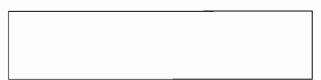
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	NAME		Page 1	/16
	10-DIGIT PUID		Page 2	/34
	RECITATION INSTRUCTOR		Page 3	/26
			Page 4	/24
	RECITATION TIME		TOTAL	/100
	DIRECTIONS		-	
	<ul> <li>Write your name, 10-digit PUID, recitation instructor's name and recitation time in the space provided above. Also write your name at the top of pages 2, 3 and 4.</li> <li>The test has four (4) pages, including this one.</li> <li>Write your answers in the boxes provided.</li> <li>You must show sufficient work to justify all answers unless otherwise stated in the problem. Correct answers with inconsistent work may not be given credit.</li> <li>Credit for each problem is given in parentheses in the left hand margin.</li> <li>No books, notes, calculators or any electronic devices may be used on this exam.</li> </ul>			
(16)	1. Find the derivative of the following functions. (It is not necessary to simplify). (a) $y = (1 + \cos^2 x)^6$			
	(b) $g(t) = rac{1}{(t^4+1)^3}$			
	(c) $y = \sin^2(3x)$		•	
	(d) $y = \ln(x^4 \tan x)$			

(8) 2. Find  $\frac{dy}{dx}$  by implicit differentiation, if  $x^2y + xy^2 = 3x$ .



(8) 3. Find the second derivative of  $y = xe^{2x}$ .



(12) 4. Find the exact value of each expression.

(a) 
$$\sin^{-1}\left(-\frac{1}{\sqrt{2}}\right)$$



(b)  $\sec(\tan^{-1} 2)$ 



(c)  $\tan^{-1} \left( \tan \frac{5\pi}{6} \right)$ 



(d)  $\cos^{-1} 0$ 



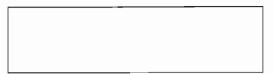
(6) 5. Find the slope of the tangent line to the curve  $y = \sinh x$  at the point  $\left(\ln 2, \frac{3}{4}\right)$  and express your answer as the ratio of two integers.



(12) 6. Find the derivatives of the following functions. (It is not necessary to simplify). (a)  $y = \tan^{-1}(x^2)$ 



(b)  $f(x) = \sin^{-1}(2x+1)$ 



(c)  $y = x^{\sqrt{x}}$ 



(6) 7. Find the linearization L(x) of the function  $f(x) = x^5$  at a = 1.



(8) 8. Find the differential dy if (a)  $y = \sqrt{1 + x^2}$ 



(b)  $y = \sec(3x)$ 

(12) 9. A boat is pulled into a dock by a rope attached to the bow of the boat and passing through a pulley on the dock that is 1 m higher than the bow of the boat. If the rope is pulled in at a rate of 1 m/sec, how fast is the boat approaching the dock when it is 8 m from the dock.

The boat is approaching the dock at the rate of

m/sec

(12) 10. A coffee cup has the shape of an inverted circular cone with height 10 cm and radius at the top 5 cm. If coffee is poured into the cup at the rate of 2 cm<sup>3</sup>/sec, how fast is the coffee level rising when the coffee is 5 cm deep?