



## EXAM I REVIEW

### TEXTBOOK REFERENCE:

- *Vector Calculus*, Colley, 4th Edition: §1.1-1.5, 1.7, 3.1, 3.3
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### TOPICS TO KNOW:

- dot product formulae, magnitude/length, displacement vectors, position vector
- cross product formulae, cross product properties, geometric applications of cross product (e.g. area of triangle, volume of parallelepiped)
- distance formulae: distance between points, distance from point to plane, distance between parallel planes.
- parametric description of a line
- equation of a plane, parametric description of a plane, normal vectors to a plane
- spherical, cylindrical, polar coordinate systems; coordinate transformations
- paths, image curves, velocity vectors, tangent lines
- vector fields, plotting vector fields, flow lines

### COMPUTATIONS TO KNOW:

- How to compute the dot product using algebraic and geometric formulae.
- How to compute magnitude of a vector.
- How to compute the cross product.
- How to compute the distance between points.
- How to compute a parametric description of a line.
- How to compute the equation of a plane; how to compute a parametric description of a plane; how to compute a normal vector to a plane.
- How to transform equations between coordinate systems.
- How to compute velocity vectors.
- How to compute tangent lines.
- How to check if a path is a flow line for a vector field.