

## 9.3 Quadratic Inequalities in Two Variable

A quadratic inequality in two variable may be written in one of the following four forms:

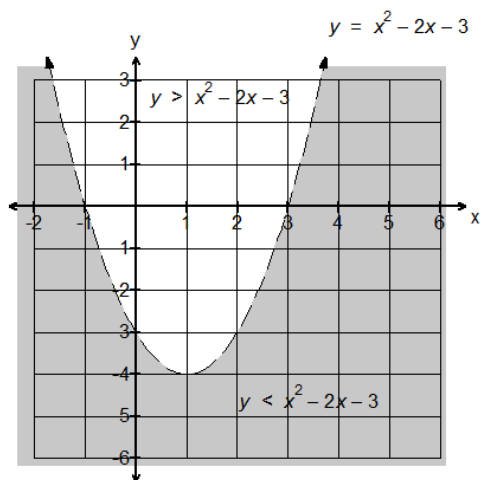
$$y < ax^2 + bx + c$$

$$y \leq ax^2 + bx + c$$

$$y > ax^2 + bx + c$$

$$y \geq ax^2 + bx + c \quad \text{where } a, b, \text{ and } c, \text{ are real numbers and}$$

A quadratic inequality in two variables represents a region of the Cartesian plane with a parabola as the boundary. The boundary may be dotted or solid as with linear inequalities.



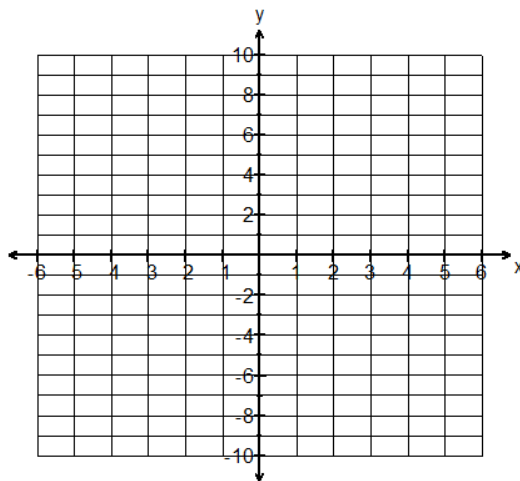
As with linear inequalities,  $>$  generally implies shading above the curve, and  $<$  implies shading below.

(You can always select a point in a region and check see if it satisfies the inequality. If it does, this is the region to be shaded.)

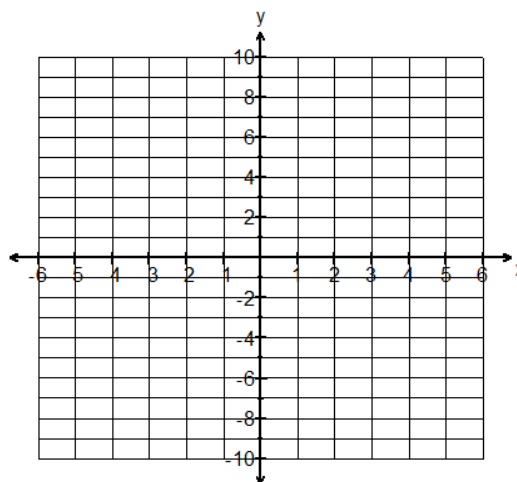
A dotted boundary - points on the curve are not part of the solution set

A solid boundary - points on the boundary are part of the solution set.

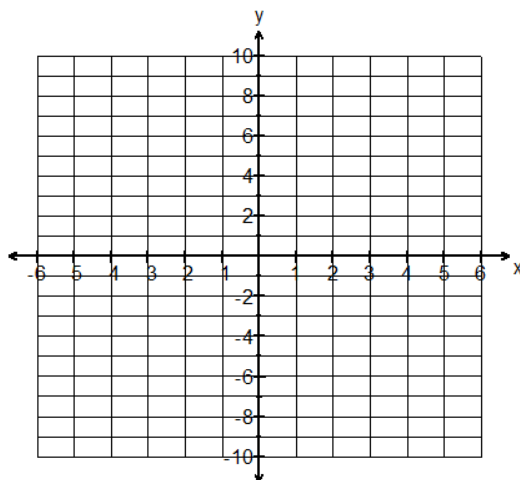
Ex. 1 Graph  $y < -2(x - 3)^2 + 1$  and determine if  $(2, -4)$  is a solution.



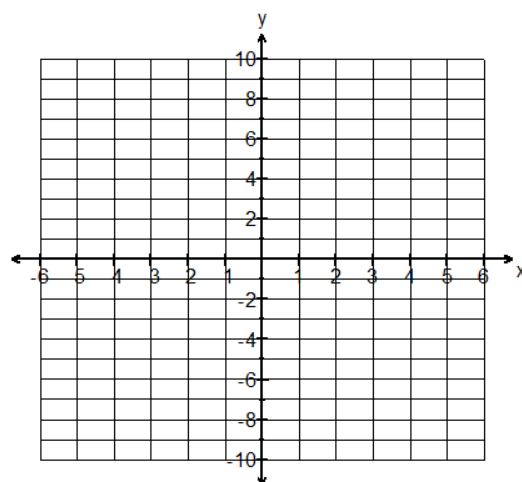
Ex. 2 Graph  $y > (x - 4)^2 - 2$  and determine if the point  $(2, 1)$  is a solution to the inequality.



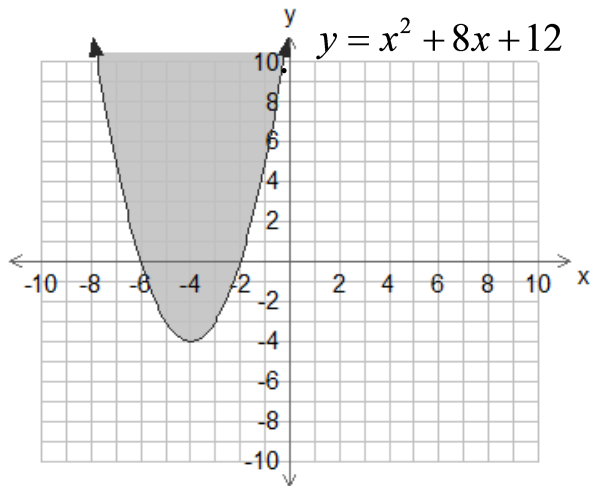
Ex. 3 Graph  $y \geq x^2 - 4x - 5$



Ex 4 Graph  $y \leq -x^2 + 2x + 4$



Ex 5. Write an inequality to describe each graph. The given equation for the boundary is part of the solution.



Key Ideas p. 496

Assign: p. 496 - 500 1(a), 3(abc), 4(ab), 5(ac), 6(ab), 8(b)