Math 344

Q's

HW

today

13.2

talk

do 13.2 HW

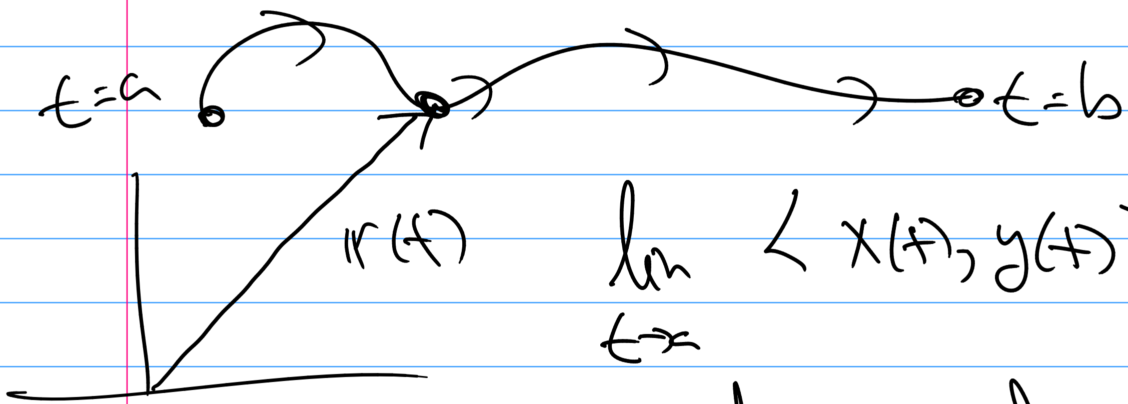
wed

Q's on 13.2

friday

48hrs

$$\mathbf{r}(t) = \langle x_1(t), x_2(t), \ldots, x_n(t) \rangle \quad a \le t \le b$$

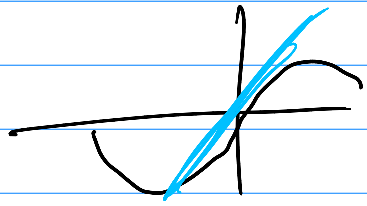


$$\lim_{t \to a} \langle x(t), y(t) \rangle$$

$$= \langle \lim_{t \to a} x(t), \lim_{t \to a} y(t) \rangle$$

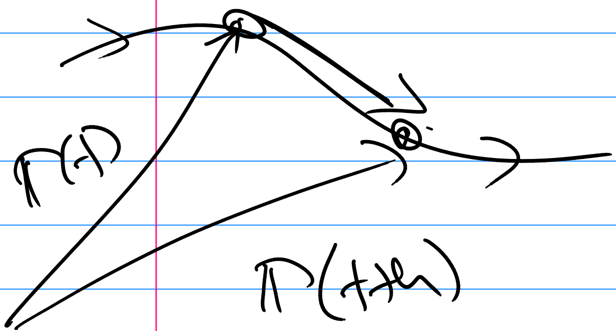
ex $\lim_{t\to 0} \left\langle \frac{\sin(t)}{t}, t^2+t+1, \frac{t^2+t}{t} \right\rangle$

$= \left\langle \lim_{t\to 0} \frac{\sin(t)}{t}, \lim_{t\to 0} t^2+t+1, \lim_{t\to 0} \frac{t^2+t}{t} \right\rangle$



$\lim_{t\to 0} t+1$

$\frac{d}{dt}[r(t)] = \frac{d}{dt}[\langle x_1(t), x_2(t), \dots \rangle]$



$\frac{d}{dt}[r(t)] = \lim_{h\to 0} \frac{r(t+h) - r(t)}{h}$

$= \lim_{h\to 0} \left\langle \frac{x_1(t+h) - x_1(t)}{h}, \frac{x_2(t+h) - x_2(t)}{h}, \dots \right\rangle$

$\boxed{3D}$

so $\frac{d}{dt}\left[\langle x(t), y(t), z(t)\rangle\right]$

$$= \left\langle \frac{d}{dt}[x(t)], \frac{d}{dt}[y(t)], \frac{d}{dt}[z(t)] \right\rangle$$

Anti Deriv. $\int \mathbf{r}(t)\,dt = \mathbb{R}(t)$

Means $\frac{d}{dt}\left[\mathbb{R}(t)\right] = \mathbf{r}(t)$

$\boxed{2D}$ $\int \langle x(t), y(t)\rangle\,dt$

$\int x(t)\,dt = X(t) + C$

$$= \left\langle \int x(t)\,dt, \int y(t)\,dt \right\rangle$$

$$= \langle X(t) + C_1, Y(t) + C_2 \rangle$$

$$= \langle X(t), Y(t) \rangle + \mathbf{c}$$

(ex) $\frac{d}{ds}\left\langle \frac{s^2+\sqrt{s}}{\sin(s)},\ t+1,\ \cos(s^3+s)\right\rangle$

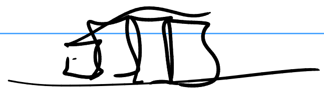
$= \left\langle \frac{d}{ds}\left(\frac{s^2+\sqrt{s}}{\sin(s)}\right),\ \frac{d}{ds}(t+1),\ \frac{d}{ds}\left(\cos(s^3+s)\right)\right\rangle$

$= \langle$ do at home!, 0, do at home! $\rangle$

def. integral $\quad \int r(t)\,dt = R(t) + C$

2D $\quad \int_a^b r(t)\,dt = \left\langle \int_a^b x(t)\,dt,\ \int_a^b y(t)\,dt \right\rangle$

Calc 1 $\quad \int_a^b f(x)\,dx = \lim_{n\to\infty} \sum_{i=1}^{n} f(x_i)\,\underbrace{\Delta x}_{\frac{b-a}{n}}$



(x) $$\int_{-1}^{1} \left\langle t\sin(t^2+1),\ \cos(t)\sin(t),\ \frac{t^3+t^2+1}{t^2-1} \right\rangle dt$$

$$= \left\langle \boxed{\int_{-1}^{1} t\sin(t^2+1)\,dt},\ \int_{-1}^{1} \cos t(\sin t)\,dt,\ \int_{-1}^{1} \frac{t^3+t^2+1}{t^2-1}\,dt \right\rangle$$

$u = t^2+1$ $\qquad u = \sin(t)$

$= \langle \quad , \quad , \quad \rangle$

$\int \cancel{\sin(t)\,dt}$

$$\frac{d}{dt}\left[u_1 \pm v_1\right] = u_1' \pm v_1'$$

$$\frac{d}{dt}\left[f(t)\,u_1(t)\right] = f'(t)\,u_1(t) + f(t)\,u_1'(t)$$

$\vdots$