

IN CLASS SUPER FAST PROBLEMS

ULTRA QUICK DERIVATIVES		
$a(x) = \cos 5x$ $a' = -5 \sin 5x$	$b(x) = \csc 3x$ $b' = -\csc 3x \cot 3x \cdot 3$ $b''(x) = -3 \csc 3x \cot 3x$	$c(x) = \sin^3(7x)$ $c'(x) = 3(\sin 7x)^2 \cos 7x \cdot 7$ $c''(x) = 21(\sin 7x)^2 \cos 7x$
$d(x) = \frac{2}{\sqrt{4-x}} = 2(4-x)^{-1/2}$ $d'(x) = -1(4-x)^{-3/2}(-1)$ $d''(x) = \frac{1}{(4-x)^{5/2}}$	$e(x) = x\sqrt{x} = x^{3/2}$ $e'(x) = \frac{3}{2}x^{1/2}$	$f(x) = \frac{2x-6x^5}{x^2} = 2x^{-1} - 6x^3$ $f' = -2x^{-2} - 18x^2$ $= \frac{-2}{x^2} - 18x^2$
$g(x) = \frac{2x-1}{3x-5}$ $g' = \frac{(3x-5)(2) - (2x-1)(3)}{(3x-5)^2}$ $= \frac{-7}{(3x-5)^2}$	$h(x) = x \sin(4x)$ $h'(x) = x \cos 4x \cdot 4 + \sin 4x (1)$ $= 4x \cos 4x + \sin 4x$	

Use the graph to find each.

1. $h'(1)$ for $h(x) = f(x) \cdot g(x)$

$$h'(1) = f(1) \cdot g'(1) + g(1) f'(1)$$

$$0 \left(\frac{1}{2}\right) + (-\frac{1}{2}) (-3)$$

$$= \frac{3}{2}$$

2. $h'(3)$ for $h(x) = g(f(x))$

$$h'(3) = g'(f(3)) \cdot f'(3)$$

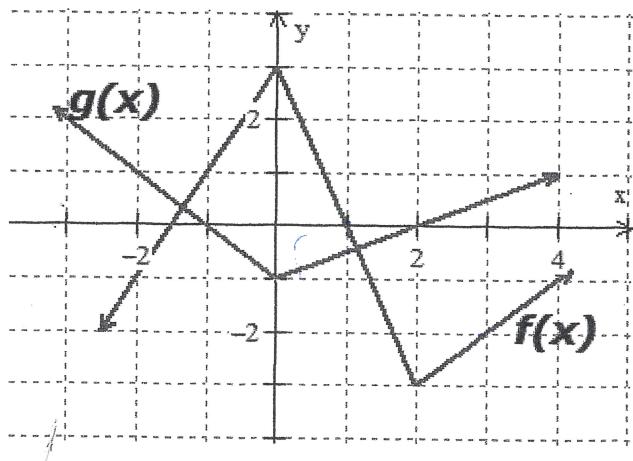
$$g'(-2) \cdot f'(3)$$

$$(-1) \cdot 1 = -1$$

3. $h'(-2)$ for $h(x) = \frac{f(x)}{g(x)-4}$

$$h'(-2) = \frac{(g(-2)-4)f'(-2) - f(-2)g'(-2)}{(g(-2)-4)^2}$$

$$= \frac{(1-4)(2) - (-1)(-1)}{(1-4)^2} = \frac{(-6) - 1}{9} = \frac{-7}{9}$$



$\frac{-7}{9}$