ÇANKAYA UNIVERSITY
Department of Mathematics and Computer Science

MATH 155 Calculus for Engineering I

Final

January 16, 2007
09:00-11:30

Surname : _____
Name : _____
ID # : _____
Department : _____
Section : _____
Instructor : _____
Signature : _____

- The exam consists of 6.
- Please read the questions carefully and write your answers under the corresponding questions. Be neat.
- Show all your work. Correct answers without sufficient explanation might not get full credit.
- Calculators are not allowed.

GOOD LUCK!

Please do not write below this line.

Q1	Q2	Q3	Q4	Q5	Q6	TOTAL
15	15	16	24	18	18	106

1. A right triangle is formed in the first quadrant by the x - and y - axes and a line through the point $(7, 5)$. What should the vertices be in order that the triangle have as small an area as possible?

2.

a) Given $xe^{x-y^2} = x^2 - y^2$, find the slope of the tangent line to the curve at $\left(2, \sqrt{2}\right)$.

b) Find the derivative of $y = 3x^{x^2} + 1$ at $(1, 4)$.

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3. Evaluate.

a) $\lim_{x \to 0^+} (1 + 5x)^{\csc x}$,

b) $\lim_{x \to 0} \left(\frac{\sin x}{x} \right)^{1/x^2}$.

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4. Evaluate.

a) $\int \frac{xdx}{1+\sqrt{x}}$, b) $\int \sin^3(2x)\cos^5(2x)\ dx$, c) $\int \frac{4x^2dx}{(1-x^2)^{3/2}}$.

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5. Evaluate.

a) $\int \ln\left(x^2+1\right)\, dx,$ b) $\int \frac{x+1}{(x-1)(x^2+2)}\, dx.$

6.

(a) Does $\displaystyle\int_1^\infty \frac{x}{1+2x^2}\,dx$ converge or diverge. Prove your answer.

(b) Determine whether $\displaystyle\int_0^\infty \frac{dx}{\sqrt[3]{x}+x^3}$ converges or diverges. Give reasons for your answer.
