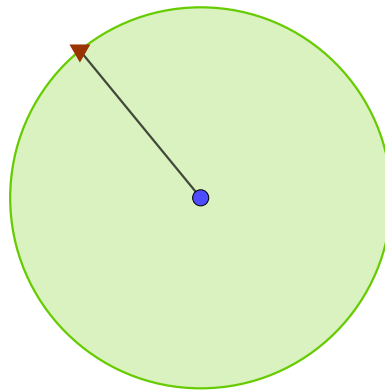


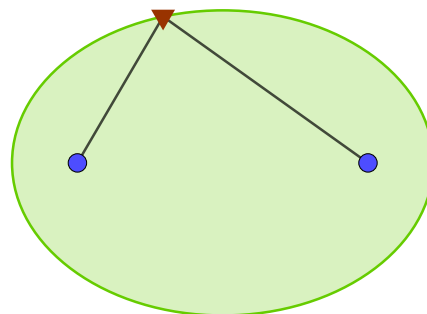
A Grazing Goat

I have a goat, and I want to take it to a field to graze, but since I don't want it to escape, I tie it to a pole with a rope. What's the shape of the area of grass that the goat can reach?

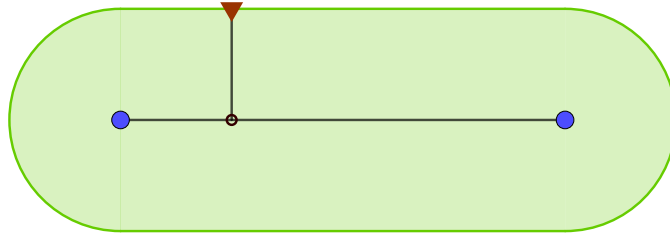
It will be a circle: (in the picture the goat is shown with the brown triangle, and the area of grass it can reach is in green)



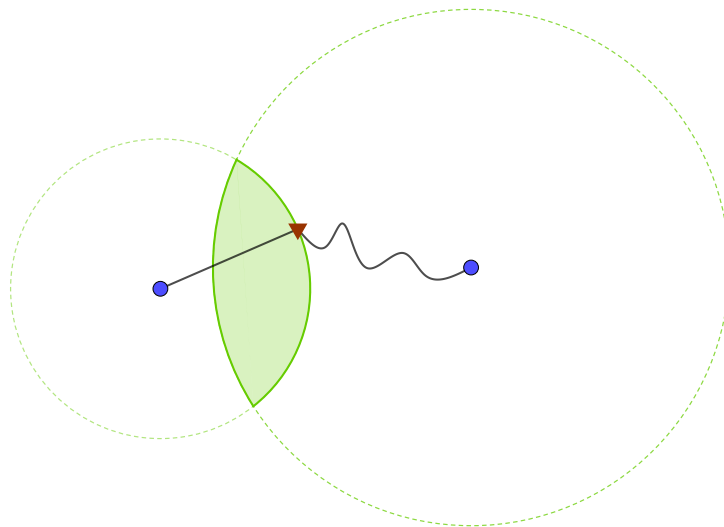
Now what if instead I have two poles, and I tie a rope between them so that it's loose, and the goat is attached to the rope by a ring, so that it can go anywhere along the rope? The shape we get looks like a stretched out circle, and it's called an **ellipse**.



Now instead the rope is completely taut between the two poles, and the goat is attached by another rope to a ring that slides along the first rope. What shape can the goat reach now? It's a rectangle with two semi-circles at the ends:



This time, I tie the goat to two poles with two separate ropes (they can be of different lengths). Then the goat can only reach the grass in places that it could have reached if either of the two ropes were there. So it's the area that's part of both circles - we call it the **intersection** of the two circles.



Now can you find a way to tie the goat so that the area that it can reach is a rectangle? (Hint: use an intersection of two areas!)