BC Calculus - Unit 3 - Composite, Implicit, & Inverse Functions - Test Review Worksheet

Show all appropriate work!

 Find the derivative.

 1. $h(x) = \cos^2(4x)$

 2. $y = \ln \sqrt{x+3}$

 3. $x^2 + 2y^5 = 10xy$

 4. $y = \csc^{-1}(x^3)$

For each problem, let f and g be differentiable functions where $g(x) = f^{-1}(x)$ for all x.			
5. $f(6) = -1, f(4) = -2, f'(6) = 3, \text{ and } f'(4) =$	6. Let <i>f</i> be the function defined by		
7. What is the value of $g'(-1)$?	$f(x) = x^3 + 3x + 1$. Let $g(x) = f^{-1}(x)$, where $g(-3) = -1$. What is the value of $g'(-3)$?		
	g(-3) = -1. What is the value of $g'(-3)$?		

Find $\frac{d^2y}{dx^2}$ based on the given information.			
7. $y = x^5 - e^{4x}$	$8. y = y^2 + x$		
9. Find the equation of the tangent line. $x^2 + 7y^2 = 8y^3$ at (-6, 2)	10. If $x = y^2 - \cos x$ find $\frac{d^2 y}{dx^2}$ at $(0, -1)$.		
	l		
10. Find the equation of any horizontal tangent lines	11. Slope of the tangent line of $g(x) = 4 \sin^3 x$ at		
for the graph of $(y^3 + 1)^2 = x^2 + 4x + 4$.	$x = \frac{\pi}{4}.$		
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12. Let f and g be differentiable functions where $q(x)$	$f = f^{-1}(x)$ for all x. $f(6) = 8, f(8) = 2, f'(6) = -3,$		

12. Let f and g be differentiable functions where $g(x) = f^{-1}(x)$ for all x. f(6) = 8, f(8) = 2, f'(6) = -3, and f'(8) = 4. What is the value of g'(8)?

Find $\frac{d^2y}{dx^2}$ based on the given information.		
13. $y = e^{x^4}$	14. $5y^2 + 3 = x^2$	
Evaluate the 2 nd derivative at the given point.		
15. If $f(x) = x^3 + \frac{5}{x}$, find $f''(-1)$.	16. If $x^2 + y^2 = 13$, find $\frac{d^2y}{dx^2}$ at (2,3).	
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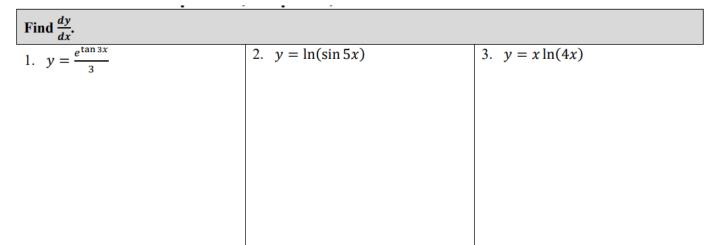
The table below gives values of the differentiable functions g and h, as well as their derivatives, g' and h', at selected values of x.

x	g(x)	g'(x)	h(x)	h'(x)
-1	0	4	3	6
0	9	2	0	-4
3	-1	-2	9	4
9	3	1	16	9

17. If
$$f(x) = \frac{g(x)}{\sqrt{h(x)}}$$
, find $f'(3)$.
18. Find $\frac{d}{dx}h^{-1}(9)$.

19. Find the equation of the tangent line to $g^{-1}(x)$ at x = 3.

Additional Practice Problems



4. $e^{y^2} = x^5 + 10$	5. $y = \cos^{-1}(7x^3)$	$6. 2x^3 - xy = \ln(y)$

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Find the equation of the tangent lin	Find the equation of the tangent line at the given point.			
7. $4x^3 = -5xy + 4y$ at $(1, -4)$	8. $y = \arccos(5x)$ at $x = -\frac{\sqrt{3}}{10}$	9. $h(x) = (2x - 1)^3(x + 2)$ at x = 1.		