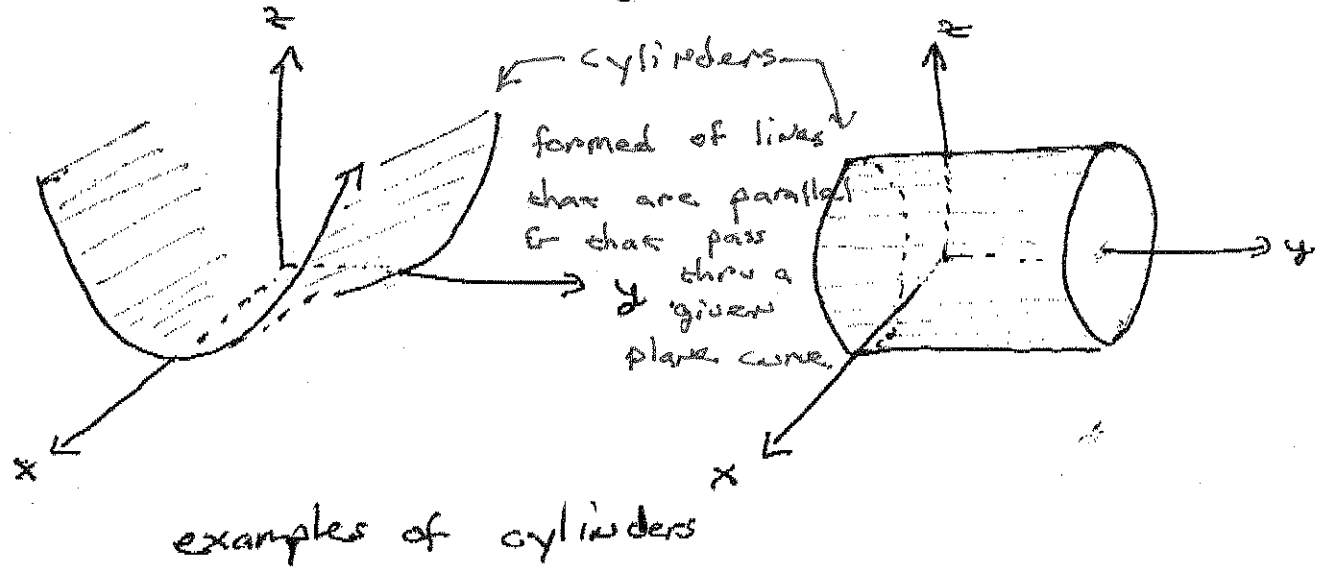


12.6: Quadric Surfaces

Ex1: Sketch a) $z = y^2$ and $x^2 + z^2 = 1$



Quadric Surfaces

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

or if centered @ the origin.

① $Ax^2 + By^2 + Cz^2 + J = 0$

② $Ax^2 + By^2 + Iz = 0$

trace: The curve of intersection where a surface meets a plane parallel to a coordinate plane.

* Find Traces ... ID the surface... and sketch it.

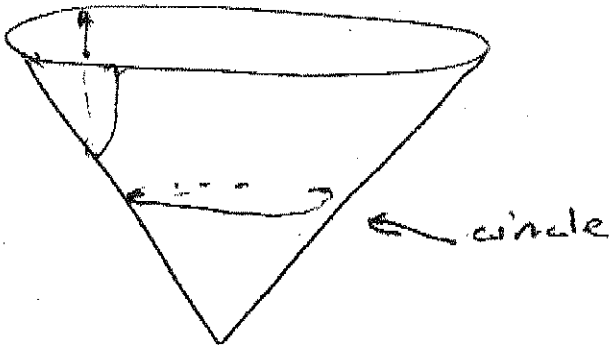
→ $x = y^2 + z^2$
 → $z = x^2 - y^2$
 → $9x^2 - y^2 - z^2 = 9$

* Reduce to a standard form, classify, and sketch.

$x^2 + 4y^2 + z^2 - 2x = 0$
 $x^2 + 4y^2 = 100$
 $x^2 - y^2 + 4y + z = 4$

12.6
2/4

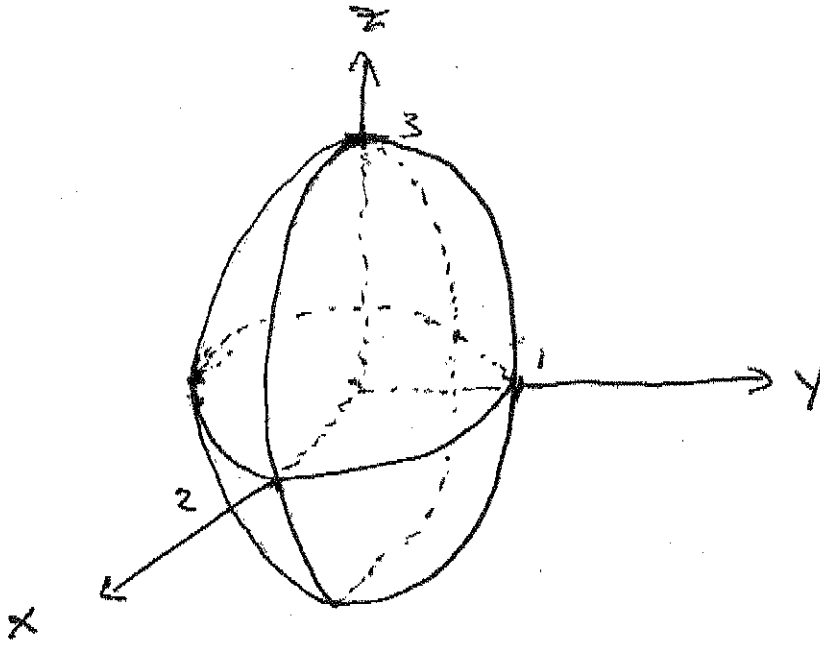
Conic sections.



hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1.$

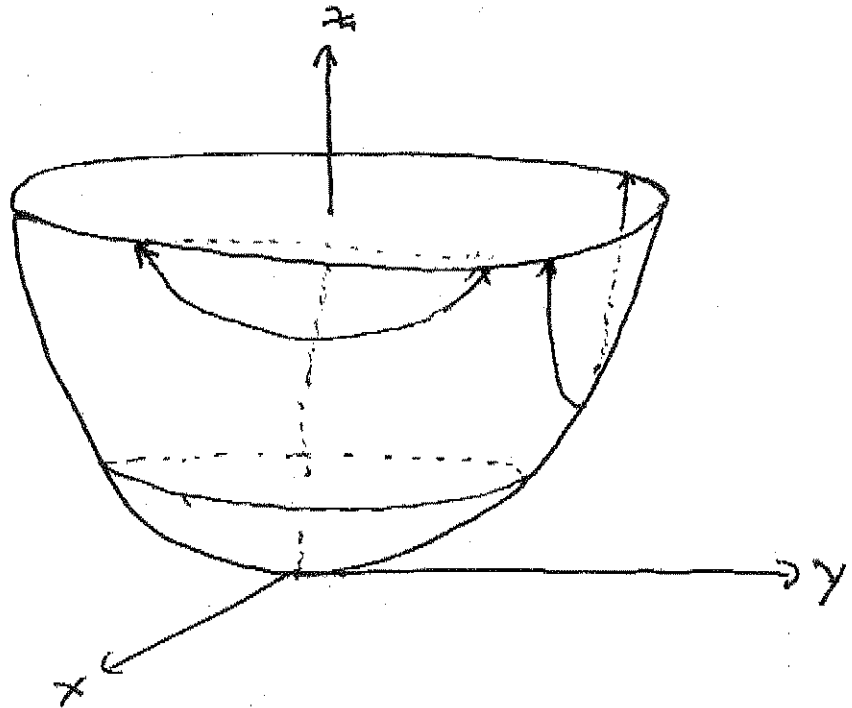
12,6
3/4

Ex 2: Sketch
$$\frac{x^2}{4} + y^2 + \frac{z^2}{9} = 1$$



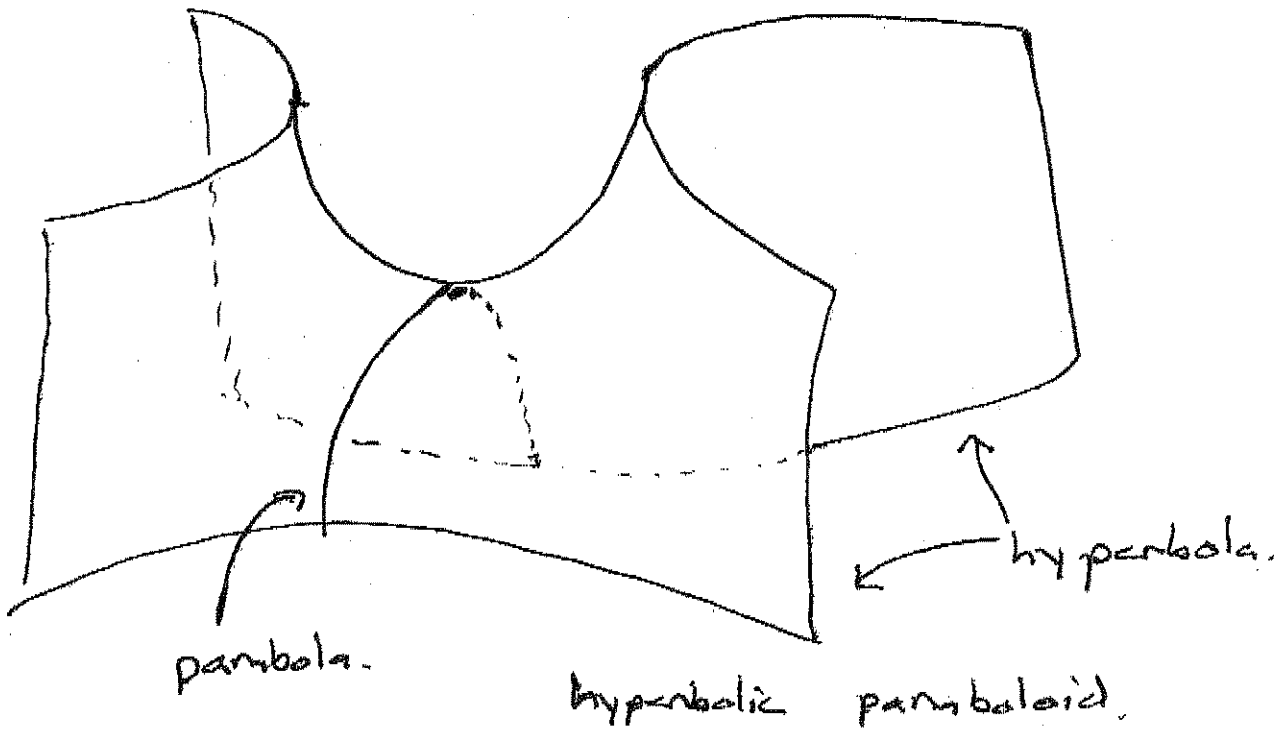
Ex 3: Sketch

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



12.6
4/4

Ex 4: sketch $z = y^2 - x^2$



Ex 5: sketch $\frac{x^2}{4} + y^2 - \frac{z^2}{4} = 1$ hyperboloid
of 1 sheet

Ex 6: sketch $-x^2 + \frac{y^2}{4} - \frac{z^2}{9} = 1$ hyperboloid
of 2 sheets

GROUP WORK 1, SECTION 12.6

The Matching Game

Match each function with its graph. Give reasons for your choices.

1. $x^2 + y^2 + \frac{1}{4}z^2 = 1$

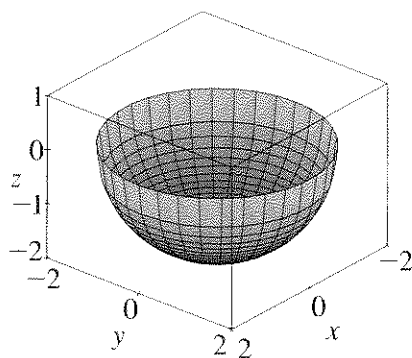
2. $z = -\sqrt{4 - x^2 - y^2}$

3. $y^2 + \frac{1}{4}z^2 = 1$

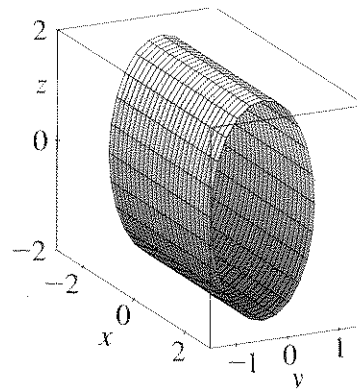
4. $\frac{1}{9}z^2 - \frac{1}{4}y^2 = 1$

5. $\frac{1}{4}x^2 - y^2 - z^2 = 1$

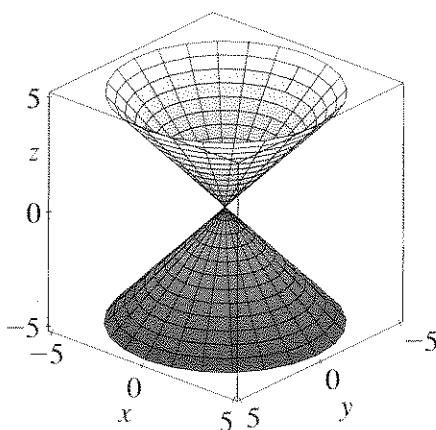
6. $|z| = \sqrt{x^2 + y^2}$



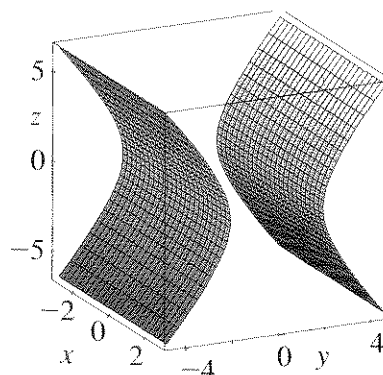
I



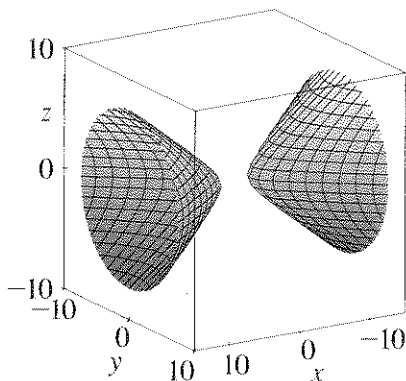
II



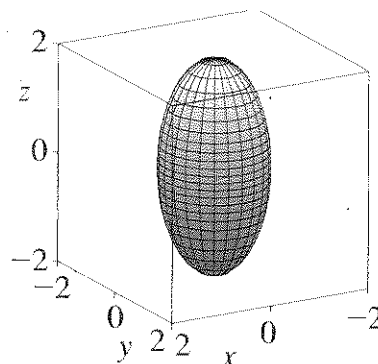
III



IV



V



VI