Sh 5 #s 1, 2, 3, 5, 7, 11, 14, 17, 21, 25, 28, 30, 34, 41, 44, 45, 50, 53, 58, 61, 64, 78

(49) Find direction vector $\bar{v}$ for the line of intersection of the planes.

$x+y+z=1$
$x+z=0$

$x=0: \Rightarrow z=0$
$0+y+0=1$
} (0,1,0) shared by both.

$$\left[\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \end{array}\right] \xrightarrow{-R1+R2} \left[\begin{array}{ccc|c} 1 & 1 & 1 & 1 \\ 0 & -1 & 0 & -1 \end{array}\right] \sim \left[\begin{array}{ccc|c} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{array}\right]$$

Interpret

$x+y+z=1$

$y=1$ $\Rightarrow$ $x+1+z=1$ $\quad$ z is free!

$x=-z$

$\{(x,y,z) \mid x=-z, y=1, z=z\}$

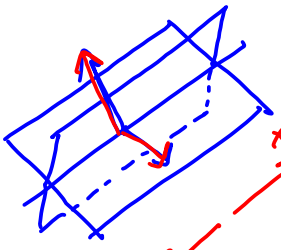
$\{(x,y,z) \mid x=-t, y=1, z=t\}$

$x=-t, \; y=1, \; z=t$

$\bar{r} = \langle 0,1,0\rangle + t\langle -1,0,1\rangle$

Direction vector $\bar{v} = \langle -1,0,1\rangle$

Book says $\bar{v} = \langle 1,0,-1\rangle$?



Slick way:

$\bar{n}_1 = \langle 1,1,1\rangle$, ⊥

$\bar{n}_2 = \langle 1,0,1\rangle$ ⊥

$\langle 1,0,-1\rangle = \bar{v}$

#58 wants parametric eqns of the line:

By hook or crook, need ONE POINT on the line:

$\bar{r} = \bar{r}_0 + t\bar{v}$

$= \langle 0,1,0\rangle + t\langle 1,0,-1\rangle$

$x=t, \; y=1, \; z=-t$

$x=-t, \; y=1, \; z=t$

$x^2+y^2=49$ $x^2+y^2=r^2$

$(h,k)=(0,0)$, $r=7$

$x^2+y^2+z^2=49$

$(h,k,l)=(0,0,0)$, $r=7$

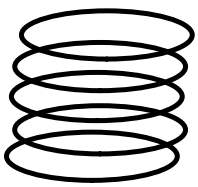
Level curves, traces.

When in doubt

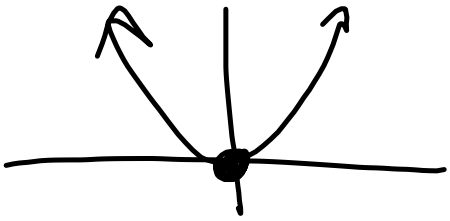
$x^2+y^2=49$ in 3-D is ?

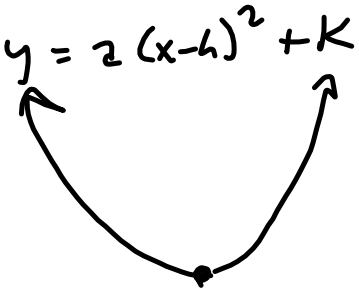
Independent of z, so its trace in the xy-plane is the circle $x^2+y^2=49$ $z=0$

$z=1$: Same Deal



$y = x^2$ parabola





$(h,k) = (-3, -16)$

$y = x^2 + 6x - 7$

$= x^2 + 6x + 3^2 - 9 - 7$

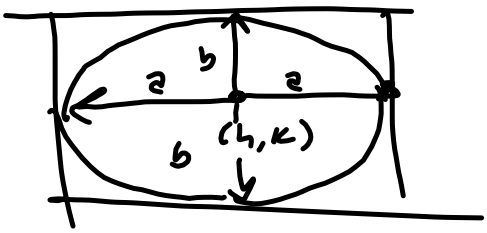
$= (x+3)^2 - 16$

$y = x^2 - 7x - 92$

$= x^2 - 7x + \left(\frac{7}{2}\right)^2 - \frac{49}{4} - \frac{368}{4} = \left(x - \frac{7}{2}\right)^2 - \frac{417}{4}$

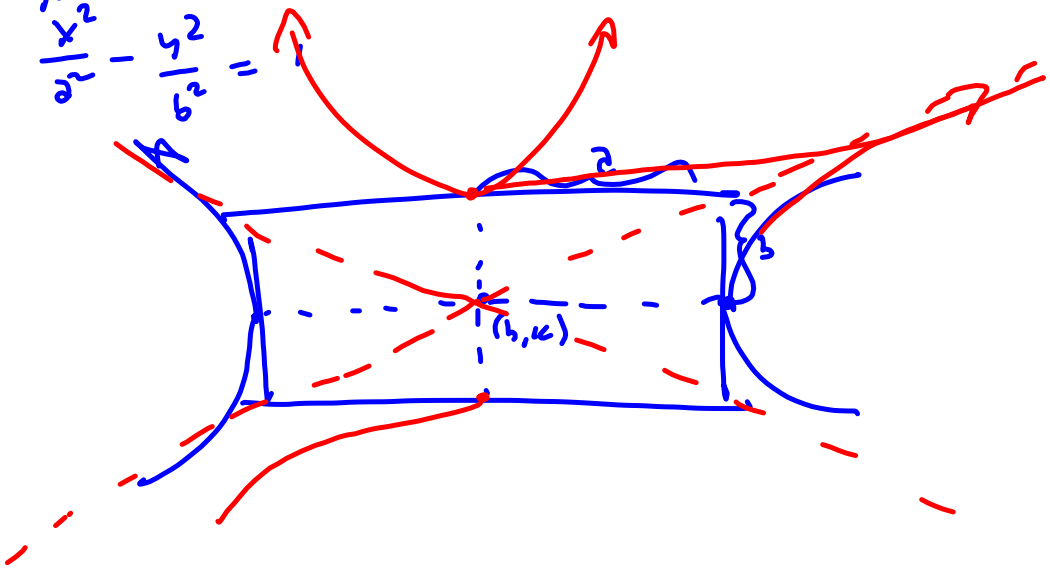
Ellipses

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \qquad \frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

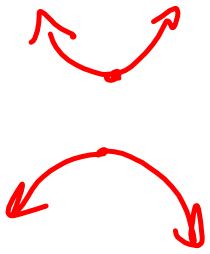


Hyperbola

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



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



§12.6 #s 1, 2, 4, 9, 11, 13, 15, 21-28, 31, 37

↓

Just answers