WRH-2-Solutions

12.5 : 2, 27, 45
12.6 : 4, 35

12.5

② $P(6,-5,2)$

$P \in \ell$ and $\ell \parallel \langle 1, 3, -\frac{2}{3} \rangle = S$

Vector equation: $r = r_0 + tv$

v has the same direction as S.

$$tv = \langle t, 3t, -\frac{2}{3}t \rangle$$

$$r_0 = \langle x_0, y_0, z_0 \rangle = \langle 6, -5, 2 \rangle$$

$$\boxed{r(t) = \langle 6+t, -5+3t, 2-\frac{2}{3}t \rangle} =$$

$$= \boxed{(6+t)i + (-5+3t)j + (2-\frac{2}{3}t)k}$$

Parametric equations:

$$\begin{cases} x = 6+t \\ y = -5+3t \\ z = 2-\frac{2}{3}t \end{cases}$$

▼

㉗ $P(1,-1,-1)$

plane $\Pi \parallel$ to the plane $5x-y-z=6$

$$a(x-x_0)+b(y-y_0)+c(z-z_0)=0$$

$(x_0,y_0,z_0)=(1,-1,-1)$

$r=\langle a,b,c\rangle=\langle 5,-1,-1\rangle=n$

$5(x-1)-(y+1)-(z+1)=0$

$$5x-y-z=7$$

▼

(45)

$x=2-2t$
$y=3t$
$z=1+t$

plane: $x+2y-z=7$

$2-2t+2\cdot 3t-1-t=7$

$3t=7+1-2=6$

$t=2$

Thus,

$$P=(2-4,6,1+2)=(-2,6,3)$$

▼

12.6

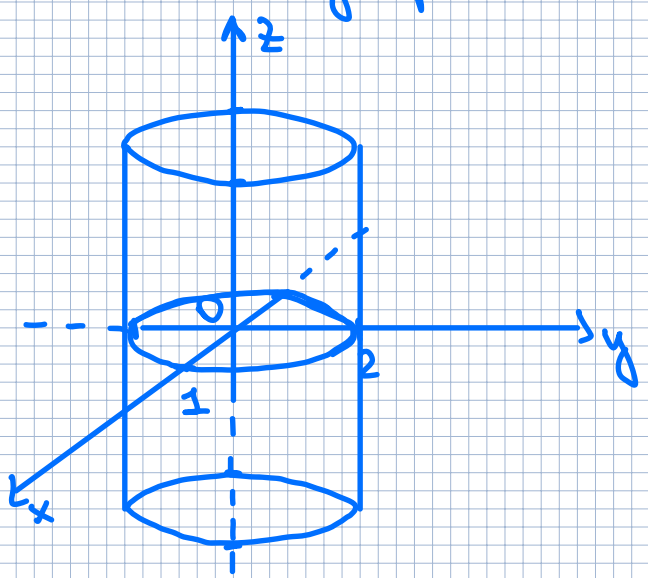
(4) $4x^2 + y^2 = 4$

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

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

We have no z. Thus, $z = k$.

The surface $4x^2 + y^2 = 4$ is an elliptic cylinder with rulings parallel to the z-axis.



(35) $x^2 + y^2 - 2x - 6y - z + 10 = 0$

$$(x-1)^2 + (y-3)^2 - z - 1 - 9 + 10 = 0$$

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

(1) is a circular paraboloid opening upward with vertex $(1,3,0)$ and axis the vertical line $x=1,\ y=3$.