(16)

NAME			
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RECITATION TIME		TOTAL	/100
DIRECTIONS			
<ol> <li>Write your name, 10-digit PUID, recitation provided above. Also write your name at</li> <li>The test has four (4) pages, including this</li> <li>Write your answers in the boxes provided</li> <li>You must show sufficient work to justify Correct answers with inconsistent work m</li> <li>Credit for each problem is given in parent</li> <li>No books, notes or calculators may be use</li> </ol>	the top of pages 2, 3 are sone.  all answers unless other hay not be given credit. Theses in the left hand not be given to the series of the s	nd 4. rwise stated in the	
1. Find the derivative of the following function (a) $y = e^{-5x} \cos(3x)$ .	ions. (It is not necessary	y to simplify).	
		.,	
$\text{(b)} \ \ y=e^{e^x}$			
(c) $y = \ln(1 + 2e^{3x})$ .			
(d) $f(x) = \sqrt[3]{9 + 8\sin 2x}$			

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


- (12) 3. Find the exact value of each expression.
  - (a)  $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$



(b)  $\sin(\sin^{-1} 0.7)$ 

(c)  $\tan^{-1}(\tan\frac{4\pi}{3})$ 

.

(d)  $\cos^{-1}(-\frac{1}{2})$ 

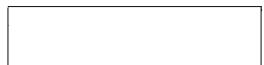
- (12) 4. Find the derivatives of the following functions. (It is not necessary to simplify).
  - (a)  $y = \tan^{-1} \sqrt{x}$



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



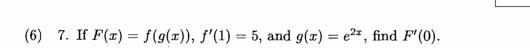
(c)  $y = (x+1)^x$ 



(8) 5. Find a formula for  $f^{(n)}(x)$  if  $f(x) = \frac{1}{x-1}$ .

$$f^{(n)}(x) =$$

(4) 6. Find an equation of the tangent line to the curve  $y = \sinh x$  at the point (0,0).



$$F'(0) =$$

(6) 8. Find the linearization L(x) of the function  $f(x) = (\sin x + \cos x)^3$  at  $a = \frac{\pi}{2}$ .

$$L(x) =$$

(4) 9. Find the differential dy if  $y = \sec(5x)$ .

(12) 10. Air is let out of a spherical balloon so that its surface area is decreasing at a rate of 2 cm<sup>2</sup>/sec. Find the rate at which the radius of the balloon is decreasing when the radius is 20 cm.

(12) 11. A lighthouse is located on a small island 3 km away from the nearest point P on a straight shoreline and its light makes four revolutions per minute. How fast is the beam of light moving along the shoreline when it is 1 km from P?