Midterm 2 study guide

- Make sure you can do all the practice problems listed in the notes from chapters 13 and 14.
- Definitions and Theorems you need to know to state and use:

  1. Vectors, their components, length, equivalence
  2. Adding vectors, algebraically and geometrically
  3. Difference of vectors
  4. Multiplying vector by scalar, algebraically and geometrically
  5. Algebra properties for vectors
  6. Unit vector
  7. Triangle inequality
  8. Equations for a line in 3-space: Based on two points, or on point plus vector
  9. Both vector equations and parametric coordinate equations
  10. Finding the intersection of two lines
  11. Dot product between two vectors
  12. Algebraic properties of dot product
  13. Geometric formula of dot product (13.3 theorem 2)
  14. Vectors perpendicular if dot product is 0
  15. Projection of a vector along another vector (13.3 theorem 3)
  16. Cross-product, definition via 3x3 determinant
  17. Properties of cross-product
  18. Volume of parallepiped defined by 3 vectors
  19. Geometric interpretation of cross-product (perpendicular to the two vectors, length equals the area of the parallelogram defined by the two vectors)
  20. Equations for planes: Vector form and scalar forms.
  21. How to find if two planes are parallel, or if they intersect, and how to find the line they intersect.
  22. Finding plane:
      - passing through 3 points
      - containing a point and a line
      - containing 2 intersecting lines
  23. Vector-valued functions, finding derivatives and integrals
  24. Rules for derivatives of vector-valued functions
  25. Finding tangent line to a vector-valued function at a point
  26. Finding the arc length of a vector-valued function
  27. Computing the curvature of a vector-valued function

- Extra practice problems, from the “Chapter Review Exercises” on pages 726 and 778:
  - 726: 5, 6, 8, 11, 18, 21, 22, 23, 24, 32, 33, 40
  - 726: 46, 47, 49, 52
  - 778: 5, 6, 9, 12, 13, 21, 24, 29, 30, 31, 32