

Review for Test 3: Sections 2.6, 3.1 – 3.7, 3.9

Only scientific calculators will be allowed on the exam. The exam will be written in such a way that calculators will not be necessary; i.e., the calculations will be with simple numbers

Assigned problems: page 113: 23, 24 (True), 25, 26 (True), 27. Also review your notes in Section 2.6 about Differentiability and review the homework from that section.

page 168: 1 – 25 eoo, 27 – 71 eoo, 75 – 79 odd, 81, 85, 87, 95, 97cdf, 107

page 182: 1, 5, 9, 15

Concepts:

- Differentiability
 - Given a graph of a function, determine points at which the function is not differentiable. Be able to explain WHY the function is not differentiable at these points.
 - Given a piecewise-defined function (given algebraically), be able to graph and determine points at which the function is not differentiable.
 - Given an absolute value function, be able to rewrite it in piecewise form and identify the point of non-differentiability.
- Find the derivative of a function using the FORMAL definition of the derivative (i.e., the limit definition)
This requires that you use analytic techniques, meaning setting up the limit for $f'(x)$, then evaluating the limit algebraically.
- Know and be able to write down, in general form, all of the rules of differentiation.
- Apply the rules of differentiation in finding derivatives.
- Given an equation containing both x and y as variables, **use implicit differentiation** to find $\frac{dy}{dx}$.
Also determine where the tangent line is vertical or horizontal.
- Show graphically that $\frac{d}{dx}(\cos x) = -\sin x$ or that $\frac{d}{dx}(\sin x) = \cos x$
- Be able to derive the formula for $\frac{d}{dx}(\ln x)$
- Be able to use the derivative to find the equation of the line tangent to a function at a point $x = a$
 - Use the “local linearization” (i.e., the tangent line) to approximate function values.
 - Determine the error of estimation
 - Know the relationship between concavity and error of estimation.
 - Illustrate all of the above using a graph.

