

1. Prelims. the area model, factoring polynomials, absolute value problems, lines, distance in the plane.
2. Limits: right, left, and two-sided. Also, limits as $x \rightarrow \infty$, that is infinity (horizontal asymptotes). And, finding limits, especially resolving zero over zero problems using one of the four discussed techniques
 - (a) factoring
 - (b) rationalizing the numerator or denominator
 - (c) subtraction of fractions
 - (d) expansion of powers
3. The algebra of limits.
4. The algebra of functions:
 - (a) combine functions using the four arithmetic operations ($f \cdot g$, f/g , $f + g$, and $f - g$)
 - (b) combine functions using composition ($f \circ g$)
5. The algebra of continuous functions and the Intermediate Value Theorem
6. Finding Derivatives (the algebra of derivatives)
 - (a) calculating them from the definition
 - (b) using formulas, especially the Chain Rule
7. Using the first and 2nd derivatives. You need to know the Test Interval Technique in order to produce the sign charts for f , f' , and f'' . You should be able to say what the sign charts for f' and f'' tell you about the function f .
 - (a) to find tangent lines
 - (b) intervals over which the function is increasing / decreasing
 - (c) intervals over which the function is concave up / down
 - (d) relative max and min
 - (e) classification of max and min
 - (f) understand the geometry of the derivative. Given the graph of a function, sketch the graph of the derivative, and given the derivative of a function sketch an antiderivative.

8. Exponential models We study five of these: growth and decay, Newton's Law of Cooling and the learning curve, and the logistic model.
9. Antiderivatives
 - (a) The algebra of antiderivatives
 - (b) Find antiderivatives using substitution
 - (c) Find areas of regions bounded by lines and graphs of functions