

IŞIK UNIVERSITY, MATH 101 MIDTERM EXAM-II

First Name:	Last Name:			Row No:
Student ID:	Q1		Q2	Exam Duration: 1 hr. 40 min.

Q1. (15 pt) Find the derivative of the function $f(x) = \cot(\sin x) + 2^{\tan^{-1} x}$.

Q2. Find the following limits:

(a) (10 pt) $\lim_{x \rightarrow 0} (\cos x)^{1/x}$

(b) (8 pt) $\lim_{x \rightarrow 1} \frac{x - 1}{\ln x - \sin \pi x}$



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First Name:	Last Name:					Row No:
Student ID:	Q3		Q4		Q5	Exam Duration: 1 hr. 40 min.

Q3. (10 pt) By using the implicit differentiation, find the equation of the tangent line to the curve $x^2 + xy - y^2 = 1$ at the point $(2, 3)$. Do not use the formula $dy/dx = -F_x/F_y$.

Q4. (12 pt) Find the absolute extreme values of function $f(x) = xe^{-x}$ on the interval $[-1, 1]$.

Q5. (10 pt) Find the value or values of c which satisfies the Mean Value Theorem for the function $f(x) = \frac{1}{x}$ on the interval $[4, 9]$.



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First Name:	Last Name:			Row No:
Student ID:	Q6		Q7	Exam Duration: 1 hr. 40 min.

Q6. (10 pt) Find the linearization of the function $f(x) = \sqrt{2x+9}$ at $x = 0$.

Q7. (25 pt) Let the function $f(x) = \frac{1}{x^2 - x}$ be given.

- (a) Find the asymptotes, if any.
- (b) Find the intervals where the function is increasing, decreasing, concave up and concave down.
- (c) Find the local extrema and inflection points, if any.
- (d) Graph the function.

