MAC2313 Calculus III
Mid-Term Examination Topic Outline

1. Determine the distance between two points in 3-space
2. Determine the equation of a sphere given its center & radius
3. Describe a surface from a given equation
4. Construct a vector in 2- or 3-space
5. Perform operations on vectors utilizing given relationships
6. Determine the magnitude of a vector
7. Unitize a given vector [find a unit vector in the direction of **v**]
8. Determine the resultant of and/or the angle between two forces/vectors
9. Find the dot product of two vectors
10. Find the angle between two vectors using the dot product
11. Find the direction cosines of given vectors
12. Determine the projection of one vector onto another vector
13. Find scalar values [a, b, c] to construct linear combinations of vectors
14. Determine the displacement vector
15. Determine the work done by a vector force
16. Determine the cross product of given vectors
17. Determine the area of a parallelogram
18. Determine the triple scalar product of three vectors
19. Determine the volume of a parallelpiped
20. Determine the torque and/or torque vector of a force F about a point P.
21. Determine the parametric equation of a line in 2- or 3-space satisfying stated conditions
22. Determine the of the equation of a plane given conditions [parametric and symmetric]
23. Determine the acute angle of intersection between to intersecting planes
24. Determine the equation of a line of intersection between two planes
25. Determine the distance between a point and a plane
26. Identify the type and/or sketch the graph of a given quadric surface

27. Identify the component form of a vector-valued function
28. Determine the domain of a vector-valued function
29. Determine the continuity and/or differentiability of a vector-valued function
30. Differentiate/integrate vector-valued functions
31. Determine the arc length of a vector-valued function
32. Determine an arc length parameterization of a vector-valued function
33. Find **T, N, B,**
34. Find equations for the rectifying, osculating, and normal planes for a given vector-valued function
35. Find the curvature κ and the radius of curvature ρ
36. Determine the velocity, acceleration, and speed of a given vector-valued function
37. Determine the tangential scalar component , the normal scalar component, the tangential vector component, and the normal vector component
38. Determine projectile motion
39. Find the position and velocity vectors from given information

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40. Sketch level curves/surfaces of given functions
41. Evaluate given functions
42. Describe the domain of a function *f* in words
43. Determine the limit and continuity of a given function
44. Find the partial derivative of a given function
45. Find a locally linear approximation to a given function
46. Utilize the multi-variate chain rule to find requested derivatives
47. Determine if given functions satisfy LaPlace's Equation and/or Cauchy-Riemann Equations
48. Solve associated applications to the above

Chapter Practice Exercises

p. 757	1 – 76, every other odd
p. 802	1 – 29, odd
p. 891	1 – 34, odd

And study your take-home tests and in-class quizzes