# Advanced Placement Calculus

Name _____

Copy original problem.

Per _____     Date _____

Convince *me* that **you** understand the concept*!*

*No Calculators !*

# Chapter 10  Exam

**I**     Evaluate:                                                                                                (15 pts ea)

a)  $\displaystyle\int_0^1 x\sqrt{1-x^4}\; dx$

b)  $\displaystyle\int_1^4 \sqrt{t}\;\ln t\; dt$

c)  $\displaystyle\int_o^1 \ln x\; dx$

**II**     The base of solid $S$ is the region $\{(x,y)|\; x^2 \le y \le 4\}$ (which means that $x^2 \le y\;$ *and* $\;y \le 4$).
Cross sections perpendicular to the $y$-axis are semi-circles.  Find the volume of $S$.          (15 pts)

**III**     Given the region bounded by the graphs of $x=1,\;\; x=5,\;\; y=0\;\;$ and $\;\;y=\dfrac{1}{x}$.          (20 pts)

Compare the approximations supplied by Simpson's Rule and the Trapazoidal Method when you use four
    sections..

**IV**     Set up integras which represent the volumes of the following objects.  Do not evaluate the integrals.

(10 pts ea)

a)  The solid obtained by rotating the region bounded by the curves $y=x\;$ and $\;y=x^2$ about
        the line $x=7$.

b)  The solid obtained by rotating the region bounded by the curves $y=x\;$ and $\;y=x^2$ about
        the line $y=7$.

**Extra Credit** -------------------------------- **5 pts** ---------------------------------------------------------

There is a cone with the pointed end cut off leaving what is known as a frustum.  The radius of the big end
is $R$ and the radius of the smaller end is $r$.  The frustum has height $h$.  On a standard cartesian axis mark
the points ( $0$ , $R$ ) and ( $h$, $r$ ).  Connect them with a straight line.  When this figure is revolved about the
$x$-axis you will have the frustum.  Find the volume of the frustum.

In mathematics, it is not enough to read the words ...  you *must* hear the music. – John Kelley