Unit 3 - Review

Score: _____/ 33   Name:_____

Find the equation of any *vertical* tangent lines for the graph of $3y - y^3 = 5x - 2$

Let f and g be differentiable functions where $g(x) = f^{-1}(x)$ for all x. Let $f(-4) = -2$, $f(-1) = -4$, $f'(-4) = 5$, and $f'(-1) = 3$. What is the value of $g'(-4)$?

x	$g(x)$	$g'(x)$	$h(x)$	$h'(x)$
-1	1	-2	5	-2
1	4	2	-1	3
4	5	-3	1	2
5	-1	3	4	-3

Find $\frac{d}{dx} g^{-1}(4)$.

Find $\frac{dy}{dx}$.

$y = \tan^{-1}(3x)$ $y = \ln(x^3 - 2)$

Find the slope of the tangent line at the given point.

$y = \arctan\left(\frac{x}{2}\right)$ at $x = 2\sqrt{3}$. $4 = 5x + y^2$ at $(-1, 3)$

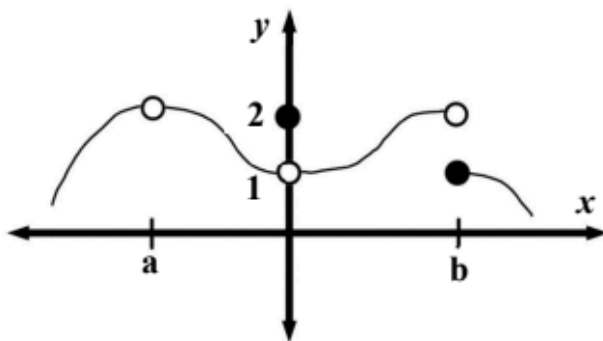| Evaluate $\frac{d^2y}{dx^2}$ at the given point. |
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$y = e^{3x}$ at $x = \frac{1}{3}$.

Let f be a function with $f(1) = -2$. The derivative of f is given by $f'(x) = \cos\left(\frac{\pi x}{2}\right) + x^2 - 5$.

Find $f''(3)$.

Write an equation for the line tangent to the graph of $y = \frac{1}{f(x)}$ at $x = 1$.

Let g be the function defined by $g(x) = f\left(\sqrt{17 - 2x^2}\right)$. Find $g'(2)$.

Let h be the inverse function of f. Find $h'(-2)$.

. The graph of the function f is shown in the figure above. Which of the following statements about f is true?

(A) $f(a)$ exists

(B) $\lim\limits_{x \to a} f(x) = 2$

(C) $\lim\limits_{x \to b} f(x) = 1$

(D) $\lim\limits_{x \to b^-} f(x) = \lim\limits_{x \to b^+} f(x)$

(E) f is continuous at $x = 0$