Inverse Function Derivatives (No Calculator)

2008 #26

What is the slope of the line tangent to the curve $y = \arctan(4x)$ at the point at which $x = \dfrac{1}{4}$?

(A) 2   (B) $\dfrac{1}{2}$ (C) 0   (D) $-\dfrac{1}{2}$ (E) -2

2008 #28, part 1

Let f be a differentiable function such that $f(3) = 15$, $f(6) = 3$, $f'(3) = -8$, and $f'(6) = -2$. The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(3)$?

(A) $-\dfrac{1}{2}$ (B) $-\dfrac{1}{8}$ (C) $\dfrac{1}{6}$ (D) $\dfrac{1}{3}$ (E) cannot be determined

2008 #28, part 2

Let f be a differentiable function such that $f(3) = 15$, $f(6) = 3$, $f'(3) = -8$, and $f'(6) = -2$. The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(15)$?

(A) $-\dfrac{1}{2}$ (B) $-\dfrac{1}{8}$ (C) $\dfrac{1}{6}$ (D) $\dfrac{1}{3}$ (E) cannot be determined

2003 #27

Let f be the function defined by $f(x) = x^3 + x$. If $g(x) = f^{-1}(x)$ and g(-2) = -1, what is the value of $g'(-2)$?

(A) $\dfrac{1}{13}$ (B) $\dfrac{1}{4}$ (C) $\dfrac{7}{4}$ (D) 4   (E) 13