***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:***



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| --- | --- |
| Boundary of values:Quadrant I: 0 < x < 2.5, 0 < y < 3Quadrant II:-5 < x < 0, 0 < y < 8Quadrant III: -5 < x < 0, -1 < y < 0Quadrant 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 < 3Quadrant II:-4 < x < 0, 0 < y < 7Quadrant III: not possibleQuadrant IV: see diagram | So possible examples could be:(x – 1)2 + (y – 3)2 = 16(x + 2)2 + (y – 4)2 = 16no 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:Quadrant I: 0 < x < 1, 1.5 < y < 2Quadrant II:-3 < x < 0, 1.5 < y < 6Quadrant III: not possibleQuadrant IV: (5,3)  | So possible examples could be:(x – 1)2 + (y – 2)2 = 25(x + 2.5)2 + (y – 5)2 = 25no solutions(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***

