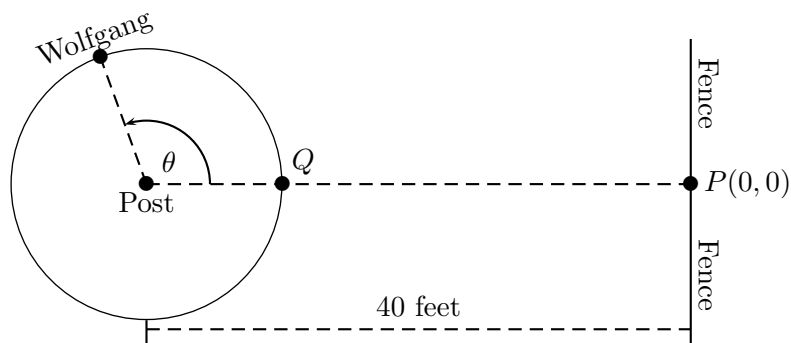


10. [4 points] Suppose that the number of acorns in Squishy squirrel’s nest is proportional to the cube of the number of squirrels currently living there. If there are 113 acorns in his nest when there are two squirrels living there, how many acorns will there be in Squishy’s nest when there are four squirrels living there? *Remember to show your work carefully.*

Answer: _____

11. [7 points] Wolfgang the wolf is on a 10-foot long leash that is tied to a post that is 40 feet west of a fence.



Because he dislikes being on his leash, he stays 10 feet away from the post at all times.

- a. [4 points] Suppose we think of the origin at the point P as shown in the diagram and that the unit of measurement is feet so that the coordinates of the post are $(-40, 0)$. Find Wolfgang’s coordinates when he is at the angle θ shown in the diagram. (*Your answer should be in terms of θ .*)

Answer: Wolfgang’s coordinates are (_____ , _____).

- b. [3 points] Wolfgang starts walking counterclockwise from the point Q . The angle θ through which Wolfgang has walked is a function of the amount of time he has been walking. Let $\theta = z(t)$ be the angle (in radians) through which Wolfgang has walked after he has been walking for t minutes. Let $A(t)$ be the distance Wolfgang has traveled along the circle in t minutes. Find a function $f(t)$ such that $A(t) = f(z(t))$.

Answer: $f(t) =$ _____