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MA1125 – Calculus
Homework #7
due Thursday, Nov. 8

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1. Find the area of the region enclosed by the graphs of $f(x) = 2x^2$ and $g(x) = x + 6$.

2. Compute the volume of a sphere of radius $r > 0$. Hint: one may obtain such a sphere by rotating the upper semicircle $f(x) = \sqrt{r^2 - x^2}$ around the x-axis.

3. Compute the length of the graph of $f(x) = \frac{1}{3}x^{3/2}$ over the interval $[0, 5]$.

4. Find both the mass and the centre of mass for a thin rod whose density is given by

$$\delta(x) = x^3 + 2x^2 + 5x, \qquad 0 \le x \le 2.$$

5. A cylindrical tank of radius 2m and height 3m is full with water of density 1000kg/m³. How much work is needed to pump out the water through a hole in the top?

• This assignment is due by Thursday noon, either in class or else in my office.

• Write your name and course (Maths, TP, TSM) on the first page of your homework.

• NO LATE HOMEWORK WILL BE ACCEPTED.