习题 6.7（P36）

1．说明下列曲面是什么形状，并作出草图

(1) $4x^2-9y^2-16z^2=-25$　　(2) $4x^2-9y^2-16z^2=25$

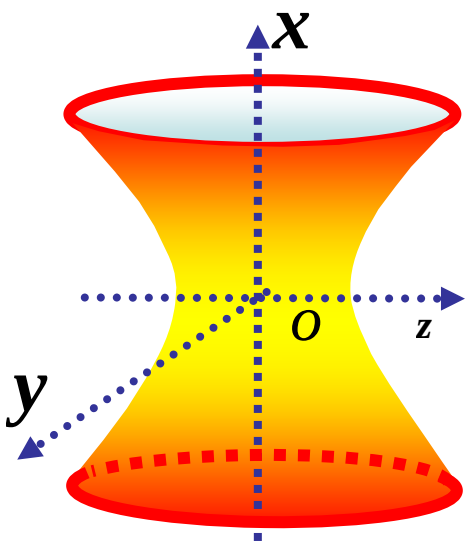
(3) $x^2-y^2=2x$　　(4) $y^2+z^2=2x$

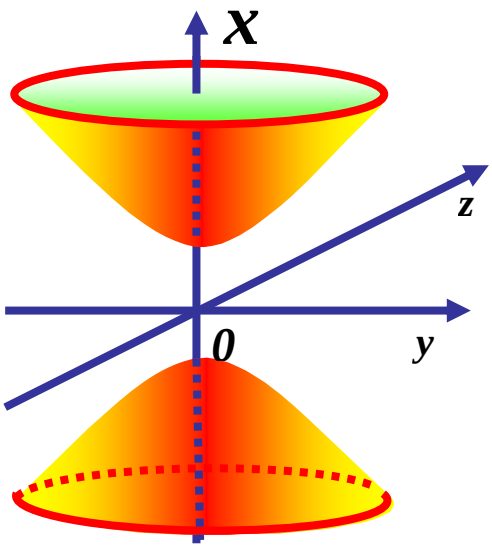
(5) $\frac{x^2}{2}+\frac{z^2}{4}=y^2$　　(6) $z=2-x^2-y^2$

(7) $y-x^2+z^2=0$　　(8) $x^2+y^2+4z^2=2x+2y-8z$

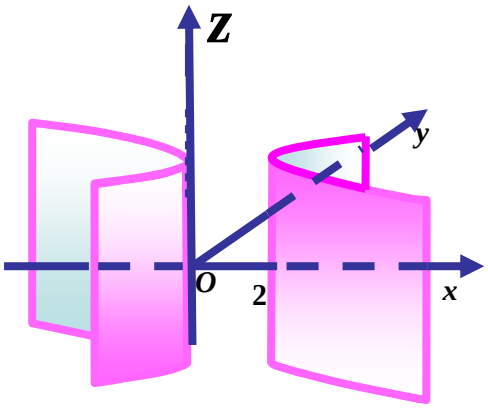
(9) $y=\sqrt{x^2+z^2}$　　(10) $x=\sqrt{y^2+z^2+1}$

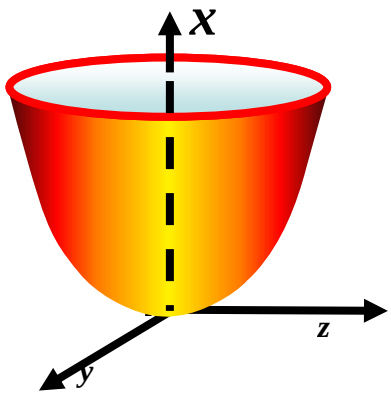
解：(1)将方程化为 $-\frac{x^2}{\frac{25}{4}}+\frac{y^2}{\frac{25}{9}}+\frac{z^2}{\frac{25}{16}}=1$，表示单叶双曲面.　　(2) 表示双叶双曲面.



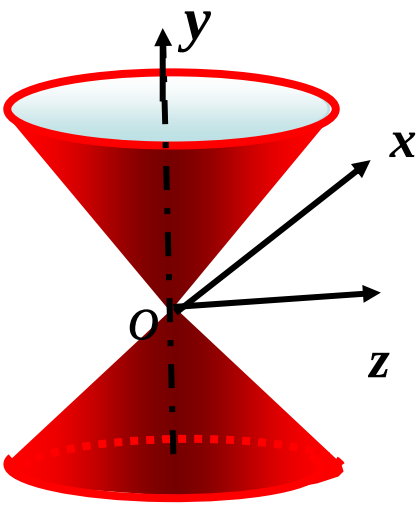


(3) 将方程化为 $(x-1)^2-y^2=1$，表示双曲柱面.　　(4) 表示椭圆抛物面.

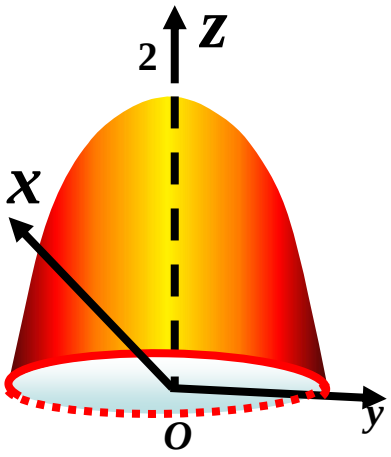




(5) 表示椭圆锥面.

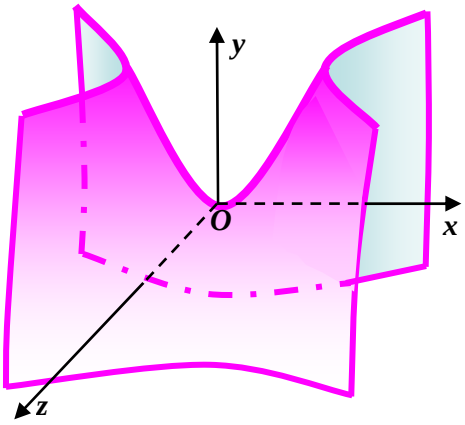


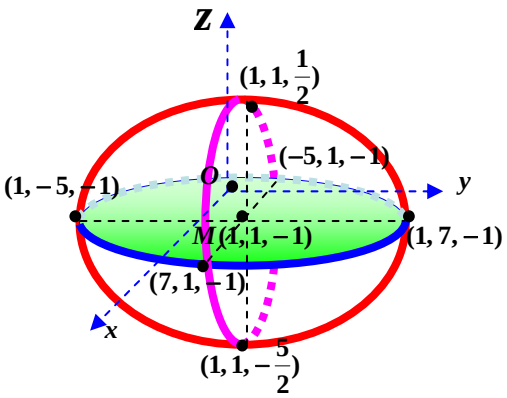
(6) 表示椭圆抛物面.



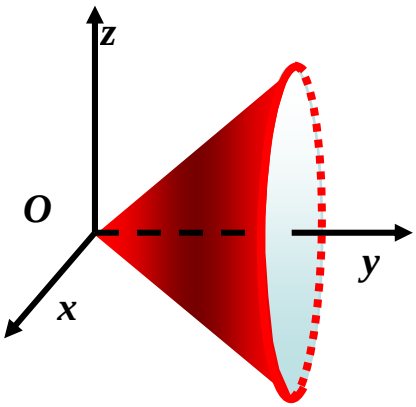
(7) 表示双曲抛物面.

(8) 将方程化为 $(x-1)^2+(y-1)^2+4(z+1)^2=6$，表示椭球面.

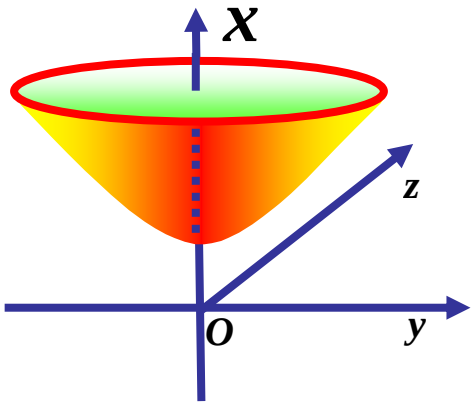




(9) 表示锥面的右半部分.



(10) 表示双叶双曲面的一叶.



2. 画出下列各组曲面所围立体的图形.

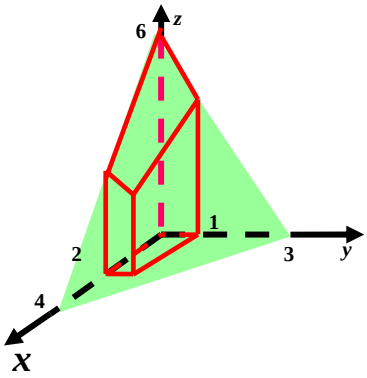
(1) $x=0$，$y=0$，$z=0$，$x=2$，$y=1$，$3x+4y+2z-12=0$

(2) $x=0$，$y=0$，$z=0$，$x^2+y^2=1$，$y^2+z^2=1$（在第一卦限内）

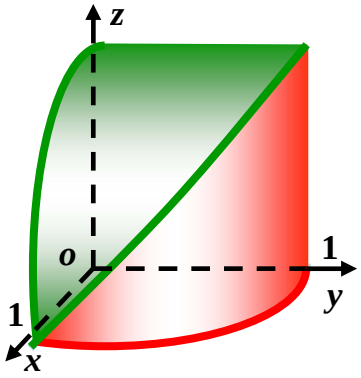
(3) $z=\sqrt{x^2+y^2}$，$z=\sqrt{1-x^2-y^2}$

(4) $z=x^2+y^2$，$z=1-x^2-y^2$

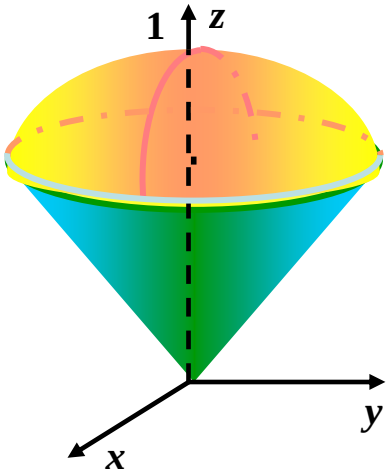
解：



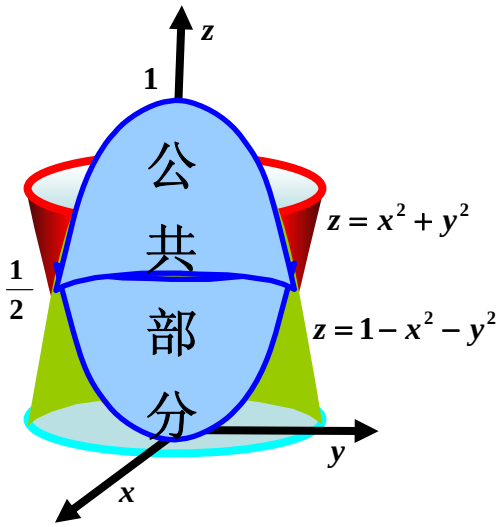
(1)



(2)



(3)



(4)