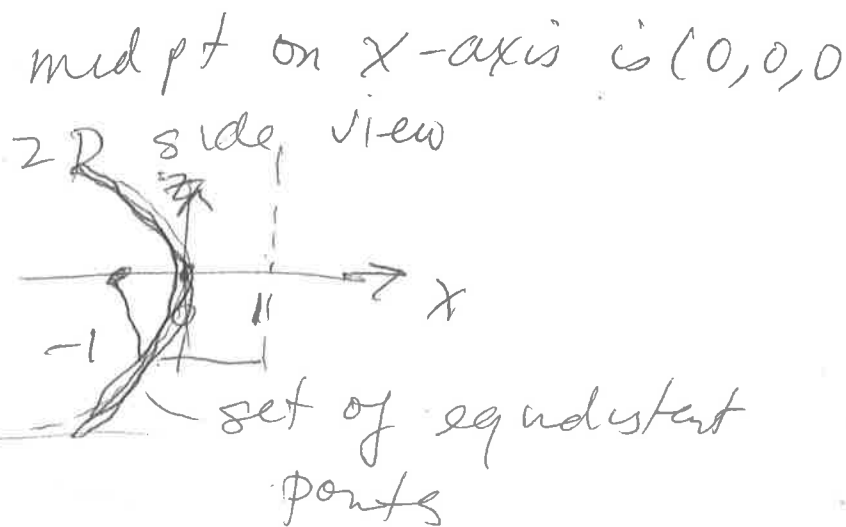


12.6/#47 solution

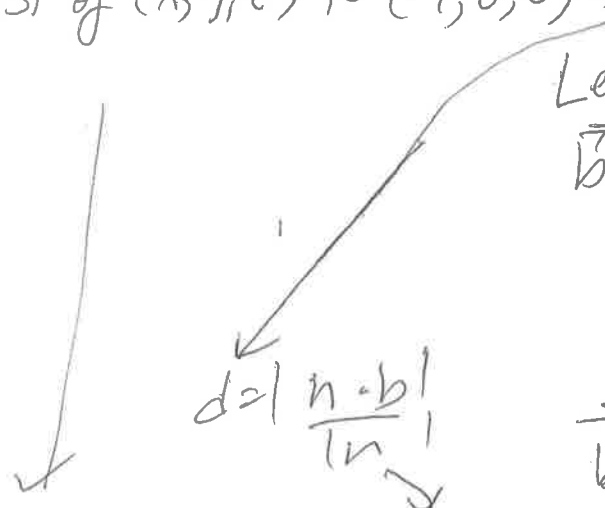
Find set of points equidistant from  $(-1, 0, 0)$  and plane  $x=1$



$\vec{n}$  parallel to x axis  
 $\langle 1, 0, 0 \rangle$

Let  $(x, y, z)$  = point on desired plane

dist of  $(x, y, z)$  to  $(-1, 0, 0)$  = dist of  $(x, y, z)$  to plane  $x=1$



Let  $\vec{n} = \langle 1, 0, 0 \rangle$

$\vec{b}$  = vector from original to final plane

$(x, y, z)$  final plane

$x=1$  plane  
 $\rightarrow (1, 0, 0)$  a point on  $x=1$

$b = \langle x-1, y, z \rangle$

$$\sqrt{(x+1)^2 + y^2 + z^2} = \frac{|\langle 1, 0, 0 \rangle \cdot \langle x-1, y, z \rangle|}{1}$$

$$\sqrt{x^2 + 2x + 1 + y^2 + z^2} = |x-1|$$

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

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

$\rightarrow$  paraboloid  
 "backward focus"

