Prince Sultan University
MATH 113
First Examination
First Semester 2014/2015, Term 141
Wednesday, 22nd October 2014
Dr. Bahhaeldin Abdalla & Dr. Ahmed Kaffel

Time Allowed: 70 minutes
Maximum points: 30 points

Name: _____   ID Number # _____

Important Instructions:

1. You may use CASIO scientific calculator that does not have programming or graphing capabilities.
2. You may NOT borrow a calculator from anyone.
3. You do NOT get special consideration if you forget your calculator.
4. Don't use notes or any notebook.
5. There should be NO talking during the examination.
6. Your exam will be taken immediately without any warning if your mobile is seen or heard.
7. You must show all your work beside the problem. Be organized.
8. You may use the back of the pages for extra space, but be sure to indicate that on the page with the problem.
9. This examination has 9 problems, some with several parts. Make sure that your paper has all these problems

Problem	Max points	Student's Points
1,2	9	
3,4,5	7	
6,7	7	
8,9	7	
Total	**30**	

1. (6 points) Evaluate each integral.

    (a) $\int \dfrac{t^3}{1+t^4} dt$

    (b) $\int \dfrac{x}{x^4 +1} dx$

    (c) $\int \dfrac{\sqrt{y} - y}{y^3} dy$

2. (3 points) The velocity function for a particle moving along a line is given by $v(t) = 3t - 5$. Find the distance traveled by the particle between $t = 0$ and $t = 3$.

3. (3 points) Use the properties of integrals to estimate the integral and to determine a and b.

$$a \le \int_{-1}^{1} \sqrt{2 + x^2}\, dx \le b$$

4. (2 points) Estimate the area under the graph of $f(x) = 1 + x^2$ from $x = -1$ to $x = 5$ using 3 rectangles and right endpoints.

5. (2 points) Find the derivative of the function $h(x) = \int_{1}^{\sqrt{x}} \dfrac{z^2}{z^4 + 1}\, dz$.

6. (3 points) Find the area enclosed by the line $y = x - 3$ and the parabola $y^2 = 2x + 2$.

7. (4 points) Find the volume of the solid obtained by rotating the region bounded by $y = (x - 2)^2$ and $y = 4$ about the x-axis.

8. (4 points) Use the method of cylindrical shells to find the volume generated by rotating the region bounded by $x = y^2 + 1$ and $x = 2$ about the line $y = 2$.

9. (3 points) Find the average value of the function $f(\theta) = \sec^2\left(\dfrac{\theta}{2}\right)$ on $\left[0, \dfrac{\pi}{2}\right]$.