Exam Format

You may **not** use a graphing calculator on parts of this exam. You are welcome to use a non-graphing calculator on any of it if you so desire.

Things You Should Know/Be Able to Do

Many of the OpenStax exercises have a paragraph above the first one telling you more details about the problem, so if you're not sure what the question is asking, look above it to see if there's a paragraph starting with "In the following exercises...."

Note also that reviewing problems from your homework and WeBWorK can be helpful.

- (D9) Use implicit differentiation, including to find an equation for the tangent line to a graph at a given point and to find where a tangent line has a given slope. (e.g., Apex Section 2.6 Exercises 13–17, 19–23, 26(a)–(c), 27(a), 28–35; OpenStax Section 3.8 Exercises 300–316(a), 318, 319, 322–325)
- (A5) Solve related rates problems. (e.g., Apex Section 4.2 Exercises 3–6, 9–15; OpenStax Section 4.1 Exercises 1–3, 5–15)
- (A2) Find absolute and local maximums and minimums of a function (e.g., Apex Section 3.1 Exercises 2–7, 15–20, 24, Section 3.4 Exercises 29–38, 42–51; OpenStax Section 4.3 Exercises 90–95, 100–103, 118–140)
- (D8) Verify that a function satisfies Rolle's Theorem (e.g., Apex Section 3.2 Exercises 3–10)
- (D8) Prove that an equation has at least one or exactly one real root (e.g., OpenStax Section 4.4 Exercise 182)
- (D8) Verify that a function satisfies the Mean Value Theorem (e.g., Apex Section 3.2 Exercises 11–15, 17–19; OpenStax Section 4.4 Exercises 152–156, 161–170, 173–178, 180–181)
- (D8) Use the Mean Value Theorem to answer questions about a function (OpenStax Section 4.4 Exercises 148–151, 190–191)
- (A3) Sketch the graph of a given function using calculus considering all the possible features (e.g., Apex Section 3.3 Exercises 14–23 (these only ask for increasing and decreasing behavior), Section 3.4 Exercises 16–25 (these only ask for concavity), Section 3.5 Exercises 12–15, 18–21, 23–25; OpenStax Section 4.5 Exercises 221–237, 239, Section 4.6 Exercises 294–301, 303, 305)
- (A3) Sketch the graph of a function that satisfies given criteria (e.g., Apex Section 3.4 Exercises 1–4; OpenStax Section 4.3 Exercises 96–98, 104–107, Section 4.5 Exercises 216–220, Section 4.6 Exercises 285–288)
- (A2) Find intervals of increase/decrease and concavity based on the graph of a function, its derivative, or its second derivative. (e.g., OpenStax Section 4.5 Exercises 201–215 (note that the given graph in each case is the graph of **the derivative** of $f(x)$), 241–245)