

# Math 0120 Final Exam Checklist

The checklist of skills listed below is compiled from several recent final exams for the course.

- Find the equation of a line.
- Evaluate limits of algebraic functions.
- Instantaneous rate of change (absolute and relative).
  - The instantaneous growth rate of  $y = f(x)$  at  $x = x_0$  is  $f'(x_0)$ .
  - The relative growth rate of  $y = f(x)$  is  $\frac{f'(x)}{f(x)} = \frac{d}{dx} \ln(f(x))$
- Log and exponential functions.
  - Simplify expressions involving logs and exponentials.
  - Continuously and annually compounded interest. Doubling time.
  - Conversion between base  $e$  and other bases.
- Find derivatives of functions using formulas for powers, logs, exponentials, and rules for sums, products, quotients, and compositions.
- Find tangent line to a given curve at a given point.
- Implicit differentiation.
- Related rates.
- Elasticity of demand: Calculate elasticity of demand and interpret elastic and inelastic demand in terms of revenue.
- Find definite and indefinite integrals.
  - Rules for powers, sums, constant multiples, and exponentials.
  - Integration by substitution.
  - Integrate by parts. Especially integrals of the forms  $\int x e^{ax} dx$  and  $\int x^p \ln x dx$ .
- Optimization problems.
  - Geometric problems involving length, area, volume.
  - Financial problems involving profit, revenue, cost.
- Sketch a graph using the first and second derivatives.
- Calculate total change from rate of change using integration.
- Area between curves.
- Calculate market equilibrium and consumer and producer surplus from supply and demand curves.
- Relative extrema for functions of two variables: Second Derivative Test.
- Constrained optimization: Lagrange multipliers.