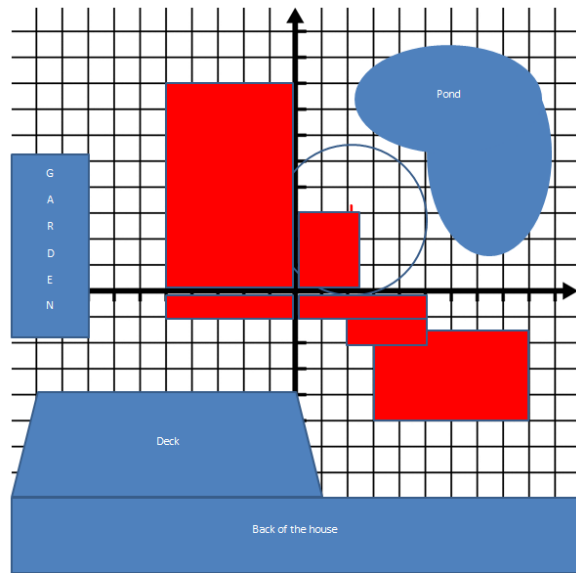


**Solution Set Note:**

Please understand that this assignment is geared to help students practice with writing the equation of a circle using the radius and center point. The focus of checking the assignment should be on correct use of the +, - signs for each quadrant location as well as the correct math when squaring the radius. Possible solutions are given for each question, however a range of solutions does exist as shown.

1) Determine one possible location to place the stake (center of the circle) in each of the quadrants of the yard so that Fido can run in the greatest circle possible with a leash 3 feet long. Write below to represent your circles:

There are a range of solutions but the values for the position of x and y are approximately bounded as shown below:



Boundary of values:

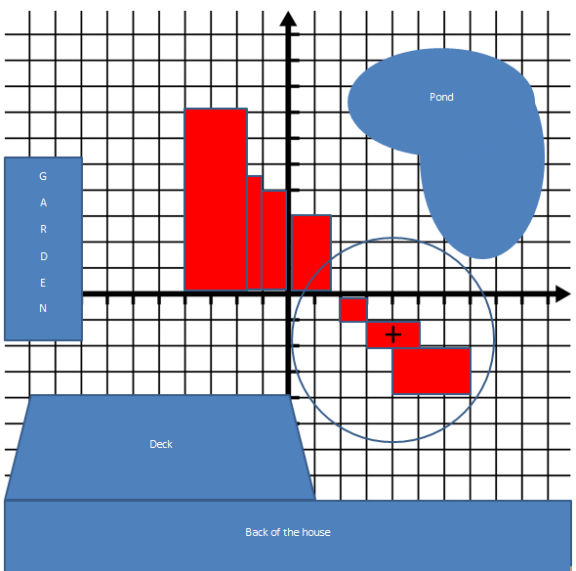
Quadrant I:  $0 < x < 2.5, 0 < y < 3$   
 Quadrant II:  $-5 < x < 0, 0 < y < 8$   
 Quadrant III:  $-5 < x < 0, -1 < y < 0$   
 Quadrant IV: see diagram

So possible examples could be:

$(x - 2)^2 + (y - 1)^2 = 9$   
 $(x + 3)^2 + (y - 4)^2 = 9$   
 $(x + 5)^2 + (y + 1)^2 = 9$   
 $(x - 3)^2 + (y + 4)^2 = 9$

2) Where could you place the stake so that Fido could run with a 4 feet long leash in three of the quadrants? Write equations below to represent your circles:

As you can see the amount of places has greatly diminished with a longer leash, in fact the stake could not be placed anywhere in quadrant 3 given the parameters.



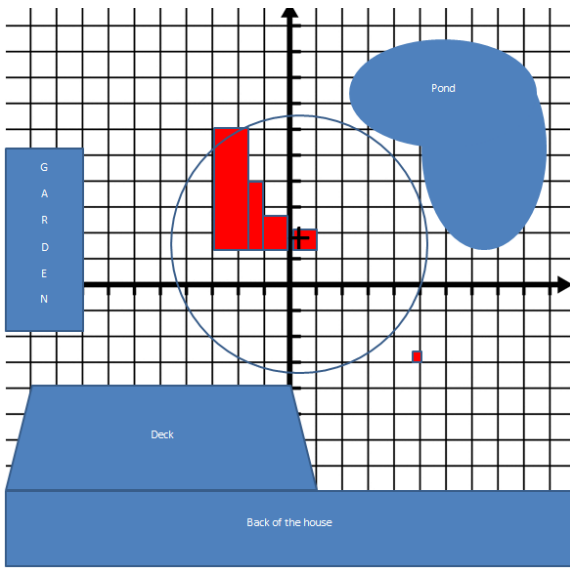
Boundary of values:

Quadrant I:  $0 < x < 1.5, 0 < y < 3$   
 Quadrant II:  $-4 < x < 0, 0 < y < 7$   
 Quadrant III: not possible  
 Quadrant IV: see diagram

So possible examples could be:

$(x - 1)^2 + (y - 3)^2 = 16$   
 $(x + 2)^2 + (y - 4)^2 = 16$   
 no solutions  
 $(x - 4)^2 + (y + 2)^2 = 16$

3) Where could you place the stake if the leash was 5 feet long? Write the equations to represent your circles below



Boundary of values:	So possible examples could be:
Quadrant I: $0 < x < 1, 1.5 < y < 2$	$(x - 1)^2 + (y - 2)^2 = 25$
Quadrant II: $-3 < x < 0, 1.5 < y < 6$	$(x + 2.5)^2 + (y - 5)^2 = 25$
Quadrant III: not possible	no solutions
Quadrant IV: (5,3)	$(x - 5)^2 + (y + 3)^2 = 25$

4) Could you find a location for a leash 6 feet long? Why or why not?

***At this point there is pretty much just one location for the stake to go, and it is about (-2, 2.5) or even (-2, 3.5) so the equation should look like  $(x + 2)^2 + (y - 3)^2 = 36$***

