1	2	3	TOTAL
/20	/20	/15	
4	5		
/20	/25		/100

ÜNİVERSİTESİ 1999 OKAN · İSTANBUL ·

2012–12–05 **MATH 113 – Calculus I – Second Exam** Time Allowed: 80 min.
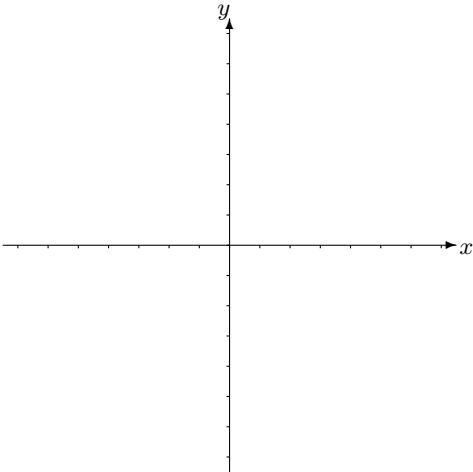
(You must show your working for all questions.)

1. [20 pts] Find the lines that are (a) *tangent* and (b) *normal* to the curve $x \sin 2y = y \cos 2x$ at the point $(\pi/4, \pi/2)$.

   [p154 q36]

3. [15 pts] What are the dimensions of the lightest (minimum surface area) open-top right circular cylindrical can that will hold a volume of 1000 cm^3 [p282 q35]
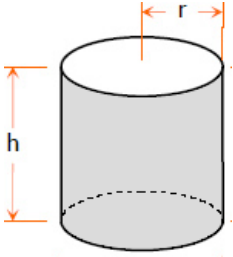
2. [20 pts] Find the area of the region enclosed by $y = x^2 - 2x$ and $y = x$. [p298 q44]

4. [20 pts] Find $F(4)$ and $F'(x)$ if

$$F(x) = \int_{\sqrt{x}}^{2} \sin(t^2)dt \qquad \text{[p282 q35]}$$

b) Determine where the graph of y is concave up and where it is concave down. Find the inflection points, if any.

5. [25 pts] Suppose

$$y = \frac{8x}{x^2 + 4}, \quad y' = \frac{-8x^2 + 32}{(x^2 + 4)^2}, \quad \text{and} \quad y'' = \frac{16x(x^2 - 12)}{(x^2 + 4)^3}.$$

[p211 q43]

a) Determine where the graph of y is increasing and where it is decreasing. Find the local maxima or minima, if any.

c) Sketch the curve on the given coordinate system.

x	y'	y''	y
$-\infty < x < \cdots$			
$\cdots < x < \cdots$			
$\cdots < x < \cdots$			
$\cdots < x < \cdots$			
$\cdots < x < \cdots$			
$\cdots < x < +\infty$			