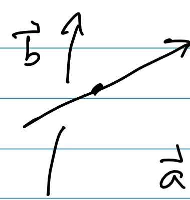
- Midterm Friday, here
- 11:05 – 11:56
- See our section's webpage

Covers 12.1 ~ 12.5 & 16.5 & 12.6

12.4: If $\vec{a}, \vec{b}$ in 3-dim

(1) $\vec{a} \times \vec{b}$ is $\perp$ $\vec{a}, \vec{b}$

e.g.



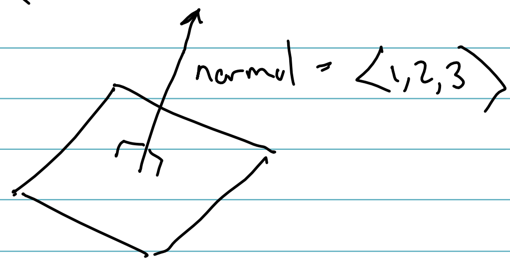
$\vec{a} \times \vec{b} \perp \vec{a}, \vec{b}$

Planes: $x + 2y + 3z = 4$, Plane$_1$

$7x - 9y + 8z = 3$

Plane$_1$

$\langle 1,2,3 \rangle \cdot \langle x,y,z \rangle = 4$

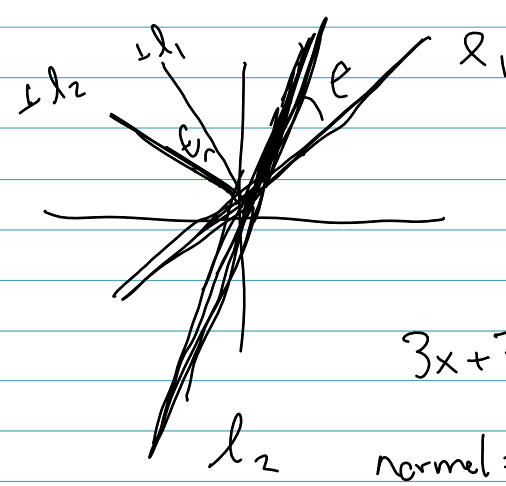


Plane$_2$ normal = $\langle 7,-9,8 \rangle$

$n_1 \times n_2$

$\langle 1,2,3 \rangle \times \langle 7,-9,8 \rangle$

3d ☺ ~ 2-d



$3x + 7y = 5$

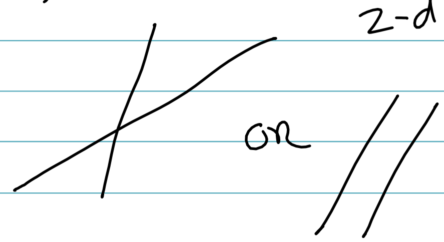
normal = $\langle 3,7 \rangle$

$y = 3x + 2$

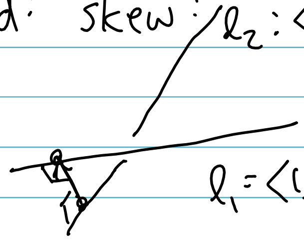
normal $\langle -3,1 \rangle$

$-3x + y = 2$ or $-3x + y - 2 = 0$

lines, distance



3-d: skew:



$\ell_2: \langle 7,8,1 \rangle + t_2 \langle 0,3,4 \rangle$

$\ell_1 = \langle 1,2,3 \rangle + t_1 \langle 4,5,6 \rangle$

SG distance skew lines = distance from planes

ℓ_1 is in $\langle 4,5,6 \rangle$ direction

ℓ_2 ... $\langle 0,3,4 \rangle$ ..

Normal of 2 planes || containing lines

$\langle 4,5,6 \rangle \times \langle 0,3,4 \rangle$

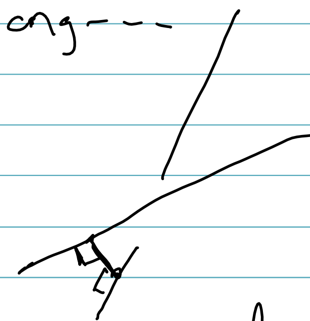
$ax + by + cz + \text{constant} = 0$

Want

(1) $\min_{t_1 \in \mathbb{R},\, t_2 \in \mathbb{R}} \left| \langle 1,2,3 \rangle + t_1 \langle 4,5,6 \rangle - (\langle 7,8,1 \rangle + t_2 \langle 0,3,4 \rangle) \right|$

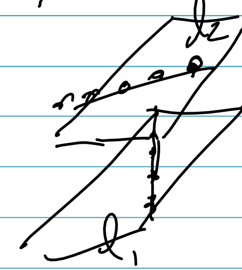
--- long ---

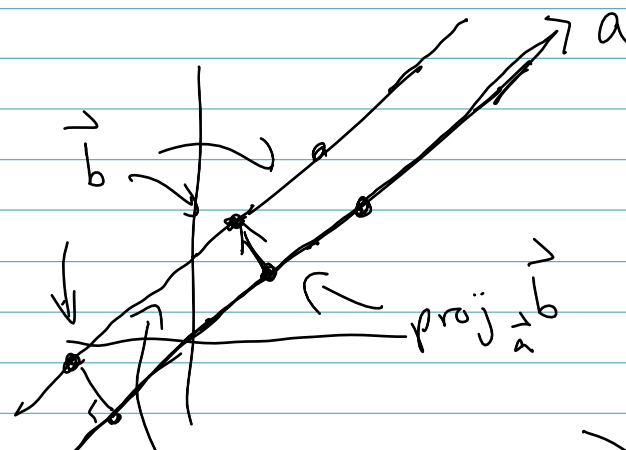
(2)



geometry

(3)





$\langle 7,3,1 \rangle + t \langle 1, , \rangle$

$t=0 : \langle 7,3,1 \rangle$