1. Know how to use the dot - product and cross - product to find angles, areas, components, equations of planes and lines (11.3, 11.4, 11.6)
2. Curvilinear motion: parametrized curves, velocity, speed, acceleration, tangent vectors and tangent lines (11.5).
3. Surfaces in space (11.8).
4. Spherical coordinates (11.9),and know polar coordinates from before. Polar coordinates are closely related the cylindrical coordinates discussed in (11.9).
5. Know how to find partial derivatives and what they mean (12.2).
6. Differentiability of functions of two variables (12.4): know how to find directional derivatives in terms of the gradient, how to find directions of greatest increase and decrease (12.5).
7. Know how to find equation of tangent plane to the graph $z = f(x, y)$ and how to use this information to approximate values of functions (12.7).
8. Know how to find maxima and minima of functions on a set S (12.8). Remember that his usually involves three steps:
   (a) Find critical points in the interior by solving the equation $\nabla f(\mathbf{p}) = 0$.
   (b) Find critical points on the boundary by either parametrizing the boundary and solving a one-variable calculus problem (12.8) or by Lagrange's mehod ((12.9), optional).
   (c) Compare the values of the function at all these points to find global maximum and minimum.
9. Double integrals: Know how to find limits for the region of integration (13.2 and 13.3), how to evaluate the integrals, how interchange order of integration.
10. Know how to recognize when to change to polar coordinates and how to do it (13.4).
11. Know some applications, for example, how to find areas, volumes (13.5) or surface area (13.6).
12. Same for triple integrals (13.7 and 13.8).
13. Vector fields: know how to find divergence and curl (14.1).
14. Know how to compute line integrals (14.2).
15. Know how to decide if a line integral is independent of path, how to find a potential function (when possible) and how to use the potential function to compute a line integral (14.3).
16. Know how to use Green's theorem (14.4)
17. Know how to use the divergence theorem in the plane (14.4).