Math 3414

HW to 13.3? → What to do? (xw)

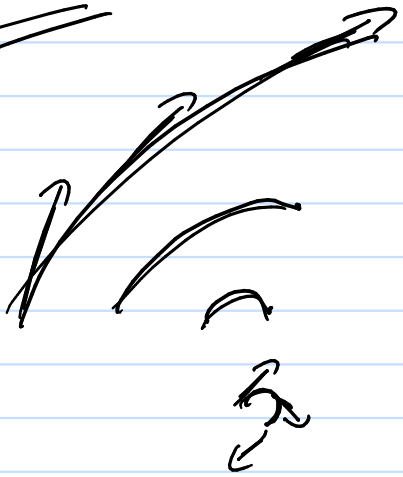
try the probs

for me -- my mistake -- in my gradebook

HW to 13.3 // (100%)

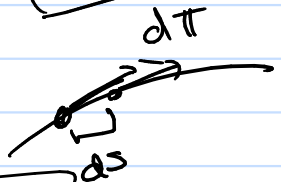
Metric → a number that has meaning for a problem.

curvature, κ



$\kappa \propto |dT|$ is $\kappa \propto \frac{1}{|ds|}$

$$\kappa = \left|\frac{dT}{ds}\right|$$



or $$\kappa = \left|\frac{dT}{ds}\right| = \left|\frac{\frac{dT}{dt}}{\frac{ds}{dt}}\right| = \frac{|T'|}{|r'|}$$

Exam 1 — 12 probs @ 10 pts each

120 pts = 100%

Wed morning (12:01 am) "open" — blackboard

Wed night (11:59 pm) "close"

→ get a pdf

→ print, do on paper (2 hrs to finish and upload a scan)

Scan? → Microsoft Lens

Ch 13

13.1 3 probs — $r(t)$ — 2D, 3D, 4D

① evaluation (intersections?)

② limits (a couple of parts)

(ex) 2a) $\lim_{t \to 3} \langle t^3+1, \cos(t), \frac{t^3-9}{t-3}, \sqrt{t} \rangle$

2b)

③ sketch (or description)

$\langle \sin(t), \cos(t), \frac{1}{t} \rangle$

$t \in (0, \infty)$

13.2 3 probs

① $\frac{\partial}{\partial t} r(t)$ or $\frac{\partial^2}{dt^2} r(t)$

$$\frac{d}{dt} \langle x(t), y(t) \rangle = \langle x', y' \rangle$$

② anti deriv

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

③ Def Int

$$\int_a^b r(t)\,dt$$

13.3 4 probs

① find arc length.

② $r(t) \rightsquigarrow s(t) \rightsquigarrow t = f(s) \rightsquigarrow r(s)$

③ find κ

④ find T, N, B

13.4 2 probs

(1) $r(t) \rightarrow v(t) \rightarrow a(t)$ sketch of plots
pos vel accel

(2) word problem for a projectile.

$a(t) \rightarrow v(t) \rightarrow r(t)$

$r(t) \rightarrow s(t) \rightarrow$ etc

(ex) $r(t) = \langle t, t^3, \frac{1}{t} \rangle$ $s(t)$ from 1 to t

$$s(t) = \int_1^t |r'| \, du = \int_1^t \sqrt{(1)^2 + (3u^2)^2 + \left(\frac{-1}{u^2}\right)^2} \, du$$

$s(t) = 3t^2 + 1$

$$\frac{1}{3}(s-1)^{1/2} = t$$

$$r(s) = \left\langle \left(\tfrac{1}{3}(s-1)\right)^{1/2}, \left(\tfrac{1}{3}(s-1)\right)^{3/2}, \left(\tfrac{1}{3}(s-1)\right)^{-1/2} \right\rangle$$