

Test 1: All Unit 1 notes and posted Unit 1 slides

Basic sing. var. calc. knowledge

- Differentiation of basic functions like $(\sin x, \cos x, e^x, x^p \text{ for } p \in \mathbb{R}, \ln x)$; Product, quotient, and chain rule.
- Equations for 2D curves: lines, parabolas, hyperbolas, ellipses, trig functions, logarithms etc.
- Computation of limits: simplifying, l'Hospital's rule.

Chapter 12

- **12.1:** Coordinate axes; Points; Coordinate planes; Projection on coordinate plane; Surfaces; Distance between points; Eqn. of a sphere.
- **12.2** Vectors: Definition, notation, scalar multiplication, vector addition, and vectors between 2 points; Length of a vector; Unit vector; Newton's 2nd law and tensions.
- **12.3** Dot product definition; Geometric interpretation: Angle and perpendicular vectors; Orthogonal projection.
- **12.4** Cross product; Geometric interpretation; Area of a parallelogram.
- **12.5** Vector and parametric equation of a line; Equation of a plane; Parallel lines and parallel planes; Intersection of a line and plane; Intersection of two planes
- **12.6** Sketching of surfaces using cross-sections: cylinders and quadric surfaces (Show shape, orientation, and position).

Chapter 14

- **14.1** Evaluating functions; Domain and range; Graph; Level curves; Matching graphs and level curves.
- **14.2** Two-path test for nonexistence of a limit; Showing existence of a limit: canceling common factors and polar coordinates; Continuity of $f(x, y)$.
- **14.3** Partial derivatives: Notation and computation; Approximating partial derivatives and limit definition; Mixed Derivative Theorem; Geometric interpretation; Implicit differentiation for $z(x, y)$.
- **14.4** Tangent plane to graphs $z = f(x, y)$; Linearization; Linear approximation.

What NOT to know? Things that I didn't discuss during class.

- Proofs.
- Sec. 12.3: Direction angles and direction cosines (p. 810)
- Sec. 12.4: Triple products (p. 819-820)
- Sec. 12.5: Symmetric equations; Skew lines; Angle between planes (p. 828); Example 9, 10 (p. 830).
- Sec. 14.1: Functions of 3 or more variables (p. 897-898).
- Sec. 14.2: δ - ϵ definition for limits (p. 904-905, Example 4, and p. 910).
- Sec. 14.3: Partial differential equations (p. 920-21); Cobb-Douglas production function (p. 922-23)
- Sec. 14.4: Differentiable (p. 930-31).