

Review Problems for Exam I
MATH 155 Section 06
Exam Date and Time: March 7th, 2017. 09:10–11:00

REVIEW PROBLEMS

1. Let R be the region bounded by the x -axis, y -axis, and the function $y = \sin x$. Find the volume of the solid generated when R is revolved about the x -axis. (Hint: $\sin^2 x = \frac{1}{2}(1 - \cos 2x)$)
2. Find the arc length of the curve given by the function $y = \frac{x^{3/2}}{3} - x^{1/2}$ on $[4, 16]$ by integrating with respect to x .
3. For the function $y = \sqrt{-x^2 + 6x - 5}$ on $[2, 3]$, find the area of the surface of revolution obtained by revolving the graph about x -axis.
4. Suppose a force of 60N is required to stretch and hold a spring 0.2m from its equilibrium position. How much additional work is required to stretch the spring 0.2m if it has already been stretched 0.2m from its equilibrium?
5. For the function $f(x) = x^3$, find the slope of the tangent line on the point $(8, 2)$ of f^{-1} .

6. Calculate the following integral:

$$\int \frac{\sec^2 x}{\tan x} dx.$$

7. Calculate the following integral:

$$\int_0^3 \frac{1}{\sqrt{36 - x^2}} dx.$$

8. Evaluate the limit:

$$\lim_{x \rightarrow 0^+} \sin x^{\tan x}$$

9. Calculate the following integral:

$$\int_2^4 \frac{x^2 + 2}{x - 1} dx.$$

10. Calculate the following integral:

$$\int x^2 (\ln x)^2 dx.$$