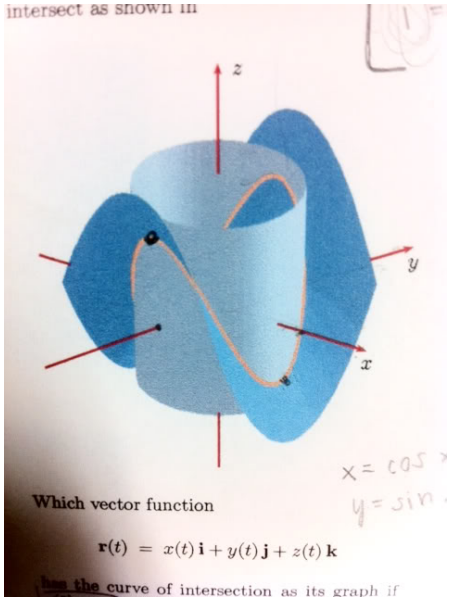
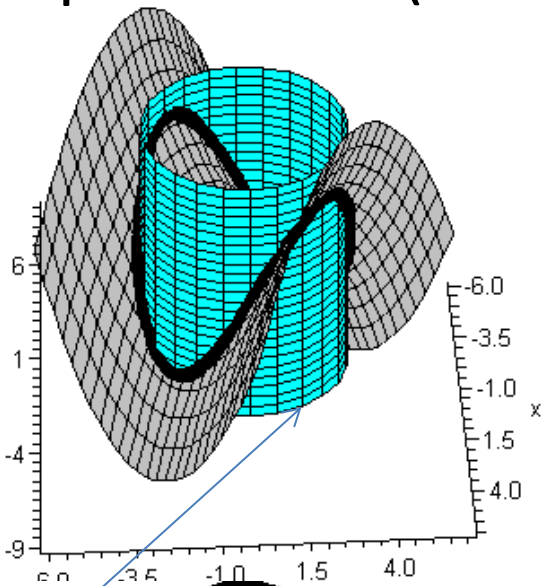
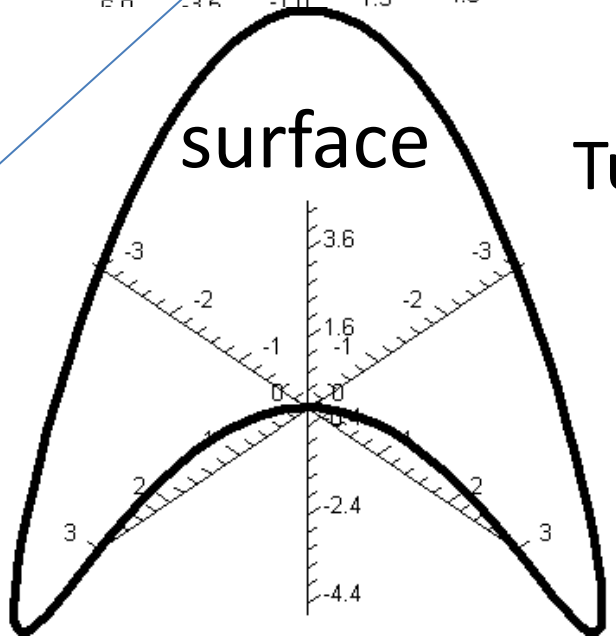
Intersection of hyperbolic paraboloid (saddle) and cylinder





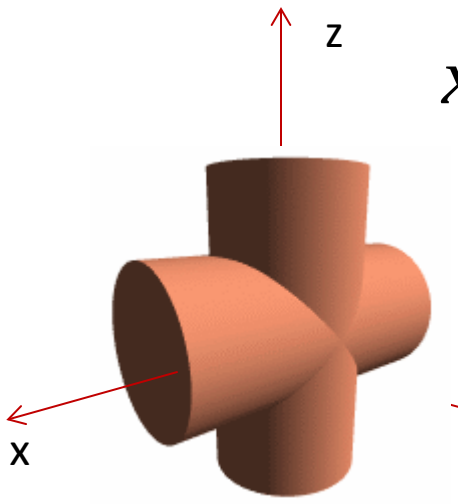
Surface defined on the base of cylinder

surface



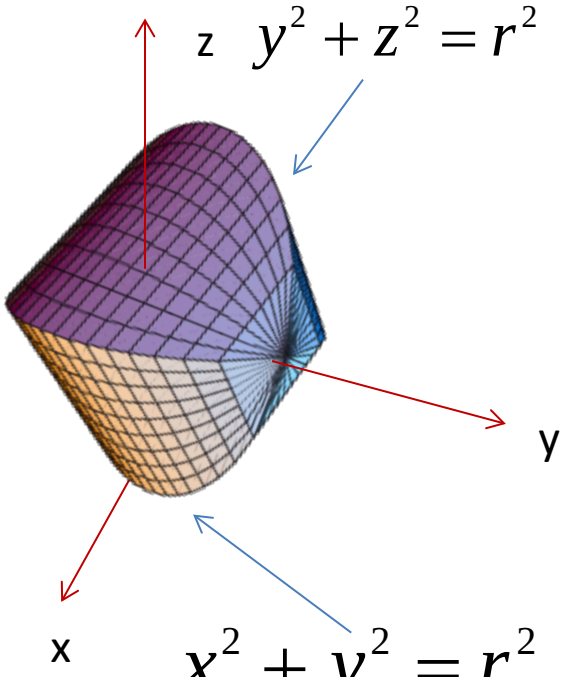
Tutorial 8 Q6

Intersection of two cylinders



$$x^2 + y^2 = r^2$$

$$y^2 + z^2 = r^2$$

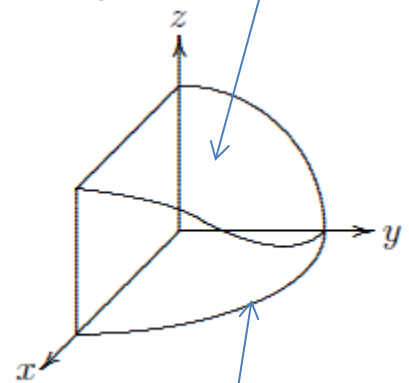


$$y^2 + z^2 = r^2$$

$$x^2 + y^2 = r^2$$

Volume of the solid

= 8 times of the volume of this solid



$$y^2 + z^2 = r^2$$

$$x^2 + y^2 = r^2$$

Tutorial 8 Q2

http://www.math.tamu.edu/~Tom.Kiffe/calc3/newcylinder/2cylinder.html

projection to xy plane of intersection of two cylinders is

$x^2 + y^2 = r^2$

equation of the curve of intersection is

$z = \pm\sqrt{r^2 - y^2}$, where y is on the project (circle)

$x^2 + y^2 = r^2$

OR $z(t) = (\pm\sqrt{r^2 - t^2})\mathrm{i} + t\mathrm{j} + (\pm\sqrt{r^2 - t^2})\mathrm{k}$

equation of the surface above the region

$x^2 + y^2 \le r^2$ is given by

$z = f(x, y) = \sqrt{r^2 - y^2}$