Math/Mat 113 Summer 2015 **Final Exam / Yarıyılsonu Sınavı** August 6, 2015

Your Name / Ad - Soyad

(**75 min.**)

Signature / İmza

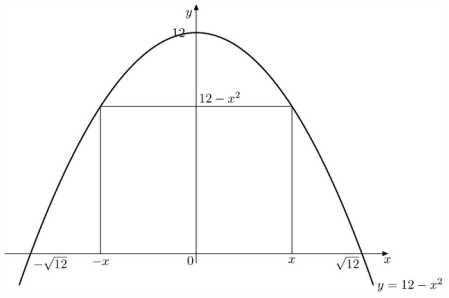
Student ID # / Öğrenci No

(**mavi tükenmez!**)

Problem	1	2	3	4	Total
Points:	25	27	25	25	102
Score:					

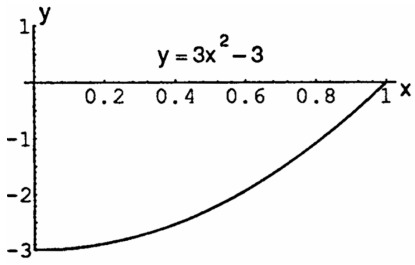
1. (a) (13 Points) Find all points (x,y) on the graph of $f(x) = 3x^2 - 4x$ with tangent lines parallel to the line $y = 8x + 5$.

(b) (12 Points) A rectangle has its base on the x-axis and its upper two vertices on the parabola $y = 12 - x^2$. What is the largest area the rectangle can have, and what are its dimensions?



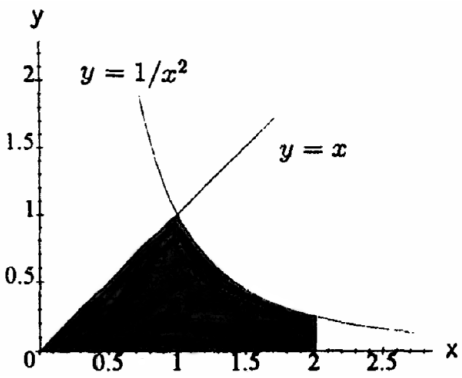
2. (a) (8 Points) $y = \int_{\sqrt{x}}^{0} \sin(t^2)\,dt \quad \Rightarrow \quad \frac{dy}{dx} = ?$

(b) (10 Points) Find the average value of $f(x) = 3x^2 - 3$ on $[0,1]$.



(c) (9 Points) $\int x^{1/2} \sin(x^{3/2} + 1)\,dx = ?$

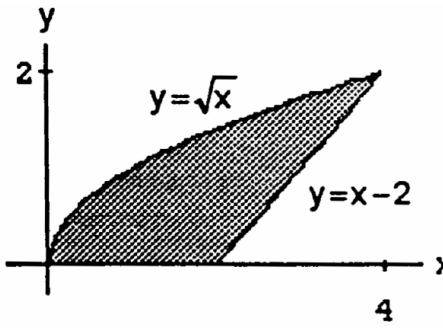
3. (a) (12 Points) Find the area of the region in the first quadrant bounded by the line $y = x$, the line $x = 2$, the curve $y = 1/x^2$, and the x-axis.



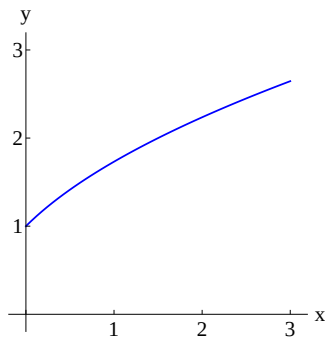
(b) (13 Points) Use the shell method to find the volume of the solid generated by revolving the region bounded by

$$y = \sqrt{x}, \quad y = 0, \quad y = x - 2.$$

about x-axis.



4. (a) (13 Points) Find the area of the surface generated by revolving the curve about the x-axis.
$y = \sqrt{2x+1}$, $0 \le x \le 3$.



(b) (12 Points) For what values of a and b is

$$f(x) = \begin{cases} -2, & x \le 1 \\ ax - b, & -1 < x < 1 \\ 3, & x \ge 1 \end{cases}$$

continuous at every x?