MA 166: Quiz 3

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You have **15 minutes** to complete this quiz. You may work in groups, but you are not allowed to use any other resources.

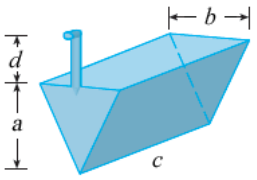
Problem 1 (Medium)**.** (a) Find the volume V of the solid obtained by rotating the region enclosed by the curves $y = x^2$ and $y = x^3$ about the x-axis.

(b) The region inside the circle $x^2 + y^2 = 1$ and to the right of the line $x = 1/2$ is rotated about the y-axis. Use the method of shells to find the volume of the resulting solid.

(c) Find the indefinite integral

$$\int x^5 e^{-x}\,\mathrm{d}x.$$

Problem 2. The tank pictured below is full of water. Let $a = 6$, $b = 4$, and $c = 8$. Do not worry about the spout. Set up the integral which gives the work required to pump all of the water over the top. Do not evaluate the integral. (Water weighs 62.5 lbs/ft^3, accounting for gravity).



Problem 3. A solid S has a square base on the xy-plane with four points $(1, 0)$, $(0, 1)$, $(-1, 0)$ and $(0, -1)$ as vertices. Its cross-section perpendicular to the x-axis are equilateral triangles. Find an expression for the volume of S.