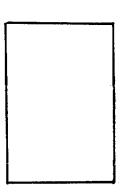
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T.A. name	1 2 3 4 5
Section time	6 7 8 9 10
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Mathematics 16B	1
R. Hartshorne	
Hour Exam	Í 2
Wednesday, 9/25/96	
	3
(The test is on	
both sides of	4
this page.)	
	5
Part I. Show your work and put your answers in the box. points each. No partial credit.	Т
O.4	
1. $f(x,y) = \frac{x}{1+e^y}$ Find $\frac{\partial f}{\partial y}$	
$f(x,y) = \frac{1}{1+e^y}$ Find $\frac{1}{2e^y}$	
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•	
$\partial_{z} f$	ſ
2. $f(x,y) = x^3y + 2xy^2$. Find $\frac{\partial^2 f}{\partial x \partial y}$.	1
$\partial x \partial y$	•
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3. $f(x,y) = \frac{2x-3y}{x}$ Find ∂f	
3. $f(x,y) = \frac{2x-3y}{2x+3y}$. Find $\frac{\partial f}{\partial x}$ and simplify.	
1 Og O2	
	
	
4. $f(x,y) = \ln(x^2y^3)$. Find $\frac{\partial f}{\partial y}$ and simplify.	•
4. $f(x,y) = \ln(x^2y^3)$. Find $\frac{3}{x^3}$ and simplify	
∂y	
E Communication	
5. Convert to radian measure: 990°. Express your answer a	00
a rational multiple of π .	ю (
The state of the s	
6. Find a value of t with $-\pi/2 \le t \le \pi/2$ for which $\sin t = \sin t$	
$n/2 \le t \le n/2$ for which $\sin t = s$	$\sin 7\pi/6$.
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7. Find $\cos(-5\pi/6)$. Express your answer using rational nur	
and square roots (Do not it is a state asing rational mur	mbers
and square roots. (Do not give a decimal.)	
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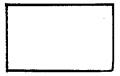
8. Simplify $(\sin t \cos t \tan t) - 1$	
8. Simplify $\frac{\sin t \cos t \tan t - 1}{\cos t \tan t}$	İ
(sint tant sect) +1	Į.
(SINT tant Sect) +1	,
, ·	<u> </u>
9. Find $\int \sec^2 3t dt$.	<u> </u>
-= . J ook dout,	1
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10. If $y = \ln(\cos x)$, find $\frac{dy}{dx}$.	
$\frac{1}{dr}$	1
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Part II. 10 points each. Show your work. Put answers in boxes.

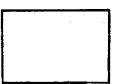
1. $f(x,y) = x^3 - y^2 - 3x + 4y$. Find all points at which the function has a possible maximum or minimum. Use the second derivative test to determine the nature of each critical point.



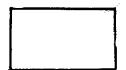
2. Using the methods of Lagrange multipliers, find two positive numbers x and y so that $x^2y = 108$ and x + y is as small as possible.



3. Find the equation of the straight line which best fits the points (1,0), (2,-1), (3,-4), in the sense of least squares.



4. Find the maximum value of the function $y = 3 \sin x + \cos x$ in the interval $0 \le x \le \pi$. Express your answer using rational numbers and square roots.



5. Find the area under the curve $y=t+\sin t$ between the values t=0 and $t=\pi$. Express your answer using rational numbers and π .

