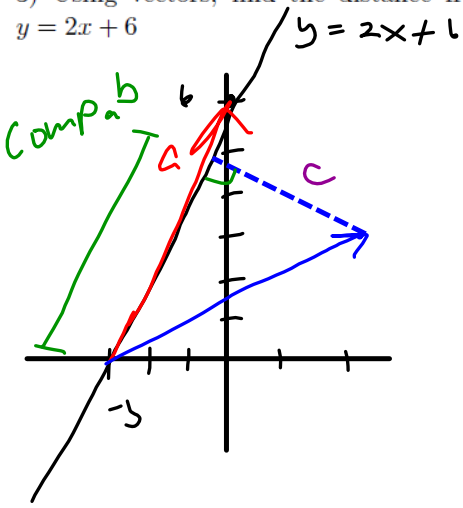
3) Using vectors, find the distance from the point $(2,3)$ to the line $y = 2x + 6$



$a = \langle 3, 6 \rangle$

$b = \langle 5, 3 \rangle$

$|a| = \sqrt{3^2+6^2} = \sqrt{45}$

$|b| = \sqrt{5^2+3^2} = \sqrt{34}$

$\text{comp}_a b = \frac{a \cdot b}{|a|} = \frac{15+18}{\sqrt{45}}$

$= \frac{33}{\sqrt{45}}$

now use the pythag. thrm to find the length of the dotted line, i.e. the distance from the point to the line.

$c^2 + (\text{comp}_a b)^2 = |b|^2$

$c^2 = |b|^2 - (\text{comp}_a b)^2$

$c^2 = 34 - \left(\frac{33}{\sqrt{45}}\right)^2$

$c^2 = 34 - \frac{1089}{45}$

$c = \sqrt{34 - \frac{1089}{45}} = \sqrt{9.8}$