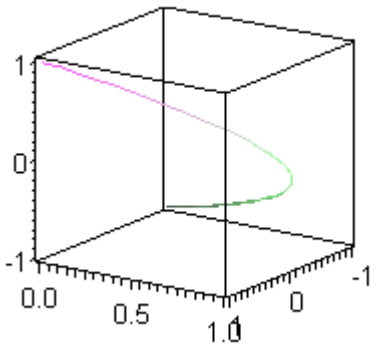
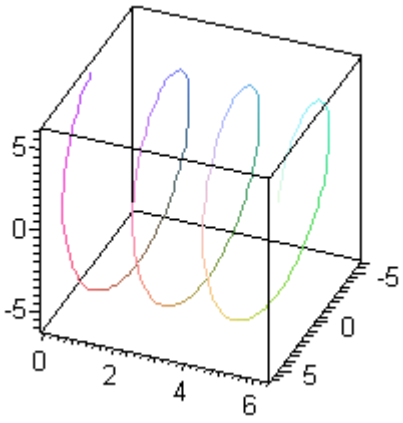
Name _____
C. W. Ehler, Inst.

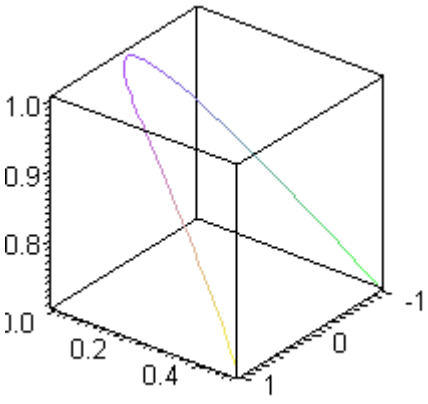
SM223 Performance Opportunity # 2 25 Sep 2008

A

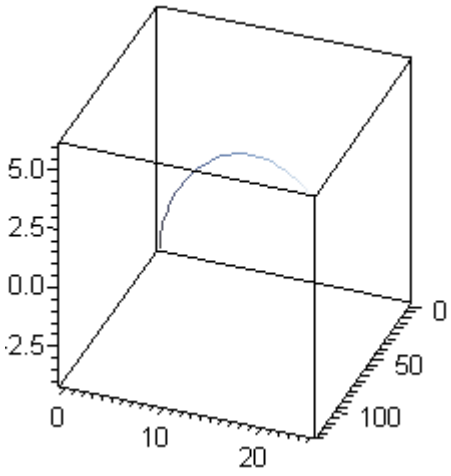


B





C



D

1. Match the function with its graph:

   a. **r**(t) = < 6 sin(π t), t, 6 sin(π t) >

   b. **r**(t) = < cos(t), 1 – (cos(t))^2, cos(t) >

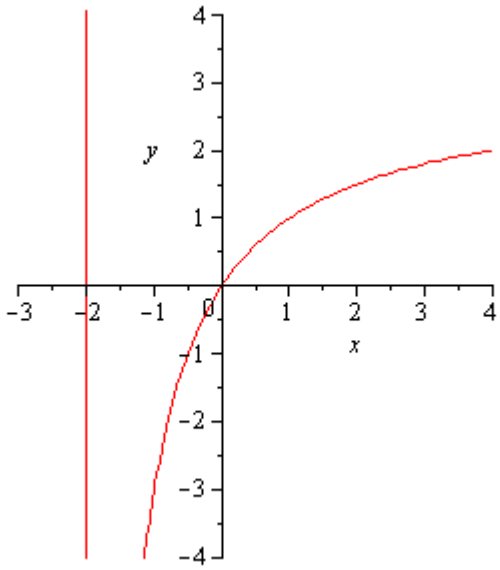
2. Sketch the function **r**(t) = < 3, $t^2 + 1$, t >.

3. Find all values of t such that **r** '(t) lies in the xy-plane (i.e. z = 0) if **r**(t) = < cos(t), sin(t), sin(2t) >

4. Find the position function **r**(t) if **v**(t) = < t + 2, t^2, $e^{-t/3}$ > and **r**(0) = <4, 0, -3 >.

5. Find the arc length along the curve defined by **r**(t) = < cos(π t) , sin(π t) , cos(4π t) > with $0 \leq t \leq 2$.

6. A graph of **r**(t) = < 2 t^{-1}, 3(t + 1) $^{-1}$ > is shown below.



a. Plot the position vector and the velocity vectors for t = ½, t = 1, and t = 2.
b. Show that the equation in x, y form is y = 3x/(2 + x)

7. A projectile is fired horizontally with a velocity of 1800 feet per second from an altitude of 1000 feet above the level ground. When and where does it strike the ground?

8. A quarterback on a football team throws a pass, releasing the ball at an angle of 30º with the horizontal. Approximate the velocity at which the football must be released to reach a receiver 50 ***yards*** downfield. (Neglect air resistance).