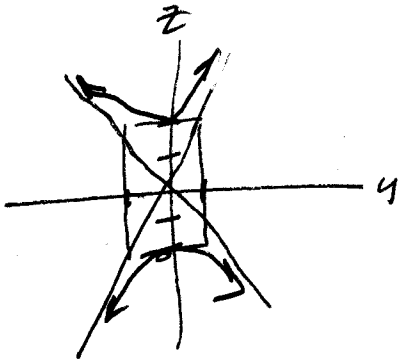
① $z^2 - x^2 - 4y^2 = 4$

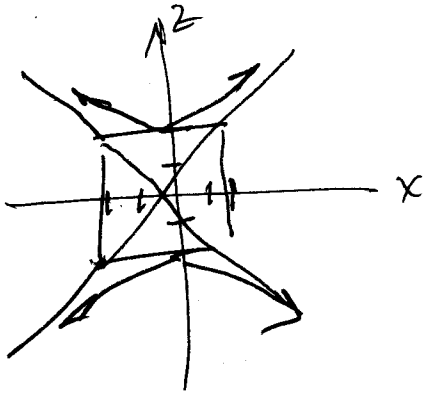
$\boxed{x=0}$ $z^2 - 4y^2 = 4$

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



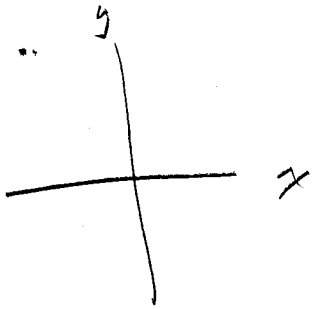
$\boxed{y=0}$ $z^2 - x^2 = 4$

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



$\boxed{z=0}$ $-x^2 - 4y^2 = 4$

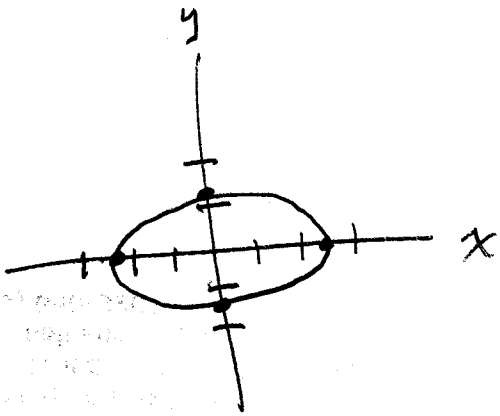
$x^2 + 4y^2 = -1$

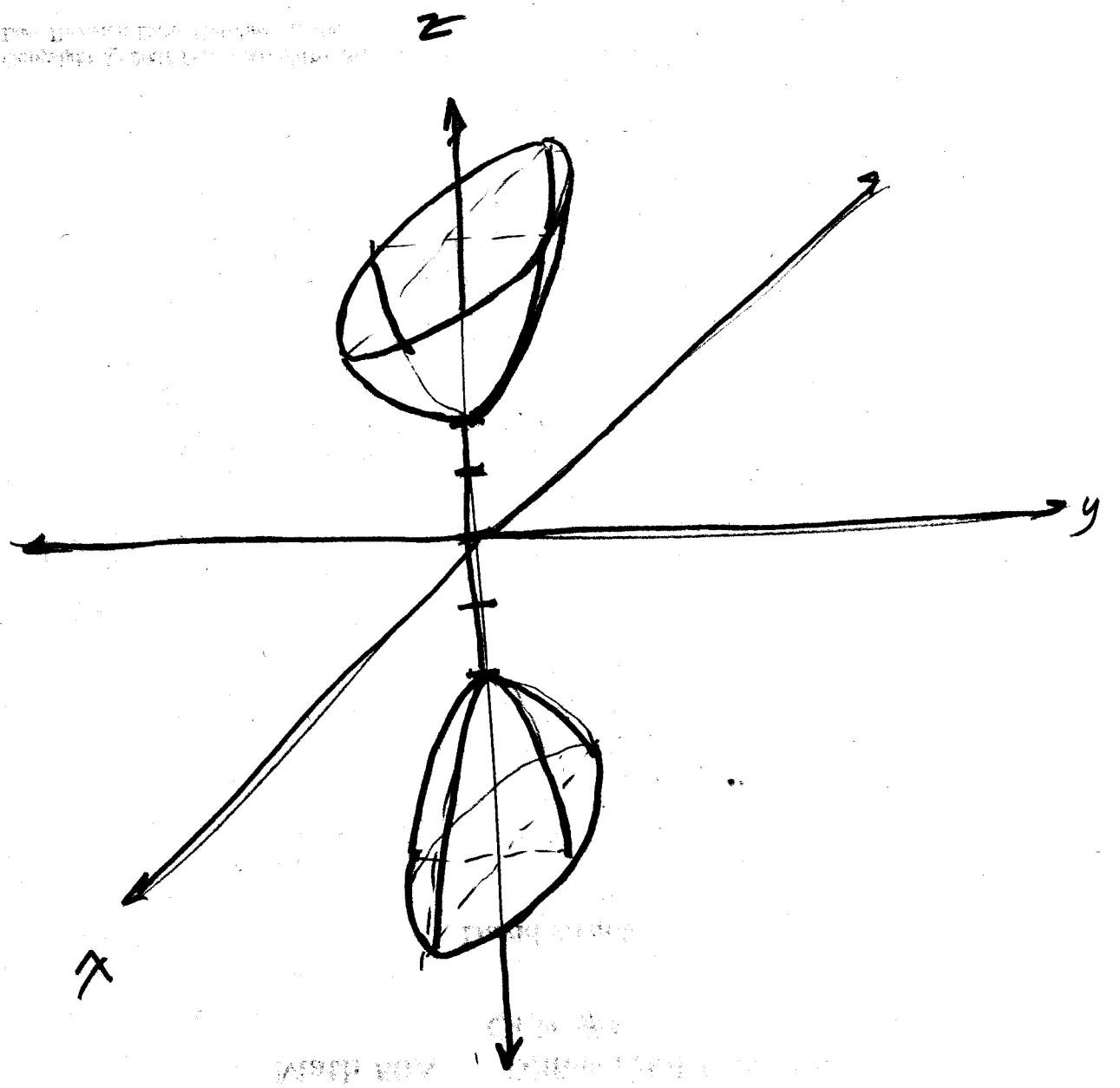


$\boxed{z=\pm 3}$ $9 - x^2 - 4y^2 = 4$

$x^2 + 4y^2 = 5$

$\frac{x^2}{5} + \frac{y^2}{5/4} = 1$




z
y
x

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

<u>Let</u>

$$x = r\cos\theta$$

$$y = r\sin\theta$$

$$z^2 - r^2\cos^2\theta - 4r^2\sin^2\theta = 4$$

$$z^2 - 4 = r^2(\cos^2\theta + 4\sin^2\theta)$$

$$r = \sqrt{\frac{z^2 - 4}{\cos^2\theta + 4\sin^2\theta}}$$

Domain: $\{(\theta, z) : 0 \le \theta \le 2\pi,\ |z| \ge 2\}$