2G Exercises

Derivatives of Inverse Trig Functions

1. Let f and g be inverse functions that are differentiable for all x. If $f(-5) = 7$ and $g'(7) = 3$, which of the following statements must be false? Explain

   I. $f'(3) = -13$
   II. $f'(-5) = 13$
   III. $f'(7) = 13$

   A. I only   B. II. Only   C. III. Only   D. I. and III.

2. A decreasing function g satisfies $g(4) = 6$ and $g'(4) = -2$. Which of the following statements about the inverse of g must be true?

   A $(g^{-1})'(-2) = 4$
   B $(g^{-1})'(6) = -2$
   C $(g^{-1})'(6) = -12$
   D $(g^{-1})'(6) = -1/2$

Derivatives of Inverse Trig Functions
Find the derivatives of these functions

43. $f(x) = 2 \arcsin(x - 1)$ **44.** $f(t) = \arcsin t^2$

45. $g(x) = 3 \arccos \dfrac{x}{2}$ **47.** $f(x) = \arctan e^x$

49. $g(x) = \dfrac{\arcsin 3x}{x}$

50. $h(x) = x^2 \arctan 5x$

51. $h(t) = \sin(\arccos t)$

57. $y = x \arcsin x + \sqrt{1 - x^2}$

56. $y = \dfrac{1}{2}\left[x\sqrt{4 - x^2} + 4 \arcsin\left(\dfrac{x}{2}\right) \right]$

Unit Circle Time! Find the equation of the tangent line to the graph of y at the indicated point.

a. $y = \sec^{-1} x$, $x = 2, 0 \le y \le \dfrac{\pi}{2}$

b. $y = \sin^{-1}\left(\dfrac{x}{2}\right)$, $x = \sqrt{3}, 0 \le y \le \dfrac{\pi}{2}$