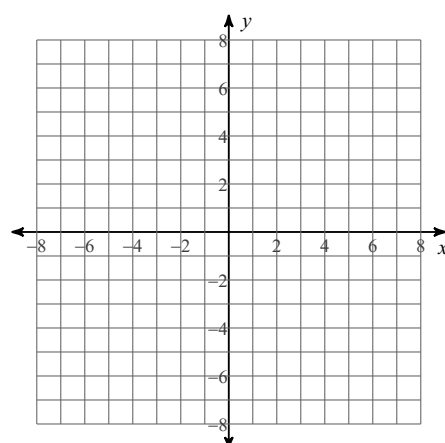
$$16) y = x^2 + 1$$



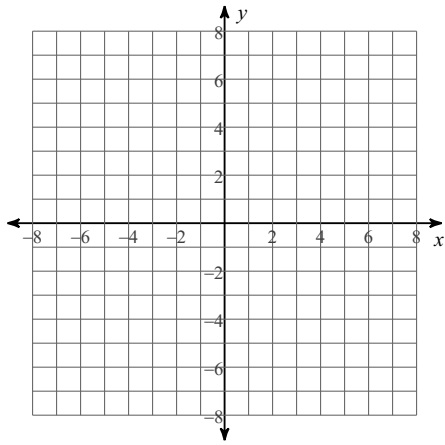
$$17) y = -(x + 5)^2 + 4$$



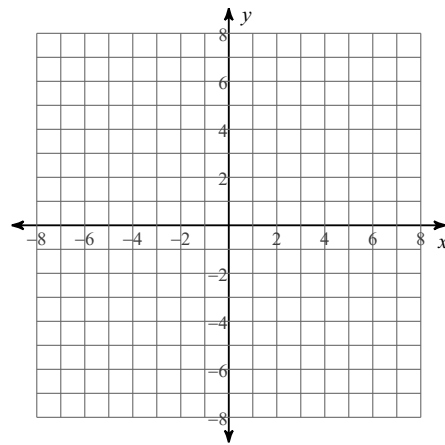
$$18) y = -\frac{1}{3}(x - 4)^2 + 3$$



19)  $y = -x^2 + 1$

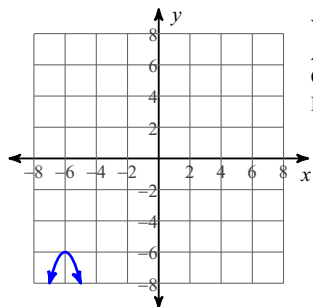


20)  $y = (x - 2)^2$



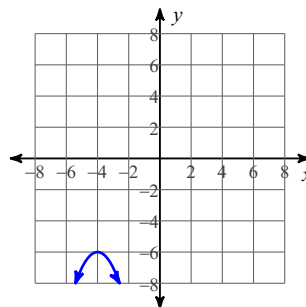
# Answers to Parabolas

1)



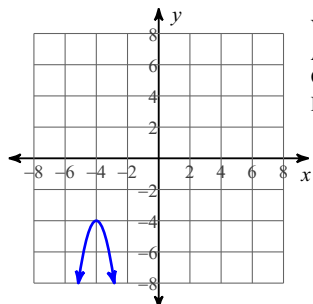
Vertex:  $(-6, -6)$   
 Axis of Sym.:  $x = -6$   
 Opens: Down  
 Max value =  $-6$

2)



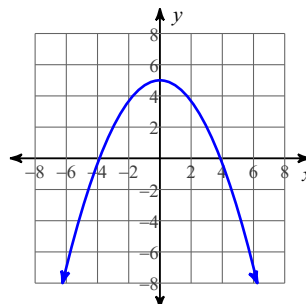
Vertex:  $(-4, -6)$   
 Axis of Sym.:  $x = -4$   
 Opens: Down  
 Max value =  $-6$

3)



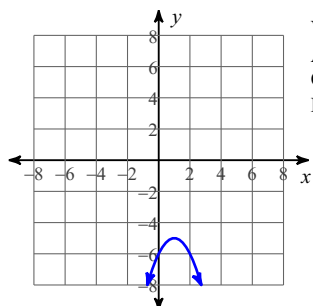
Vertex:  $(-4, -4)$   
 Axis of Sym.:  $x = -4$   
 Opens: Down  
 Max value =  $-4$

4)



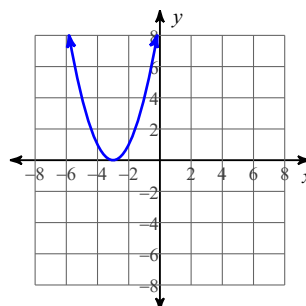
Vertex:  $(0, 5)$   
 Axis of Sym.:  $x = 0$   
 Opens: Down  
 Max value =  $5$

5)



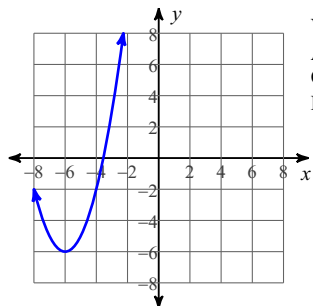
Vertex:  $(1, -5)$   
 Axis of Sym.:  $x = 1$   
 Opens: Down  
 Max value =  $-5$

6)



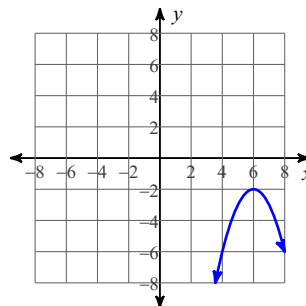
Vertex:  $(-3, 0)$   
 Axis of Sym.:  $x = -3$   
 Opens: Up  
 Min value =  $0$

7)



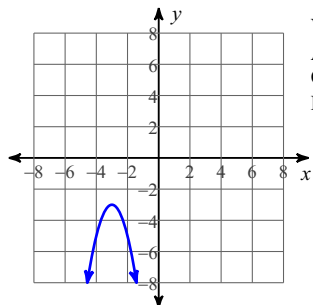
Vertex:  $(-6, -6)$   
 Axis of Sym.:  $x = -6$   
 Opens: Up  
 Min value =  $-6$

8)



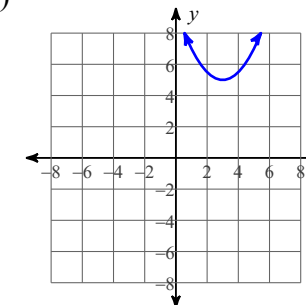
Vertex:  $(6, -2)$   
 Axis of Sym.:  $x = 6$   
 Opens: Down  
 Max value =  $-2$

9)



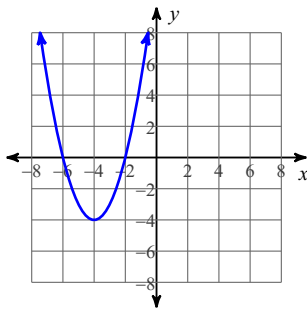
Vertex:  $(-3, -3)$   
 Axis of Sym.:  $x = -3$   
 Opens: Down  
 Max value =  $-3$

10)



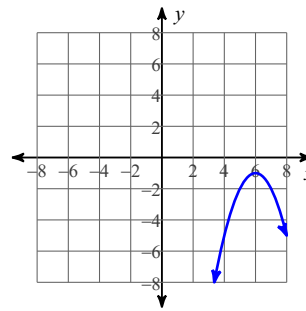
Vertex:  $(3, 5)$   
 Axis of Sym.:  $x = 3$   
 Opens: Up  
 Min value =  $5$

11)



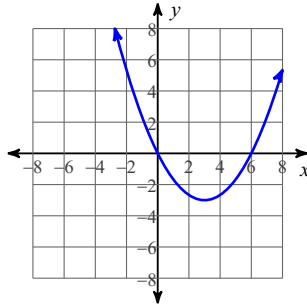
Vertex:  $(-4, -4)$   
 Axis of Sym.:  $x = -4$   
 Opens: Up  
 Min value =  $-4$

12)



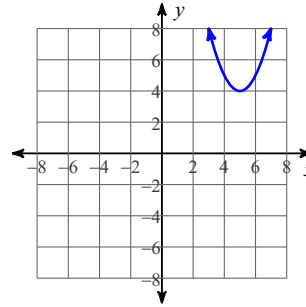
Vertex:  $(6, -1)$   
 Axis of Sym.:  $x = 6$   
 Opens: Down  
 Max value =  $-1$

13)



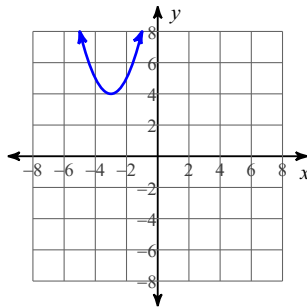
Vertex:  $(3, -3)$   
 Axis of Sym.:  $x = 3$   
 Opens: Up  
 Min value =  $-3$

14)



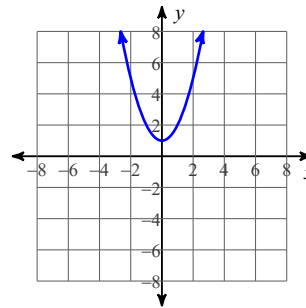
Vertex:  $(5, 4)$   
 Axis of Sym.:  $x = 5$   
 Opens: Up  
 Min value =  $4$

15)



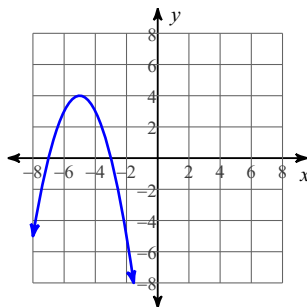
Vertex:  $(-3, 4)$   
 Axis of Sym.:  $x = -3$   
 Opens: Up  
 Min value =  $4$

16)



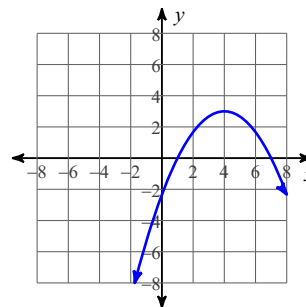
Vertex:  $(0, 1)$   
 Axis of Sym.:  $x = 0$   
 Opens: Up  
 Min value =  $1$

17)



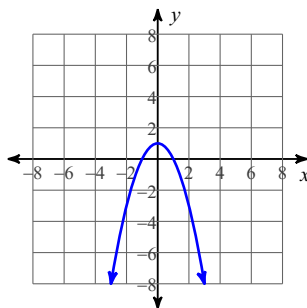
Vertex:  $(-5, 4)$   
 Axis of Sym.:  $x = -5$   
 Opens: Down  
 Max value =  $4$

18)



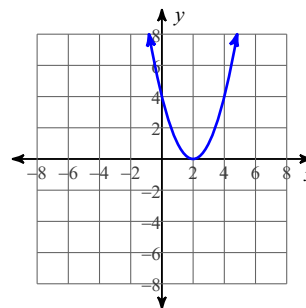
Vertex:  $(4, 3)$   
 Axis of Sym.:  $x = 4$   
 Opens: Down  
 Max value =  $3$

19)



Vertex:  $(0, 1)$   
 Axis of Sym.:  $x = 0$   
 Opens: Down  
 Max value =  $1$

20)



Vertex:  $(2, 0)$   
 Axis of Sym.:  $x = 2$   
 Opens: Up  
 Min value =  $0$