Id:
Exam#1
Math IB
<ul> <li>Please show all your work step by step clearly, and underline or circle your final answer.</li> <li>No graphic calculators are allowed.</li> </ul>
1) a) Estimate the area under the graph of $f(x) = \frac{1}{x}$ from $x=1$ and $x=5$
using four approximating rectangles and right end points.
b) Sketch the graph and rectangles.

Is your estimate an under estimate or over estimate? Why?

Name:

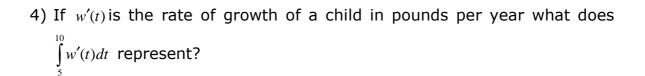
c)

Monday, May 6<sup>th</sup>, 2014

2) **Use the definition of definite integral** to calculate the value of the following integral

$$\int_{0}^{4} (x^2 - 3x) dx.$$

3) Use the comparison properties of integrals to **estimate**  $\int_{-1}^{1} \sqrt{1+x^4} dx$ .



5) a) State the Fundamental Theorem of Calculus Part I.

b) Use Part I of Fundamental Theorem of Calculus to find the derivative of the function  $y = \int_{\tan x}^{17} \sin(t^4) dt$ 

6) Find the integral of the following

$$a) \int \frac{1+x}{1+x^2} dx$$

$$b) \int_{0}^{\pi} x \cos(x^2) dx$$

- 7) Given the functions  $x = 2y^2$  and  $x = 4 + y^2$ .
  - a) Sketch the graph of the region enclosed by the given curves.

b) Find the area of the region enclosed by the given curves.

8) Given 
$$y = 1 - x^2$$
,  $y = 0$ 

a) Sketch the region, the solid, and a typical disk.

b) Find the volume of the solid obtained by rotating the region bounded by the given curves about the x-axis.

## 9) Prove the following:

Suppose f is continuous on [-a,a], If f is even [f(-x)=f(x)], then  $\int_{-a}^{a} f(x)dx = 2\int_{0}^{a} f(x)dx \ .$