JANUARY 8, 2014

IŞIK UNIVERSITY, MATH 101 FINAL EXAM

First Name:	**Last Name:**				**Row No:**
Student ID:	**Q1**		**Q2**		**Exam Duration: 2 hr.**

Q1. (12 pt) Find the volume of the solid generated by revolving the region between the x-axis and the curve $y = \sin x$, $0 \leq x \leq \pi/4$ about the x-axis.

Q2. Evaluate the integrals:

(a)(12 pt) $\int_1^4 \frac{x-1}{\sqrt{x}}\, dx$ (b)(10 pt) $\int \frac{1}{x(\ln x)^2}\, dx$

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First Name:	**Last Name:**				**Row No:**
Student ID:	**Q3**		**Q4**		**Exam Duration: 2 hr.**

Q3. Evaluate the integrals:

(a)(8 pt) $\int \tan x \ln(\cos x)\, dx$ (b)(8 pt) $\int_0^{13} \frac{dx}{\sqrt[3]{(1+2x)^2}}$

Q4. (6 pt) Find the function $f(x)$ satisfying $f'(x) = \sqrt{2x}$ and $f(0) = 3$.

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First Name:	**Last Name:**				**Row No:**
Student ID:	**Q5**		**Q6**		**Exam Duration: 2 hr.**

Q5. (10 pt) Find an equation of the tangent line to the curve $y = \sin^{-1} x$ at $x = -\dfrac{1}{2}$.

Q6. (10 pt) Find the absolute extreme values of the function $f(x) = \dfrac{\ln x}{x}$ on the interval $[1, e^2]$.

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First Name:	**Last Name:**						**Row No:**
Student ID:	**Q7**		**Q8**		**Q9**		**Exam Duration: 2 hr.**

Q7. (12 pt) Find the area of the region bounded by the curves $y = \cos x$ and $y = x^2 + 2$ from $x = 0$ to $x = \pi/2$.

Q8. (10 pt) Find the derivative of the function $f(x) = \dfrac{e^x \sin 2x}{\sqrt{x^2+1}}$.

Q9. (12 pt) Evaluate the limit:

$$\lim_{x\to 0} \frac{\tan^{-1} x}{\displaystyle\int_0^x e^{t^2}\, dt}.$$