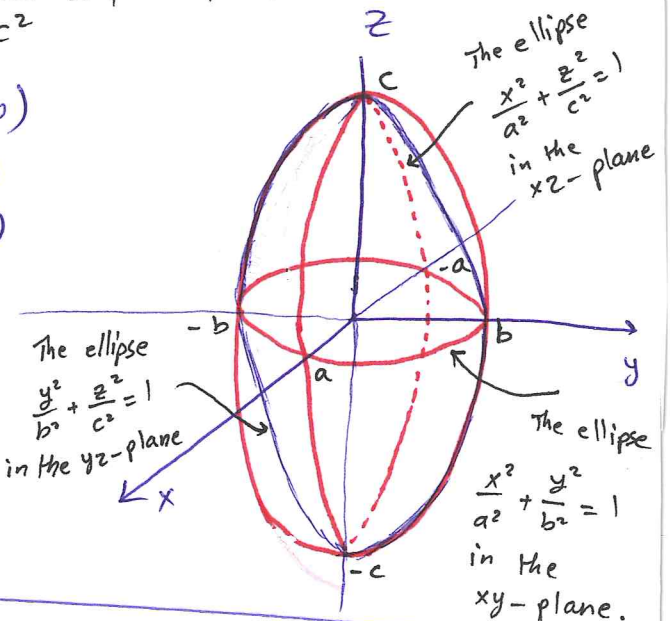
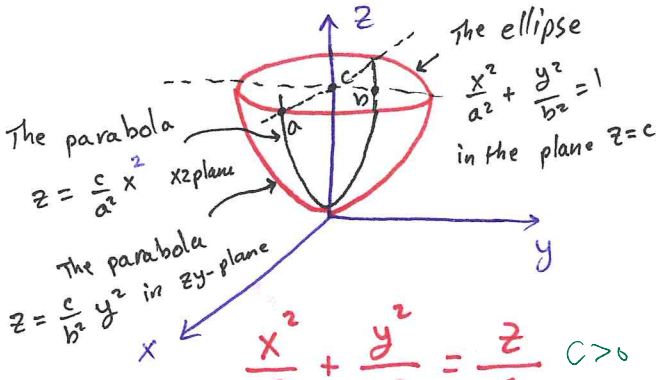
1 Ellipsoid : $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$, $a,b,c \in \mathbb{R}$

- Axes coordinates : $(\pm a, 0, 0)$, $(0, \pm b, 0)$, $(0, 0, \pm c)$
- If $a=b=c$, Then the ellipsoid becomes sphere.

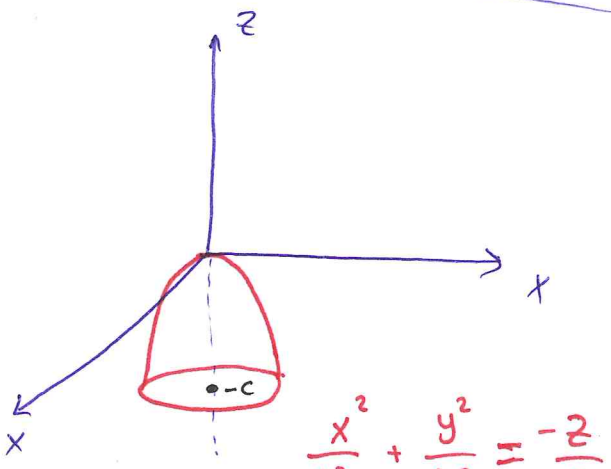


2 Paraboloid : $c>0$

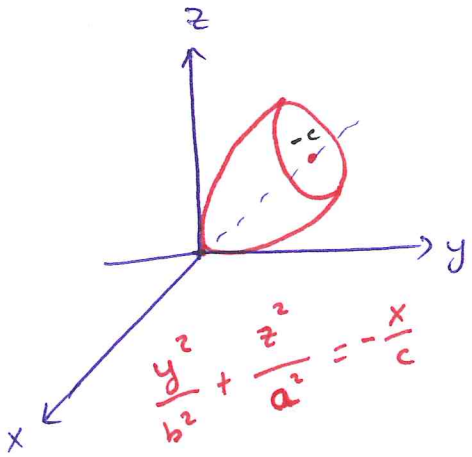


$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{z}{c} \quad c>0$$

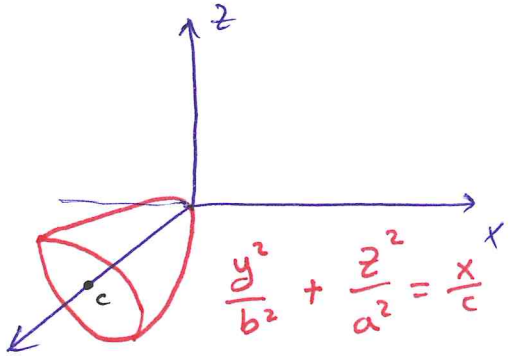
eliptical Paraboloid.



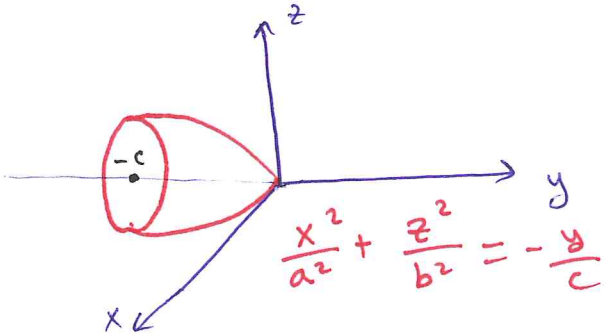
$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{-z}{c}$$



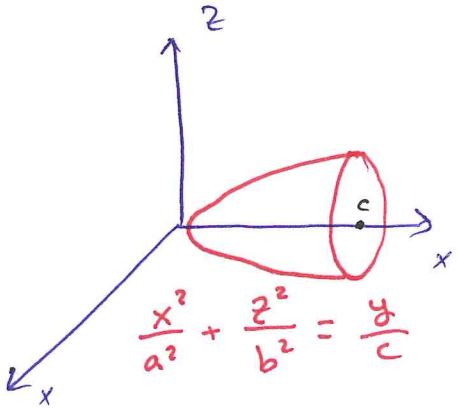
$$\frac{y^2}{b^2}+\frac{z^2}{a^2}=-\frac{x}{c}$$



$$\frac{y^2}{b^2}+\frac{z^2}{a^2}=\frac{x}{c}$$

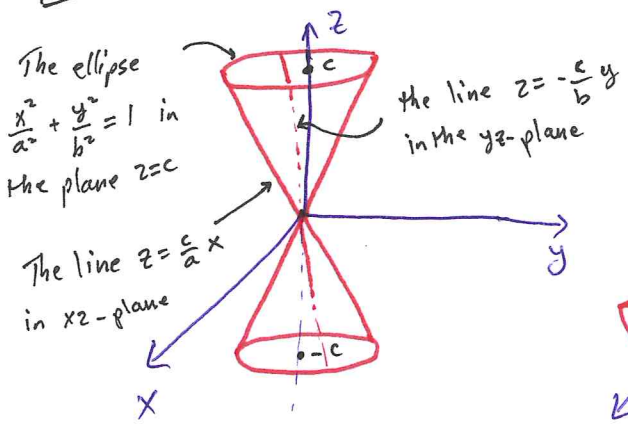


$$\frac{x^2}{a^2}+\frac{z^2}{b^2}=-\frac{y}{c}$$

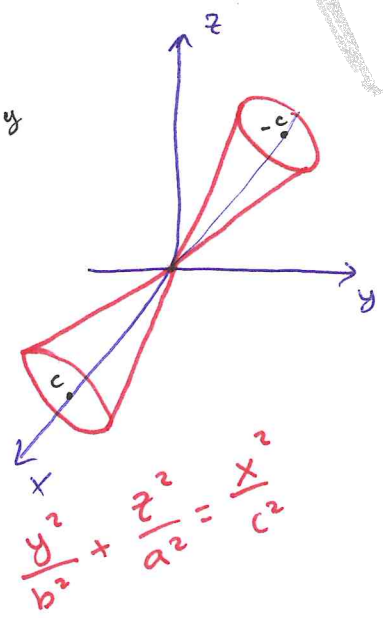


$$\frac{x^2}{a^2}+\frac{z^2}{b^2}=\frac{y}{c}$$

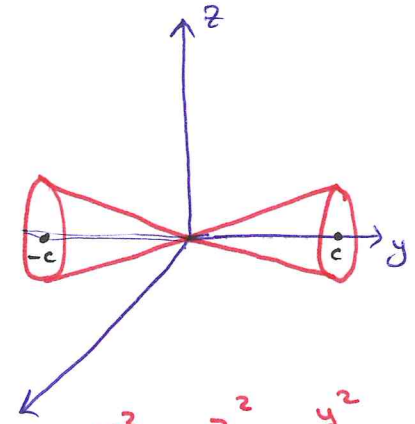
3 Cone :



$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{z^2}{c^2}$$



$$\frac{y^2}{b^2}+\frac{z^2}{a^2}=\frac{x^2}{c^2}$$



$$\frac{x^2}{a^2}+\frac{z^2}{b^2}=\frac{y^2}{c^2}$$

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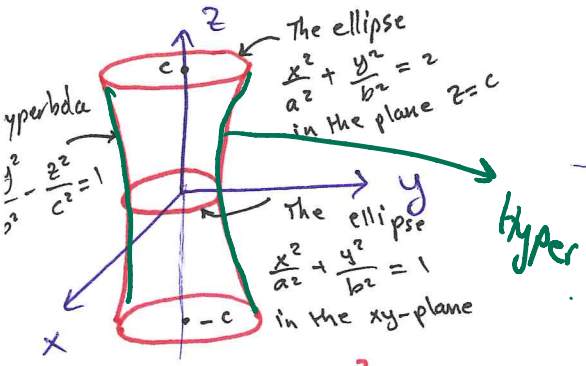
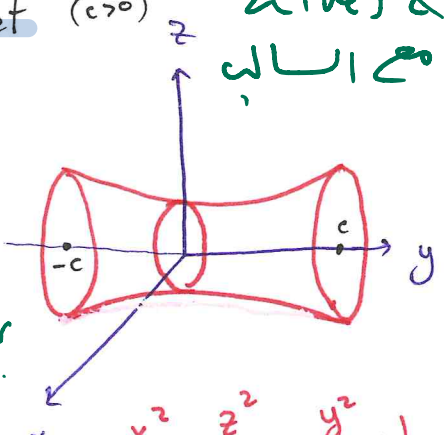
4 Hyperboloid of one sheet $(c>0)$

2(+ve) & 1(-ve)

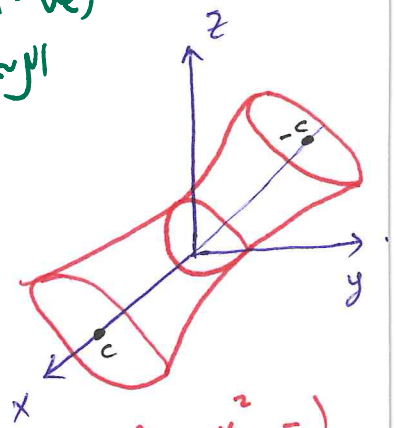
الزيحة مع السالب



$$\frac{x^2}{a^2}+\frac{y^2}{b^2}-\frac{z^2}{c^2}=1$$



$$\frac{x^2}{a^2}+\frac{z^2}{b^2}-\frac{y^2}{c^2}=1$$



$$\frac{z^2}{a^2}+\frac{y^2}{b^2}-\frac{x^2}{c^2}=1$$

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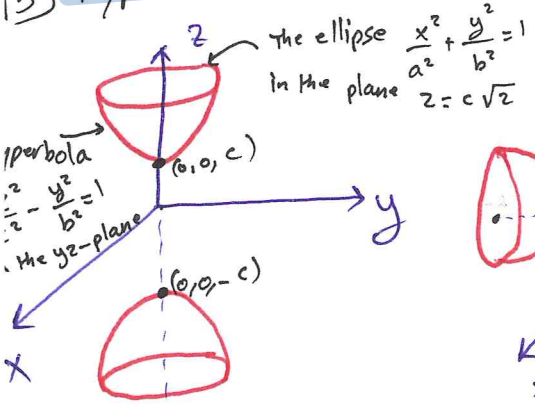
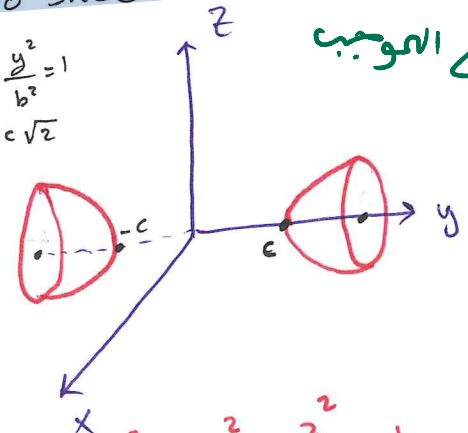
5 Hyperboloid of two sheets $(c>0)$

2(-ve) & 1(+ve)

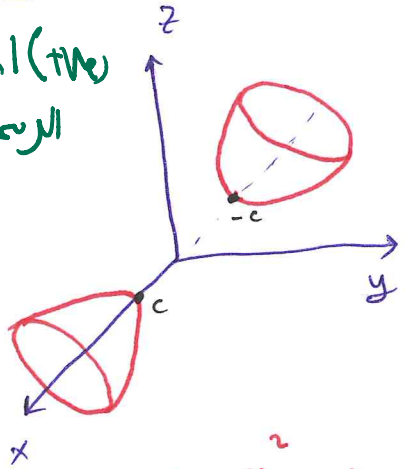
الزيحة مع الموجب



$$\frac{z^2}{c^2}-\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$$



$$\frac{y^2}{c^2}-\frac{x^2}{a^2}-\frac{z^2}{b^2}=1$$



$$\frac{x^2}{c^2}-\frac{z^2}{a^2}-\frac{y^2}{b^2}=1$$

6 hyperbolic parboiled

$$\frac{x^2}{a^2} - \frac{y^2}{b^2} = \frac{z}{c}$$