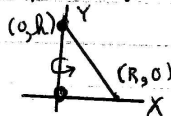


Mathematics 170
Tutorial Worksheet No. 7

Wed Feb 22 -
Tues Feb 28 2006

1. Calculate the volume of the solid obtained by rotating about the Y-axis the region of the first quadrant bounded between $y=x^2$ and $y=x^3$. Do this first by using cylindrical shells and integrating with respect to x , and then by using "washers" and integrating with respect to y . Are your two answers the same?

2. By rotating the right triangle with vertices as shown around the Y-axis, and integrating with respect to x , show (using cylindrical shells) that the volume of a right circular cone of base radius R and height h is $\frac{1}{3} \pi R^2 h$ cubic units.



3. Calculate the following:

(a) $\frac{d}{dx} \sin^{-1}(\sqrt{x})$ when $x=0.64$

(b) $\frac{d}{dx} (\tan^{-1}(x))^3$ when $x=\sqrt{3}$

(c) $\int_0^{\frac{1}{\sqrt{3}}} \frac{1}{1+9x^2} dx$

4. Calculate $\sin^{-1}(\cos(\tan^{-1}(-1))) - \tan^{-1}(\cos(\sin^{-1}(-1)))$

Answers (possibly correct): 1. $\frac{\pi}{10}$ 3. (a) $\frac{25}{24}$ (b) $\frac{\pi^2}{12}$ (c) $\frac{\pi}{9}$
4. $\frac{\pi}{4}$