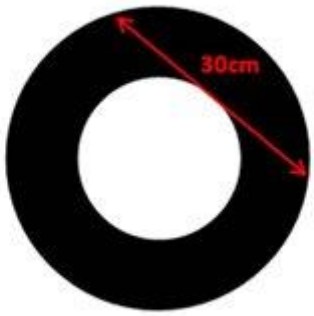
Challenge 16: Witch Hat

I'm good with cardboard: for Halloween, I'm making myself a black witch hat.

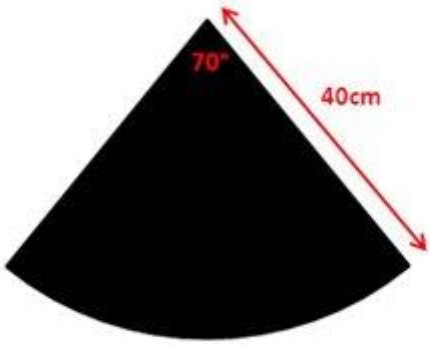
First I'm going to make the base by cutting one circle out of another, and then painting this shape black:



Once I'm done, I measure the length of the marked red arrow, and find it to be 30cm. To my surprise, this is enough information to work out the area of the shape above. What is it?

Next I'm going to make the conical bit to stick onto the base.

I do this by cutting out a sector from a circle as shown below, and then rolling this up and sticking the two straight edges together.



I measure the angle at the top of the sector to be 70°. I measure the radius of the circle from which the sector is cut to be 40cm.

Using this information, predict how pointy my hat will be once I roll up the sector.

In other words, what will the angle at the point be equal to?