<u>Example</u> If $\vec{r}'(t) = \langle 4t, 6t^2, 3\sqrt{t} \rangle$

$\vec{r}(0) = \langle 1, 2, 3 \rangle$

What is $\vec{r}(1)$?

$\vec{r}(t) = \langle f(t), g(t), h(t) \rangle$

$f'(t) = 4t \qquad f(0) = 1 \qquad f(1) = ?$

$g'(t) = 6t^2 \qquad g(0) = 2 \qquad g(1) = ?$

$h'(t) = 3\sqrt{t} \qquad h(0) = 3 \qquad h(1) = ?$

So it's just 3 SVC problems.

$$f(t) = f(0) + \int_0^t 4u \, du$$

$$= 1 + 2u^2 \Big|_{u=0}^{t} = 1 + 2t^2$$

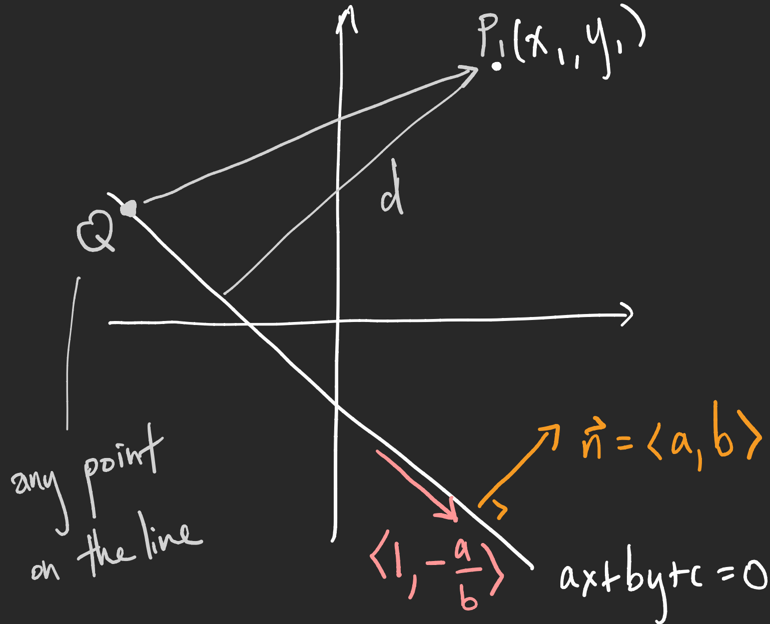
$f(1) = 3.$

Completely analogous work for the other two...

$$\vec{r}(t) = \vec{r}(0) + \int_0^t \vec{r}'(u) \, du$$

$$\langle f(t), g(t), h(t) \rangle = \langle f(0), g(0), h(0) \rangle + \left\langle \int_0^t f'(u)\,du, \int_0^t g'(u)\,du, \dots \right\rangle$$

12.3 #52)



Why $\vec{n} = \langle a, b \rangle$ works: (Assume $b \neq 0$)

$$y = -\frac{a}{b}x - \frac{c}{b}$$

So the slope is $-\frac{a}{b}$, which means the slope of a perpendicular line would be

$$-1/\left(-\frac{a}{b}\right) = b/a$$

So we could take $n = \langle 1, b/a \rangle$

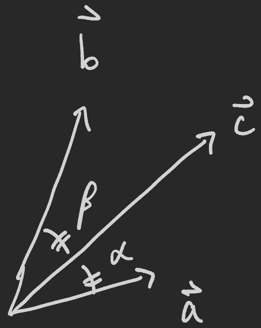
or $\langle a, b \rangle$

$$d = \left| \text{comp}_{\vec{n}} \overrightarrow{QP_1} \right|$$

absolute value

58) $\vec{c} = |\vec{a}|\vec{b} + |\vec{b}|\vec{a}$ $\quad (\vec{a}, \vec{b} \neq 0)$

then



Need to check:

$$\cos\alpha = \frac{\vec{a}\cdot\vec{c}}{|\vec{a}||\vec{c}|} = \frac{\vec{b}\cdot\vec{c}}{|\vec{b}||\vec{c}|} = \cos\beta.$$