Topics for Final Exam
Math 30, Fall 2018

The final exam will be comprehensive, and will therefore involve both the topics on this sheet and **all previous topics**. There will be some emphasis on the topics listed here, but everything we have covered is fair game.

Your first priority should be to understand the homework and the principles behind it. Besides the list below, you should also be familiar with everything specially emphasized in the text (i.e., the red boxes), and all the examples in the text. If time permits, try to do the example problems in the text by yourself.

Section 4.3. Definition: Concave up/down. **THE BOX:** Sign of f', f increasing/decreasing; sign of f'', f' increasing/decreasing, f concave up/down. Testing critical numbers for local min/max: First Derivative Test, Second Derivative Test.

Section 4.5. Curve sketching. Things to do with f: domain, intercepts, symmetry, periodicity, asymptotes. Things to do with f': intervals of increase or decrease, local max/min. Things to do with f'': intervals of concavity, inflection points.

Section 4.7. Idea of optimization. Steps in solving optimization problems (pp. 331–332). Using f' to find *absolute* min/max (especially when Closed Interval Method doesn't work). Problems.

Section 4.9. Definition of antiderivative; how "most general antiderivative" works; basic antidifferentiation formulas. Acceleration, velocity, position: word problems.

Geometry formulas. Area of rectangle, circle, triangle. Circumference of circle, perimeter of rectangle. Surface area of sphere, side of cylinder. Volume of box, sphere, cylinder. Trig: Pythagorean Theorem, SOHCAHTOA. Solving trig equations: $\sin x = a$, $\cos x = b$, $\tan x = c$.

Stuff not on exam. (4.5) Slant asymptotes.