

Midterm 1: Math 30, 9/20/07

1) A region is formed by $y = \frac{1}{4}x^2$ and $y=x$

- a) Sketch the region
- b) Find the area between two curves.
- c) If the region is rotated about the x axis find the volume of the solid

2) A region is formed by $y = 6x - x^2$ and $x = 0$

- a) Sketch the region
- b) Find the area of the region
- c) If the region is rotated about the x-axis, find the volume of the solid
- d) If the region is rotated about the y-axis, find the volume of the solid

3) A spring with constant $k = 5 \text{ N/m}$ and rest length of $.05 \text{ m}$ is stretched additional $.025 \text{ m}$. Find the work done. $F=k(x-x_0)$

4) Temperature varies as $T(t) = 10 + 5 \sin\left(\frac{\pi}{24}t\right)$ during the day where t is in hours. What is the average temperature during 24 hours?