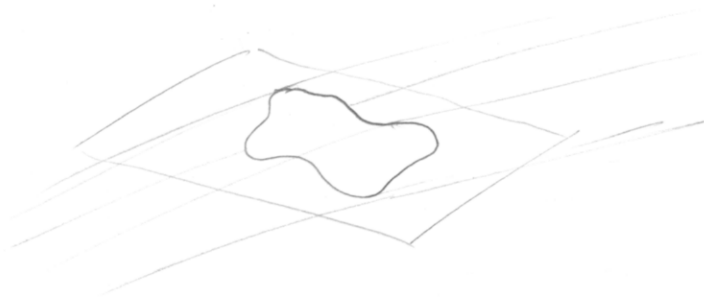


## § 10.6 CYLINDERS & QUADRIC SURFACES

Def: A CYLINDER IS A SURFACE THAT CONSISTS OF ALL LINES (CALLED RULINGS)

|| TO A GIVEN LINE & PASSING THROUGH A GIVEN PLANE CURVE.



e.g.  $x^2 + y^2 = 1$  ,  $x^2 + z^2 = 1$  ,  $y^2 + z^2 = 1$

$z = x^2 - 2x + 1$  ,  $z = \cos(y)$  ,  $y = f(x)$

EQ MISSING  $x/y/z$  DESCRIBES CYLINDER WITH RULING || TO  $x/y/z$ -AXIS.

### QUADRIC SURFACES

2<sup>nd</sup> DEGREE EQ IN  $x, y, z$ .

$$Ax^2 + By^2 + Cz^2 + Dxy + Eyz + Fxz + Gx + Hy + Iz + J = 0$$

↓  
TRANSLATIONS, ROTATIONS

$$Ax^2 + By^2 + Cz^2 + D = 0 \quad \text{OR} \quad Ax^2 + By^2 + Cz = 0$$

SKETCH USING CROSS SECTION

$$9x^2 - y^2 + z^2 = 0$$

$$25x^2 + 4y^2 + z^2 = 100$$

$$4x^2 + 9y^2 + z = 0$$

$$z = y^2 - x^2$$