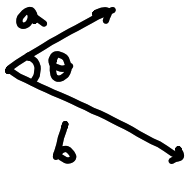
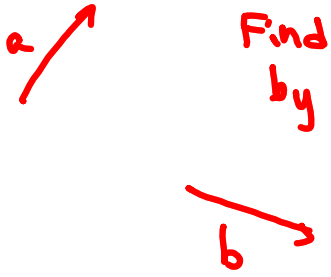
$a \cdot b = |a||b|\cos\theta$



$a = \langle 2, 1, 5 \rangle$
$b = \langle -3, 0, 2 \rangle$

Find θ formed by a & b.



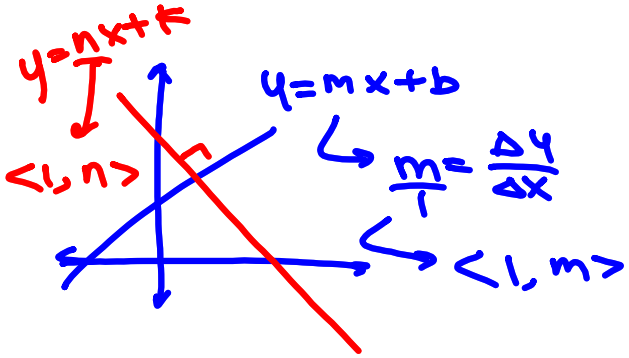
$a \cdot b = -6 + 0 + 10 = 4$

$|a| = \sqrt{30} \quad |b| = \sqrt{13}$

$\cos\theta = \frac{a \cdot b}{|a||b|} = \frac{4}{\sqrt{30}\sqrt{13}} \quad \theta = 78^\circ$

if $\theta = 90^\circ \rightarrow a \cdot b = 0$

$a \cdot b = 0 \leftrightarrow a \perp b$



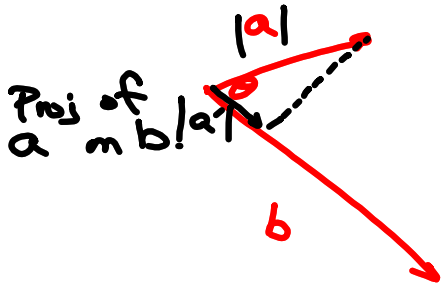
$\langle 1, n \rangle \cdot \langle 1, m \rangle = 0$

$1 + nm = 0$

$nm = -1$

mag of $\text{Proj}_b a =$

$(\text{Comp}_b a)$



$|a'| = |a|\cos\theta = \frac{a \cdot b}{|b|}$

$\text{comp}_b a = \frac{a \cdot b}{|b|}$.

$\text{Proj}_b a = \frac{a \cdot b}{|b|}\left(\frac{b}{|b|}\right)$

$a = \langle 2, 1, 5 \rangle$

$b = \langle -3, 0, 2 \rangle$

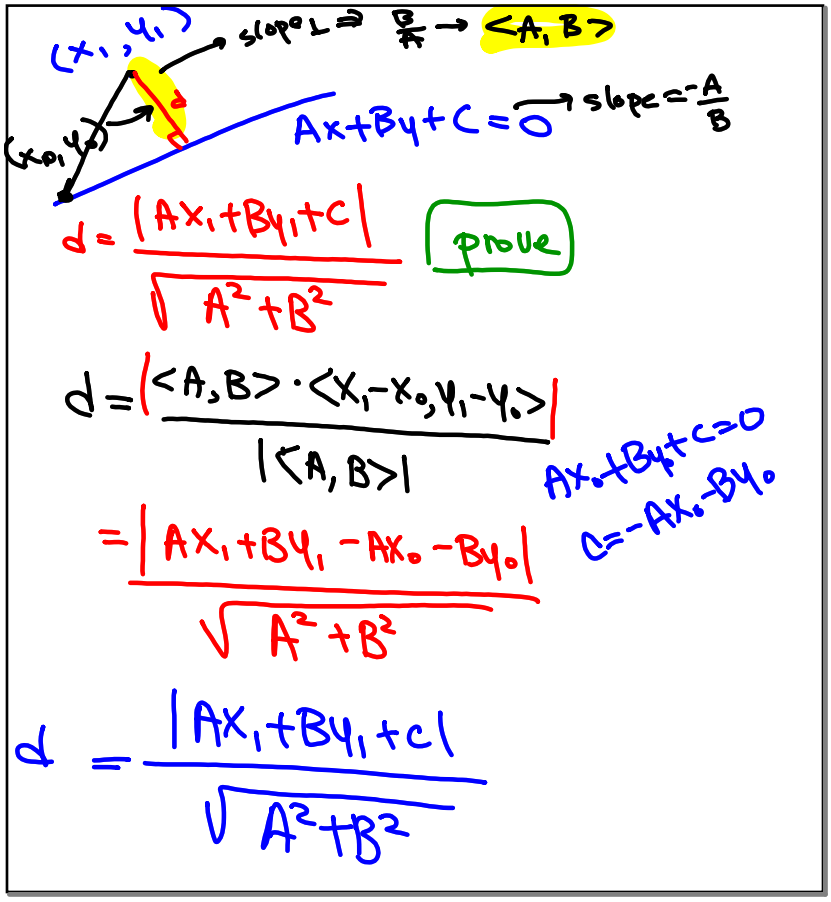
$a \cdot b = -6 + 10 = 4$

$|b| = \sqrt{9+4} = \sqrt{13}$

$\text{Comp}_b a = \frac{a \cdot b}{|b|} = \frac{4}{\sqrt{13}}$

$\text{Proj}_b a = \frac{a \cdot b}{|b|}\left(\frac{b}{|b|}\right) = \frac{4}{\sqrt{13}}\left(\frac{\langle -3, 0, 2 \rangle}{\sqrt{13}}\right)$

$= \left\langle \frac{-12}{13}, 0, \frac{8}{13} \right\rangle$


(x_1, y_1)
slope $\Rightarrow \frac{B}{A} \rightarrow \langle A, B \rangle$
(x_0, y_0)
d
$Ax+By+C=0 \rightarrow$ slope $= -\frac{A}{B}$
$d = \frac{|Ax_1+By_1+C|}{\sqrt{A^2+B^2}}$
prove
$d = \frac{|\langle A,B\rangle \cdot \langle x_1-x_0, y_1-y_0\rangle|}{|\langle A,B\rangle|}$
$Ax_0+By_0+C=0$
$C=-Ax_0-By_0$
$= \frac{|Ax_1+By_1-Ax_0-By_0|}{\sqrt{A^2+B^2}}$
$d = \frac{|Ax_1+By_1+C|}{\sqrt{A^2+B^2}}$