M E T U
Northern Cyprus Campus

	Calculus with Analytic Geometry **Short Exam 2**	

Code : *Math 119* Acad.Year: *2013-2014* Semester : *Spring* Date : *16.04.2014* Time : *18:45* Duration : *25 minutes*	Last Name: Name: Key Student No: Signature: 2 QUESTIONS ON 2 PAGES TOTAL 21 POINTS

1	2			

Show your work! No calculators! Please draw a box around your answers!

Please do not write on your desk!

Papers without names will receive 0 credits!

1. (9 pts.) Find **the** function $f(x)$ which satisfies the following conditions.

   - $f'(x) = \pi x^2 - 2x + \sin(x) + \sec^2(x) + 119$
   - $f(0) = 5$

f is antiderivative of f'.

So,

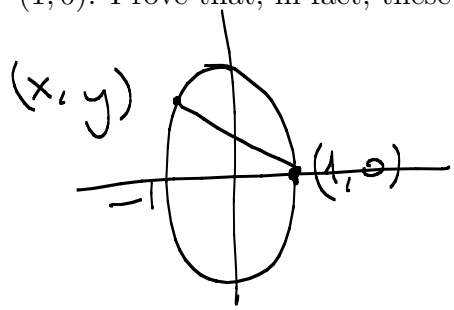
$$f(x) = \pi\frac{x^3}{3} - 2\frac{x^2}{2} - \cos x + \tan x + 119x + C$$

$$f(0) = 5 = 0 - 0 - 1 + 0 + 0 + C$$

$$\Rightarrow C = 6$$

$$f(x) = \frac{\pi}{3}x^3 - x^2 - \cos x + \tan x + 119x + 6$$

2. (12 pts.) Find the points on the ellipse $4x^2 + y^2 = 4$ that are farthest away from the point $(1, 0)$. Prove that, in fact, these points are the farthest away.



(x, y) is on the ellipse, so $x \in [-1, 1]$

(x, y) is on the ellipse, so $4x^2 + y^2 = 4$

$\Rightarrow y^2 = 4 - 4x^2$.

The distance between $(1, 0)$ and $(x, y) = D$

$= \sqrt{(x-1)^2 + (y-0)^2} = \sqrt{(x-1)^2 + 4 - 4x^2}$.

Let $d = (x-1)^2 + 4 - 4x^2$.

Absolute maximum of D and d occurs at the same number. So work with d.

$d' = 2(x-1) - 8x = -6x - 2$

x	-1		$-1/3$		1
d'		$+$	0	$-$	
d		↗		↘	

The only critical pnt of d is $-\frac{1}{3}$.

$x \in [-1, 1]$. d is inc on $[-1, -1/3]$ and dec. on $[-1/3, 1]$ so the abs. max is at $-1/3$.

$y = \mp\sqrt{4 - 4x^2} \Rightarrow y = \mp\sqrt{\frac{32}{9}}$.

So the pnts are $\left(-\frac{1}{3}, \mp\sqrt{\frac{32}{9}}\right)$.

DID YOU WRITE YOUR NAME AND ID NUMBER ON THE PAPER?