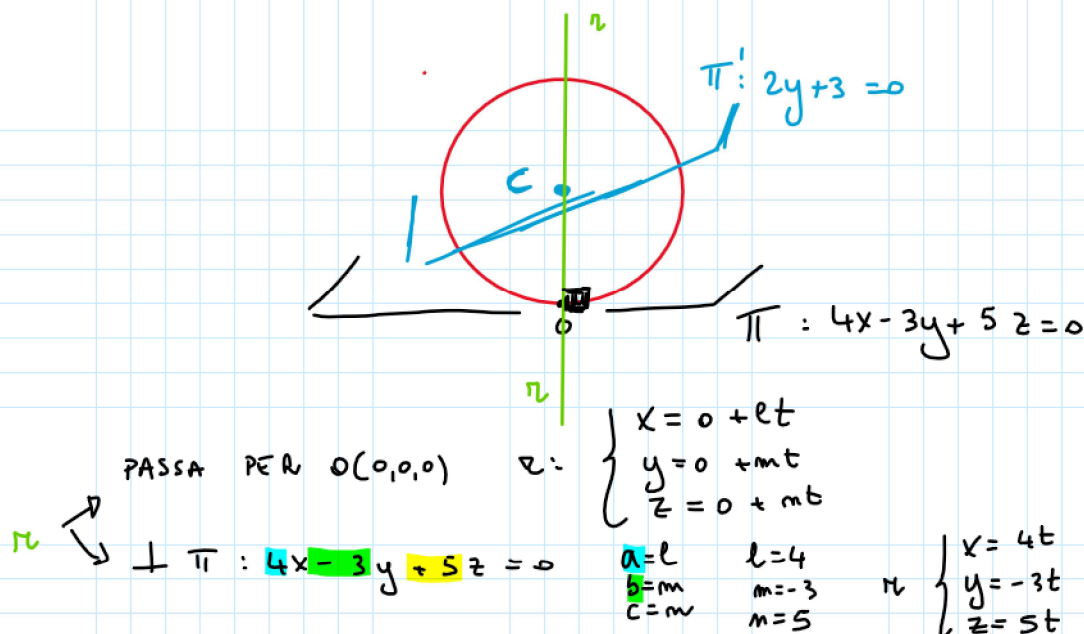


SCRIVERE L'EQ. DI UNA SFERA TANGENTE AL
 PIANO $\pi: 4x - 3y - 5z = 0$ IN $O(0,0,0)$ E AVERE
 IL CENTRO SUL PIANO $\pi': 2y + 3 = 0$

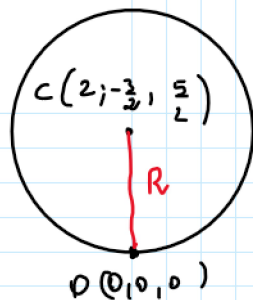
EQ. SFERA LA TROVO SE HO CENTRO $C(x_c, y_c, z_c)$
 E IL RAGGIO R

$$(x - x_c)^2 + (y - y_c)^2 + (z - z_c)^2 = R^2$$



$$C \begin{cases} \pi \\ \pi' \end{cases} \begin{cases} x = 4t \\ y = -3t \\ z = 5t \end{cases} \begin{cases} -\frac{3}{2} = -3t \\ 2y + 3 = 0 \end{cases} \rightarrow y = -\frac{3}{2} \quad t = \frac{1}{2}$$

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



$$\overline{OC} = \sqrt{2^2 + \left(-\frac{3}{2}\right)^2 + \left(\frac{5}{2}\right)^2} = \sqrt{4 + \frac{9}{4} + \frac{25}{4}} = \sqrt{4 + \frac{34}{4}} = \sqrt{\frac{25}{2}}$$

$$\Sigma: (x - 2)^2 + \left(y + \frac{3}{2}\right)^2 + \left(z - \frac{5}{2}\right)^2 = \left(\sqrt{\frac{25}{2}}\right)^2$$

$$x^2 - 4x + 4 + y^2 + 3y + \frac{9}{4} + z^2 - 5z + \frac{25}{4} = \frac{25}{2}$$

$$x^2 + y^2 + z^2 - 4x + 3y - 5z = 0$$

o

SIA Σ LA SFERA DI EQUAZIONE

$$x^2 + y^2 + z^2 = 100$$

$$x^2 + y^2 + z^2 + ax + by + cz + d = 0$$

- CAMBIO SEGNO
- DIVISO PER 2

CENTRO: $x_c = -\frac{a}{2}$ $y_c = -\frac{b}{2}$ $z_c = -\frac{c}{2}$

$$R = \sqrt{x_c^2 + y_c^2 + z_c^2 - d}$$

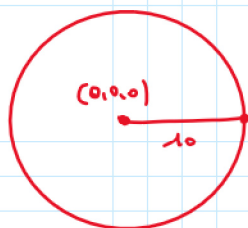
CAMBIO SEGNO

SIA π IL PIANO PARALLELO AL PIANO XZ E

PASSANTE PER $A(0; 8; 4)$. TROVARE IL CENTRO E IL RAGGIO DELLA CIRCONFERENZA OTTENUTA INTERSELANDO Σ CON π

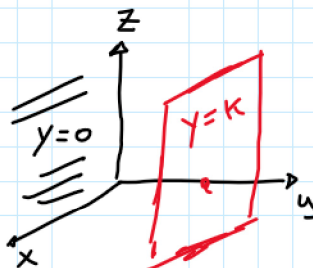
$$\Sigma: x^2 + y^2 + z^2 - 100 = 0$$

$$x_c = 0 \quad y_c = 0 \quad z_c = 0 \quad R = \sqrt{100} = 10$$



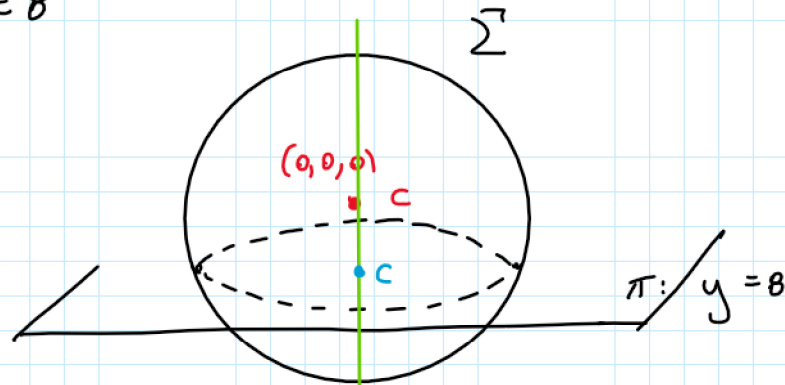
π $\rightarrow$ PASSA PER $A(0, 8, 4)$
 $\parallel$ AL PIANO XZ

$y = k$ PASSA PER $A(0; 8; 4)$
 $k = 8$



$$\pi: y=8$$

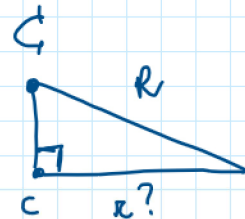
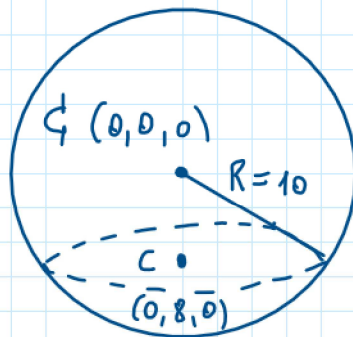
$$k=8$$



π → PASSA PER $Q(0;0;0)$
 $\pi: y=8$
 $ax+by+cz+d=0$
 $a=0=l$
 $b=1=m$
 $c=0=n$
 $d=0$

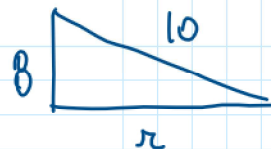
$$\begin{cases}
 X=0+0t \\
 Y=0+1t \\
 Z=0+0t
 \end{cases}
 \begin{cases}
 x=0 \\
 y=t \\
 z=0
 \end{cases}$$

$$C \begin{cases} n \\ \pi \end{cases} \begin{cases} x=0 \\ y=t \\ z=0 \end{cases} \begin{cases} n \\ y=8 \end{cases} \pi \quad C(0;8;0)$$



$$x = \sqrt{R^2 - C^2}$$

$$C = \sqrt{0 + 64 + 0} = 8$$



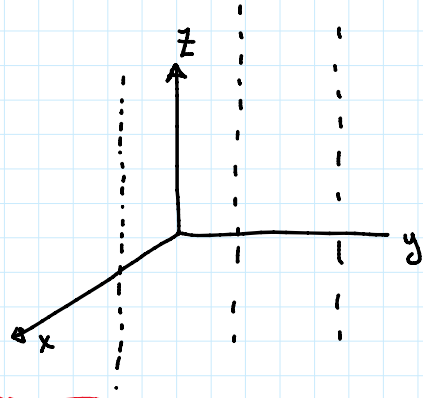
$$\begin{aligned}
 x &= \sqrt{100 - 64} \\
 x &= \sqrt{36} = 6
 \end{aligned}$$

$$C(0,8,0) \quad x=6$$

SCRIVERE LE EQUAZIONI DELLE SFERE AVENTI IL
 CENTRO SULLA RETTA PASSANTE PER $A(1; -2; -3)$

È PARALLELA ALL'ASSE Z E TANGENTE AL PIANO

$$\pi: 2x - 2y - z - 4 = 0$$



PASSA PER $A(1; -2; -3)$

$r \parallel$ ASSE Z

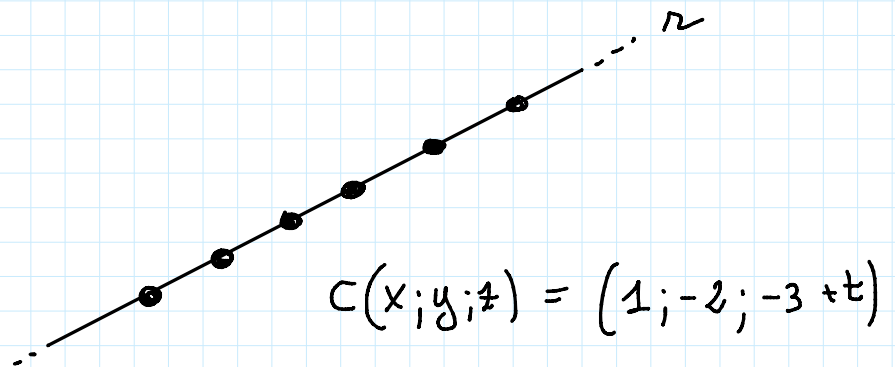
$l = l'$
 $m = m'$
 $n = n'$

ASSE Z

$l = 0$
 $m = 0$
 $n = 1$

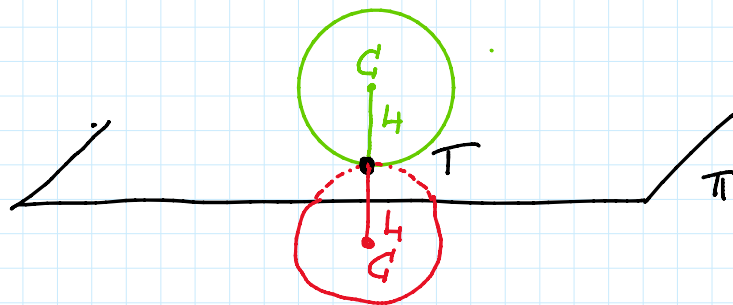
$r: \begin{cases} x = 1 + 0t \\ y = -2 + 0t \\ z = -3 + t \end{cases}$

$$r: \begin{cases} x = 1 \\ y = -2 \\ z = -3 + t \end{cases}$$



$$\Sigma: C(1; -2; -3 + t) \quad R = 4$$

$$\Sigma: \text{TANGENTE} \quad \pi: 2x - 2y - z - 4 = 0$$



SE LA Σ È TG AL PIANO LA DISTANZA CENTRO
E IL PIANO = RAGGIO DI Σ

$$d(C; \pi) = R$$

$$d((1; -2; -3+t); 2x - 2y - z - 4 = 0) = 4$$

$$\frac{|2(1) - 2(-2) - (-3+t) - 4|}{\sqrt{4 + 4 + 1}} = 4$$

$a^2 + b^2 + c^2$ DAL PIANO π

$$\frac{|2 + 4 + 3 - t - 4|}{3} = 4$$

$$|5 - t| = 12$$

$$5 - t = 12 \quad t = -7$$

$$5 - t = -12 \quad t = 17$$

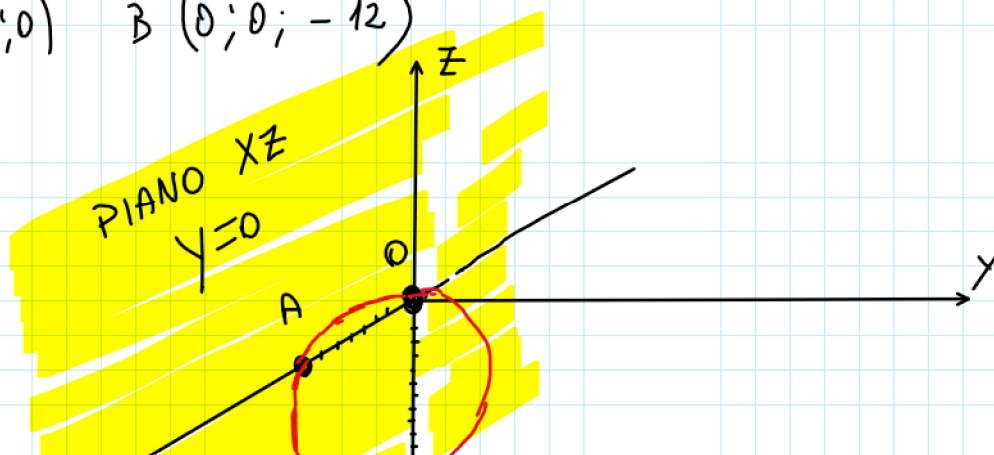
$$t = -7 \quad \Sigma_1 \quad C(1; -2; -10) \quad R = 4 \quad (x-1)^2 + (y+2)^2 + (z+10)^2 = 16$$

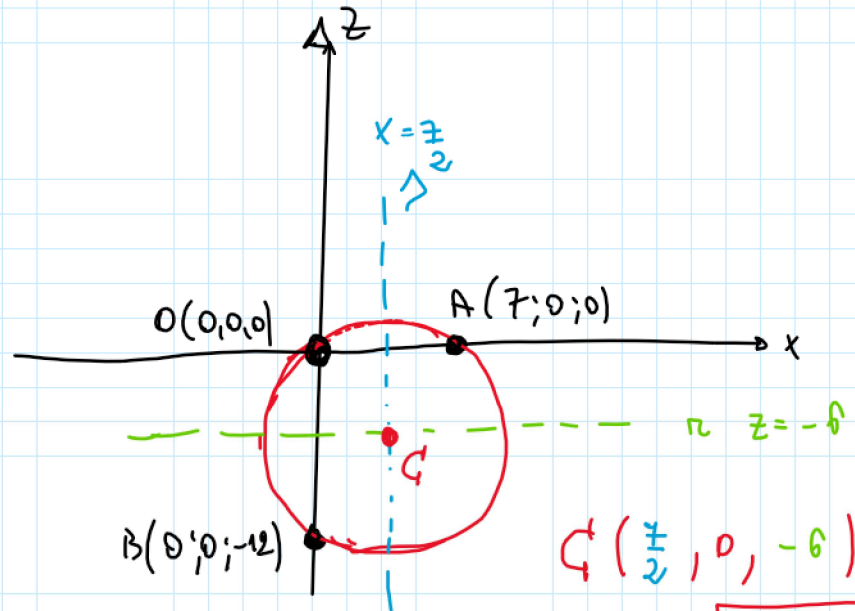
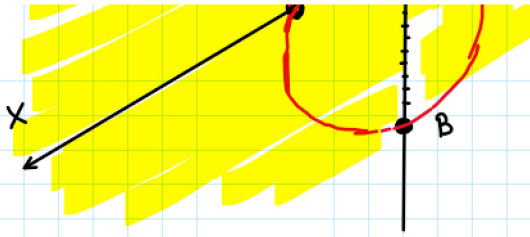
$$t = 17 \quad \Sigma_2 \quad C(1; -2; 14) \quad R = 4 \quad (x-1)^2 + (y+2)^2 + (z-14)^2 = 16$$

✂

SCRIVERE L'EQUAZIONE DI UNA SFERA E L'EQ. DI UN PIANO LA CUI INTERSEZIONE SIA LA CIRCONFERENZA CHE PASSA PER $O(0; 0; 0)$

$A(7; 0; 0) \quad B(0; 0; -12)$





$$R = CO = \sqrt{\frac{49}{4} + 36} = \sqrt{\frac{193}{4}}$$

$$\Sigma \quad \left(x - \frac{7}{2}\right)^2 + (y - 0)^2 + (z + 6)^2 = \frac{193}{4}$$

$$\left(x - \frac{7}{2}\right)^2 + (y - 0)^2 + (z + 6)^2 = \frac{193}{4}$$

$$x^2 + y^2 + z^2 - 7x + 12z = 0$$