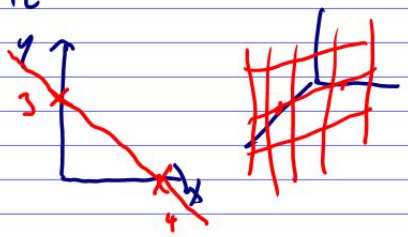
Panel 1

Last time

Coordinate system in $\mathbb{R}^3$

Distance formula: $d = \sqrt{(x_2-x_1)^2+(y_2-y_1)^2+(z_2-z_1)^2}$

3D Objects
- sphere $x^2+y^2+z^2=4$
- cylinders $x^2+y^2=4$, $x^2+z^2=9$, $(x-1)^2+(z-3)^2=9$
- sheets $3x+4y=12$



Vectors
- add, subtr., mult. by scalar
- norm (length)
- unit vector

Panel 2

$\vec{v} = \langle 3,-1,2 \rangle$

$\|\vec{v}\| = \sqrt{9+1+4} = \sqrt{14}$

Vector same dir. as $\vec{v}$ but length 1: $\frac{1}{\sqrt{14}}\langle 3,-1,2 \rangle$

$\left\| \frac{1}{\sqrt{14}}\langle 3,-1,2 \rangle \right\| = \sqrt{\frac{9}{14}+\frac{1}{14}+\frac{4}{14}} = \sqrt{\frac{1}{14}}\cdot\sqrt{14} =$

$\|c\cdot\vec{v}\| = |c|\|v\|$

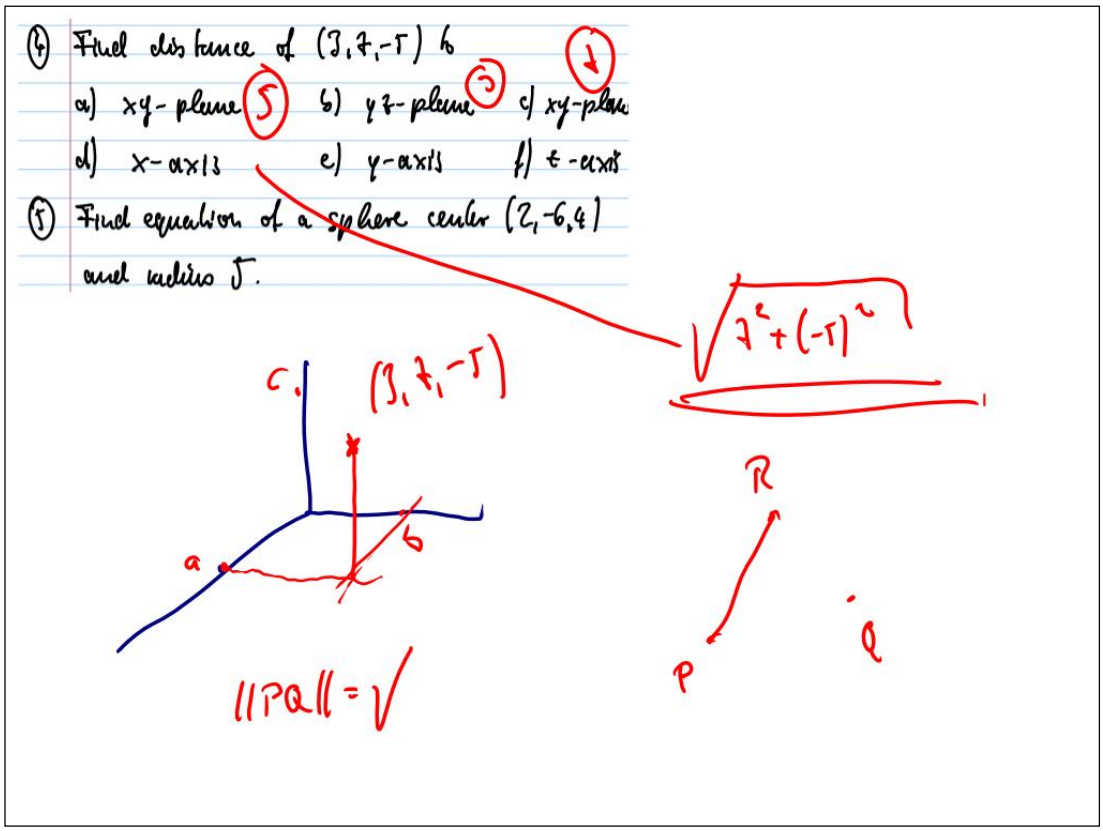
$= \frac{1}{\sqrt{14}}\cdot\sqrt{14} = 1$

Vector same dir. as $\vec{w} = \langle 3,0,2 \rangle$ but length 42:

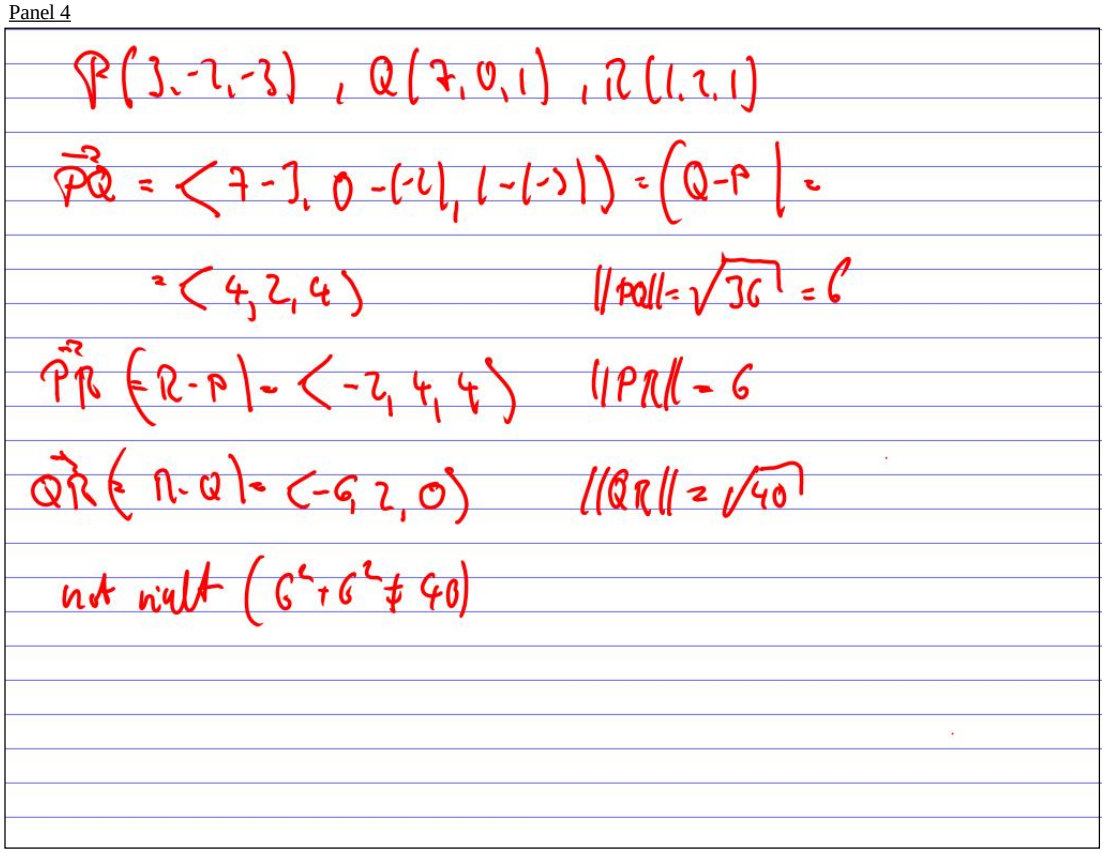
$42\cdot\frac{1}{\sqrt{13}}\langle 3,0,2 \rangle = \frac{42}{\sqrt{13}}(3,0,2)$

$= \left(\frac{3\cdot 42}{\sqrt{13}}, 0, \frac{2\cdot 42}{\sqrt{13}}\right)$

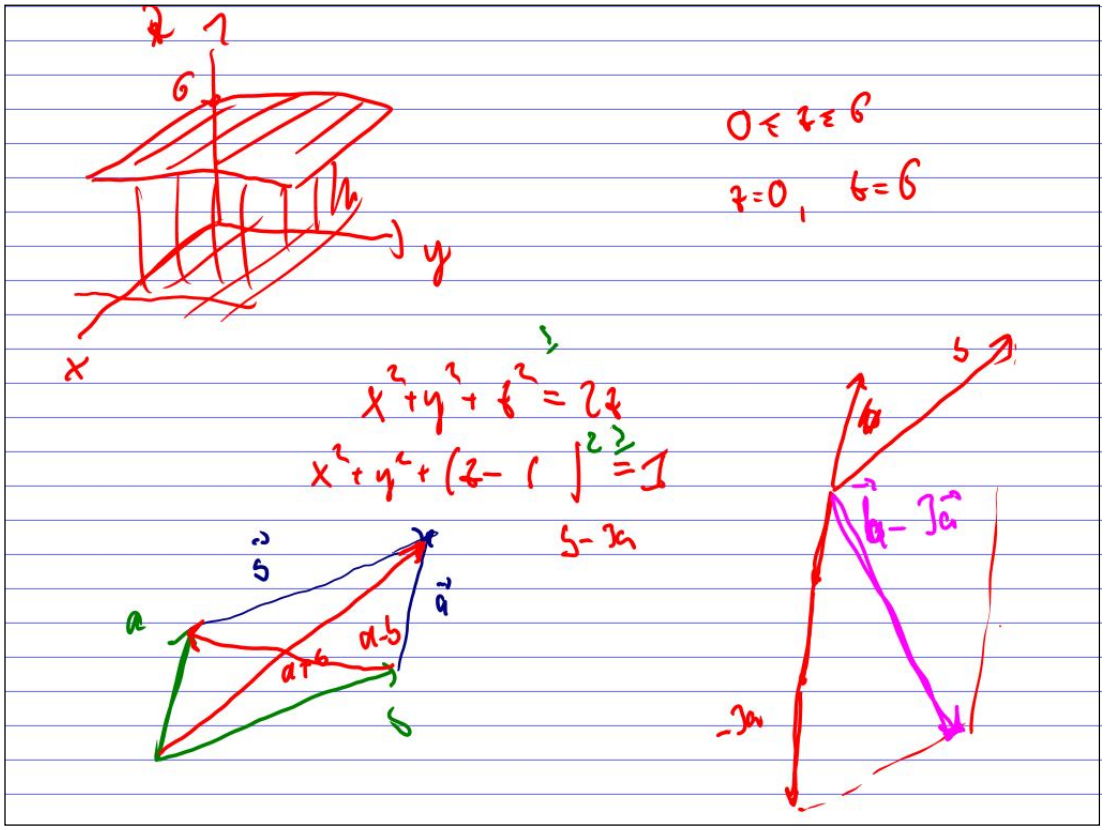
Panel 3



Panel 4



Panel 5



Panel 6

Calc 3 - Quiz #1

(1) Find the distance between $P(-1,2,0)$ and $Q(2,1,1)$.

(2) Find radius of sphere $x^2+y^2+z^2-6x+4y-2z=11$

Panel 7

③ Describe 3D object given by $x^2 + z^2 = 4$

④ Find a vector in direction $\langle -3, 4, 5 \rangle$ with length 2.