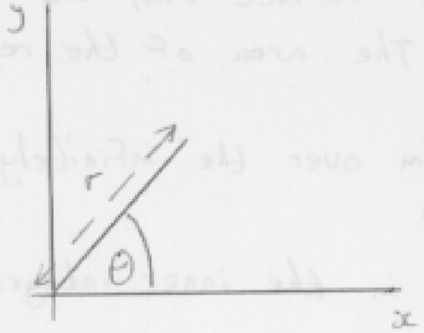
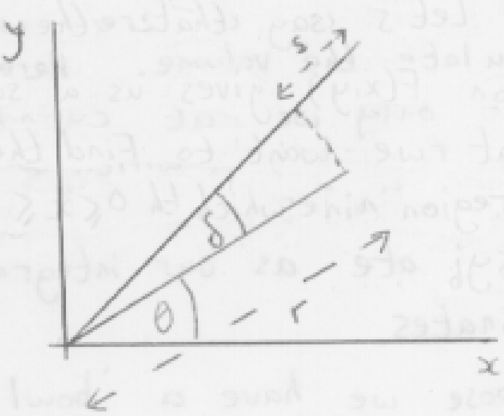
We can take the same approach to polar coordinates and look at squares instead of rectangular strips.

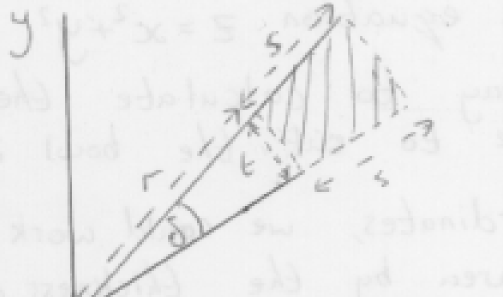
In polar coordinates, in 2 dimensions, the two coordinates are distance from the origin, r, and angle to the x-axis, θ,



If we vary the coordinates, by small amounts, $\theta \to \theta + \delta$, $r \to r + s$



We can get a shape, which, although not square, might be of use to us in building an integral



To work out the area of the shaded region, we need to calculate the distance, t.

We know that the circumference of a circle is $2\pi \times$ radius. In this case, 2π is the angle through which we would travel, if we went fully around the circle.

So circumference, $c = 2\pi r$. Similarly, the length of an arc, l, related the angle it subtends, θ, by $l = r\theta$. In our case, $t = r\delta$.

We can approximate the area of the shaded region by

Area $= ts = r\delta s$.

As δ gets smaller and smaller the two sides get closer and