1. Reparametrize $r(t)$ with respect to arc length.

2. Given the position vector of a particle, find its speed, velocity, acceleration. Also, find when is the particle moving horizontally or vertically.

3. If you are given the acceleration function, find the velocity and position functions.

4. Find the TNB frame of $r(t)$.

5. LEVEL CURVES. What is a level curve? Let $f(x, y)$ be any function of 2 variable. Sketch the level curves of f for the values $c = 0$, $c = 2$, and $c = -1$.

6. LIMITS and CONTINUITY.

   a) To show a limit DOES NOT exists: find 2 different paths which give you different answers. Sometimes it's easier if you write the function in polar coordinates.

   b) To show a limit DOES exist: use the squeeze theorem, or plug in the numbers and get a number (for instance, find $\lim_{(x,y)\to(1,2)}(xy^2 - x^3)$).

7. IMPLICIT DIFFERENTIATION. page 907.

8. CHAIN RULE. Find $\dfrac{\partial f(x,y)}{\partial u}$ and $\dfrac{\partial f(x,y)}{\partial v}$ where x and y are functions of u and v.

9. DIRECTIONAL DERIVATIVE. Let $f(x, y)$ be a continuous function. Let (a, b) be a point in the domain of f. What is the rate of change of f in the direction of the vector $u =< 2, -3 >$? What is the greatest rate of change of f and in which direction is it happening?

Good luck!