Final Exam Part 1 Preparation

1. This two or three question test covers 8.1-8.3 and 10.1-10.4.
2. Use the homework, class work, and class examples as a study guide. In other words, any problem from the homework or class work is fair-game on the exam.
3. Memorize the following:

   a) Arc length formula: $s = \int ds$, where $ds = \sqrt{\left(\frac{dx}{dt}\right)^2 + \left(\frac{dy}{dt}\right)^2}\,dt$

   b) Area of a surface of revolution: $S = 2\pi \int r ds$, where r is the radius function from the axis of rotation to the curve that generates the surface.

   c) Hydrostatic Force = (Weight Density)(Depth)(Area).

   d) $Area = A = \int_a^b \int_{g(x)}^{f(x)} dydx$, $\bar{x} = \frac{1}{A}\int_a^b \int_{g(x)}^{f(x)} xdydx$, $\bar{y} = \frac{1}{A}\int_a^b \int_{g(x)}^{f(x)} ydydx$

   e) The first and second derivative in parametric form: $\frac{dy}{dx} = \frac{dy/dt}{dx/dt}$ and $\frac{d^2y}{dx^2} = \frac{\frac{d}{dt}\left(\frac{dy}{dx}\right)}{\frac{dx}{dt}}$.

   f) Area in parametric form: $A = \int_\alpha^\beta g(t) f'(t) dt$.

   g) The formulas for converting between rectangular and polar coordinates.

   h) The formula for the area A of a polar region: $A = \int_\alpha^\beta \frac{1}{2} r^2 d\theta$.

4. You also should memorize (or be able to derive) any formula, used in this chapter, that is not mentioned here. This means you should know any relevant trig identities, the equation of a line, method for finding area between two curves, etc.

5. A well-prepared student should be able to…

   a) graph a parametric curve. [10.1]
   b) find a Cartesian equation of a parametric curve by eliminating the parameter. [10.1]
   c) perform calculus in parametric form and polar form. [10.2, 10.3, and 10.4]
   d) find the arc length of a given curve. [8.1, 10.2]
   e) find the area of a surface of revolution [8.2, 10.2 # 57]
   f) solve homework-like problems.