Suggested Review:

AP Parametrics Problems: Page 16, Parametrics Packet,

Multiple Choice Problems: Page 11, #55, 56, 58

DO NOW:

Go over HW with your group; any questions?

Greatest Hits

1) Position, Velocity, Acceleration VECTORS

2) Speed SCALAR

3) Arc Length, non parametrically

and parametrically

4) Distance Traveled vs. Displacement

5) Slope of Curves defined parametrically

6) Know how to use your calculator for these problems

7) Basic Justifications of motion based on the values of these equations.

In AP Problems, you are often given:

1) The velocity vector as complicated functions

$\frac{dx}{dt} = \ln(\cos\sqrt{t})$ $\frac{dy}{dt} = \text{arcsec}(t^{22.5})$

2) The position at a particular time at $t=7$ point is $(4,2)$

You may be asked to find:

1) Acceleration at a particular time

Use NDERIV $\left\langle \left.\frac{d^2x}{dt^2}\right|_{t_1}, \left.\frac{d^2y}{dt^2}\right|_{t_1} \right\rangle$

2) Speed at a particular time

Calculator $\sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}$ at $t=t_1$

3)Total Distance traveled for a particular time interval

$\int_{t=a}^{t=b} \text{speed}\ dt$

4) Position at a particular time

$\langle x_1, y_1 \rangle = \left\langle x_0 + \int_a^b \frac{dx}{dt}dt,\ y_0 + \int_a^b \frac{dy}{dt}dt \right\rangle$

5) Equation of the tangent at a particular time

Pt-slope form: Know the point, slope $= \frac{dy}{dx} = \frac{\frac{dy}{dt}}{\frac{dx}{dt}}$

6) When is a tangent vertical, have a slope of 2

$\frac{dx}{dt}=0$ and $\frac{dy}{dt}\neq 0$ $\frac{dy}{dt}=2\frac{dx}{dt}$

7) When does the speed have a particular value

$\sqrt{\left(\frac{dx}{dt}\right)^2+\left(\frac{dy}{dt}\right)^2}=K$ graph or SOLVER

When should you use your calculator on parametrics problems?

How can you use it most effectively?

Make sure you are in radians

PAR mode

Alpha window – fnInt

Alpha trace ~~con~~functions NDERIV

Put $\frac{dx}{dt} = X_{1T}$ $\frac{dy}{dt} = Y_{1T}$

When should you use your calculator on parametrics problems?

How can you use it most effectively?

You will have the calculator for the WHOLE test.

Given $\frac{dx}{dt}$ $\frac{dy}{dt}$

Alpha Trace

Alpha Windows

X_{1T} Y_{1T}

Vars

Y-Vars

Parametric

$\int$ fnInt NDeriv(function, var, value)

Solver to find when speed has a particular value

When should you use your calculator on parametrics problems?

How can you use it most effectively?

Finding acceleration from velocity for a single time, use NDERIV

Put $X_{1T} = \frac{dx}{dt}$ Under VARS

$Y_{1T} = \frac{dy}{dt}$ Y-VARS, PARAMETRIC

Find when $\frac{dx}{dt}$ or $\frac{dy}{dt}$ have particular values, use SOLVER or graph→INTERSECT

When should you use your calculator on parametrics problems?

How can you use it most effectively?

$\frac{dx}{dt} = 3\sin(t^3)e^{t^2}$ $\frac{dy}{dt} = \arctan\left(\frac{1}{1+t^2}\right)$

$X_1(T)$ $Y_1(T)$

Acceleration at $t = 5$

$\left\langle \left.\frac{d^2x}{dt^2}\right|_{t=5} \left.\frac{d^2y}{dt^2}\right|_{t=5} \right\rangle$ Use NDERIV

NDERIV(function, variable, value)

Position at a point at a given time:

$\langle x(1), y(1)\rangle = \left\langle x(0) + \int_0^1 \frac{dx}{dt}dt, y(0) + \int_0^1 \frac{dy}{dt}dt \right\rangle$

Distance traveled $\int_a^b \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\,dt$

SOLVER to find when slope, speed is a particular value.