G) Find the derivative of f(x) = sinx at $x = \frac{\pi}{6}$

$\left(\frac{\pi}{6}, \sin\frac{\pi}{6}\right) \rightarrow \left(\frac{\pi}{6}, \frac{1}{2}\right)$

$f'(x) = \cos x$

$f'\left(\frac{\pi}{6}\right) = \cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ $\qquad f'\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

H) Find the derivative of f(x) = arcsinx at $x = \frac{1}{2}$

$\left(\frac{1}{2}, \frac{\pi}{6}\right)$

$f'(x) = \frac{1}{\sqrt{1-x^2}}$

$f'\left(\frac{1}{2}\right) = \frac{2}{\sqrt{3}}$

$f'(x) = \frac{1}{\sqrt{1-\frac{1}{4}}} = \frac{1}{\sqrt{\frac{3}{4}}} = \frac{1}{\left(\frac{\sqrt{3}}{\sqrt{4}}\right)} = \frac{2}{\sqrt{3}}$

1. Let f be a differentiable function such that f(3) = 15, f(6) = 3, $f'(3) = -8$ and $f'(6) = -2$.

(3, 15)

$m = -8$

The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(15)$?

(15, 3)

$m =$

a) -1/2 b) -1/8 c) 1/6 d) 1/3

e) The value of $g'(15)$ cannot be determined

function (8, 4)
m = 3

Inverse (4, 8)
$m = \frac{1}{3}$

2. Let f be a differentiable function such that f(3) = 5, f(8) = 4, $f'(3) = 6$ and $f'(8) = 3$. The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(4)$?

a) -1/2 b) -1/8 c) 1/6 d) 1/3
e) The value of $g'(4)$ cannot be determined

3. Let f be a differentiable function such that f(3) = 5, f(8) = 4, $f'(3) = 6$ and $f'(8) = 3$.
m = 6
The function g is differentiable and $g(x) = f^{-1}(x)$ for all x. What is the value of $g'(5)$?

a) -1/2 b) -1/8 c) 1/6 d) 1/3
e) The value of $g'(5)$ cannot be determined

f(x)
(2, -3)
$m = \frac{4}{3}$

$f^{-1}(x)$
(-3, 2)
$m = \frac{3}{4}$

4. If $f(2) = -3$, $f'(2) = \frac{4}{3}$, and $g(x) = f^{-1}(x)$, what is the equation of the tangent line to g(x) at x = -3?

A) $y - 2 = \frac{-3}{4}(x + 3)$ B) $y + 2 = \frac{-3}{4}(x - 3)$

C) $y - 2 = \frac{3}{4}(x + 3)$ D) $y + 3 = \frac{3}{4}(x - 2)$

E) $y - 2 = \frac{4}{3}(x + 3)$

$y = 2 + \frac{3}{4}(x+3)$

f(x)

(2, -3)

$m = -\frac{4}{3}$

$f^{-1}(x)$

(-3, 2)

$m = -\frac{3}{4}$

$y = 2 - \frac{3}{4}(x+3)$

5. If $f(2) = -3$, $f'(2) = \frac{-4}{3}$, and $g(x) = f^{-1}(x)$,
what is the equation of the tangent line to g(x)
at x = -3?

A) $y-2 = \frac{-3}{4}(x+3)$ B) $y+2 = \frac{-3}{4}(x-3)$

C) $y-2 = \frac{3}{4}(x+3)$ D) $y+2 = \frac{4}{3}(x-3)$

E) $y-2 = \frac{4}{3}(x+3)$

6. If $f(2) = -3$, $f'(2) = \frac{-3}{4}$, and $g(x) = f^{-1}(x)$,
what is the equation of the tangent line to g(x)
at x = -3?

A) $y-2 = \frac{-3}{4}(x+3)$ B) $y+3 = \frac{-4}{3}(x+2)$

C) $y-2 = \frac{3}{4}(x+3)$ D) $y+2 = \frac{4}{3}(x-3)$

E) $y-2 = \frac{-4}{3}(x+3)$