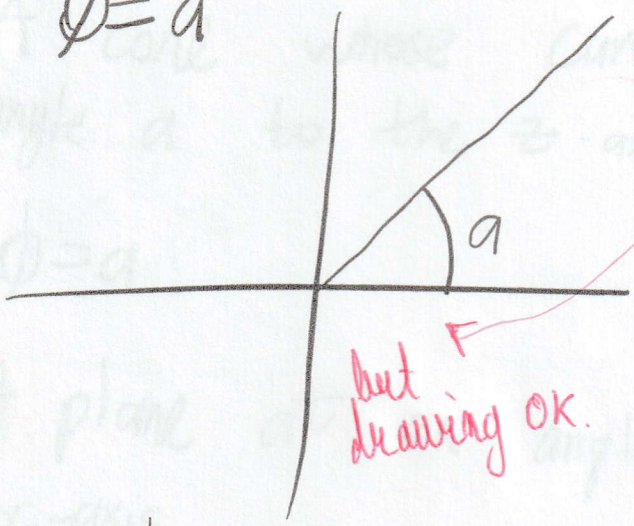
c4. (i)

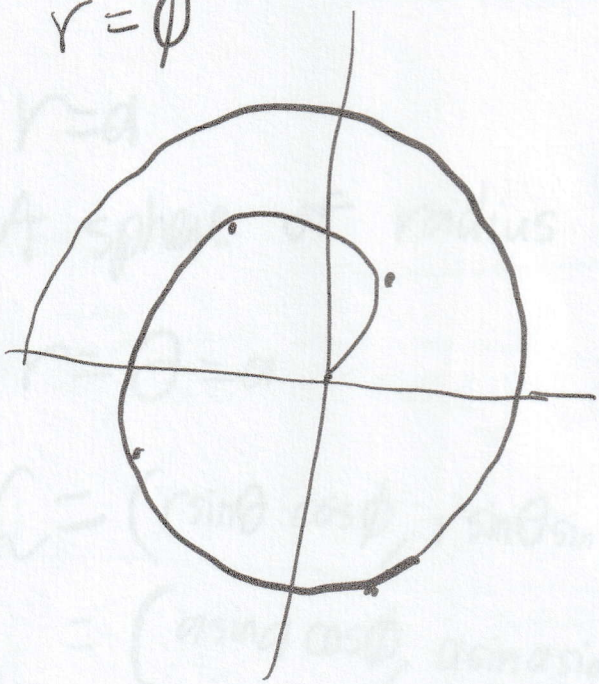
(a) $\phi = a$



A $\frac{1}{2}$ line with gradient $\tan(a)$ (but only in one quadrant)

but drawing ok.

(b) $r = \phi$

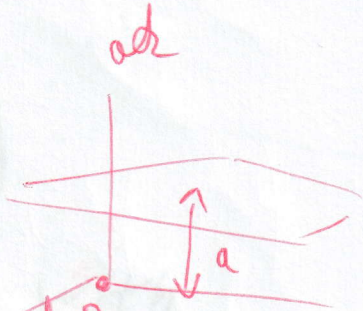


$\underset{\sim}{r} = (r\cos\theta, r\sin\theta)$

$= (r\cos r, r\sin r)$

A spiral

(ii) (a) $z = a$



offset on z by a

The plane whose z coordinate is a

(b) $r = a$

direction?

An infinite cylinder with base radius a.

(c) $r = a$ and $z = \phi$

draw it

A spiral in 3D, which is always at a distance of a from the z-axis