

12.1, number 23: Describe the set of points in 3-space whose coordinates satisfy

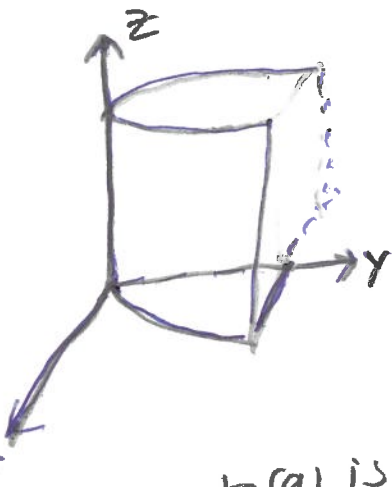
(a)  $y \geq x^2$  and  $z \geq 0$

**Answer:** The set of points in 3-space which satisfy  $y \geq x^2$  and  $z \geq 0$  is a solid. In the  $xy$  plane the picture is everything to the right of the parabola  $y = x^2$ . The cross section is exactly the same for all non-negative  $z$

(b)  $x \leq y^2$  and  $0 \leq z \leq 2$ .

**Answer:** The set of points in 3-space which satisfy  $x \leq y^2$  and  $0 \leq z \leq 2$  is a solid. In the  $xy$  plane the picture is everything in front of the parabola  $x = y^2$ . the cross section is exactly the same for all  $z$  between 0 and 2.

(a)



The answer to (a) is everything inside the parabolic cylinder, The solid starts on the  $xy$  plane and goes arbitrarily high

(b)

The bottom and the top both look like everything inside the parabola



The bottom is in the  $xy$  plane  
The top is 2 units above the  $xy$  plane