List of topics and problems for final exam. The following is a list of topics that are included in the final. The first part is a list of topics that will be **dropped** from the first and second midterm list of topics (as shown in the guides for those two midterms). The last part is a list of new topics included in the final but not in the midterms. Be sure you understand concepts, there will be some true/false questions to assess just that.

Topics from the first midterm that will not be included in the final

(1) Definition of function, domain and range. Be able to identify a function from its graph and to find its domain and range. (There won't be specific questions about this, although you need to know the domain and range of a function, etc.)
(2) Intuitive and formal $\epsilon - \delta$ definition, including interpretation as the propagation of errors.
(3) The formal $\epsilon - \delta$ definition of side limit.
(4) The formal $\epsilon - A$ definitions of limit at $\pm\infty$.

Topics from the second midterm that will not be included in the final

(1) Chapter 5
    (a) Intermediate value theorem: Although we use it in graphing I will not have questions specific about the intermediate value theorem, or problems using it to solve equations.
    (b) The mean value theorem. It is important but I will not include it in the final.
    (c) Parametrized curves. You need to know what the velocity of a parametrized curve is for the last part of the course (it is used in arc-length), but I will drop the rest.
(2) Chapter 7
    (a) Definition of Riemann sum.

Extra topics for the final

(1) The principle of slicing: a volume can be calculated as the integral of the areas of its sections. Understand well how either Leibniz or Riemann understood the calculation of volumes (as the sum of very small volumes - slices - of cylinders with infinitesimal height). This can be used for a True/False question.
(2) Volumes of revolutions:
    (a) Volume of a solid generated by rotating **a function** around an axis.
    (b) Method of washers for calculating volumes generated when rotating **an area** around the axis. The axis can be very varied: x-axis, y-axis, or other axis parallel to any of these two. Problems are as in the homework. Do not memorize formulas if you can avoid it, these are hard to do from memory.
    (c) Method of cylindrical shells for calculating volumes generated when rotating an area around the y-axis. Problems are, again, as in the homework; and again, try not to memorize formulas.
(3) Motions:
    (a) Calculate distance from velocity: if you know the velocity, how would you calculate the distance? Both in the linear motion case, and in the curve case. You do not need to reproduce how to obtain the formula, although it will help you if you understand the process.
    (b) Arc-length for a parametrized curve: what it represents and its formula (the integral of the velocity). Problems as in the homework.
    (c) Calculate the velocity from the acceleration. Similar to obtaining the distance from the velocity. Only for linear movements. Part of this is knowing how to model the free fall motion from the fact that the acceleration is constant. I can ask you to reproduce the formula for free fall.
    (d) Work: formula for work, what it means and how to find it.