For each of the following functions of x, write the equation for the derivative function. This will go a lot more smoothly if you remember the Sum, Product, Quotient, and Chain Rules... especially the Chain Rule! Please do us both a favor and don't simplify the answers.

1. $f(x) = \sin 3x$ $\qquad\qquad$ $f'(x) =$

2. $g(x) = (\sin 3x)^3$ $\qquad\qquad$ $g'(x) =$

3. $h(x) = (\sin 3x)^3 + 5x$ $\qquad\qquad$ $h'(x) =$

4. $j(x) = \left[(\sin 3x)^3 + 5x\right]^5$ $\qquad\qquad$ $j'(x) =$

5. $k(x) = x + \dfrac{1}{x}$ $\qquad\qquad$ $k'(x) =$

6. $l(x) = \sqrt{x + \dfrac{1}{x}}$ $\qquad\qquad$ $l'(x) =$

7. $m(x) = \left(\sqrt{x + \dfrac{1}{x}}\right)\left[(\sin 3x)^3 + 5x\right]^5$ $\qquad\qquad$ $m'(x) =$

Consider the functions f and g given by the following graph:
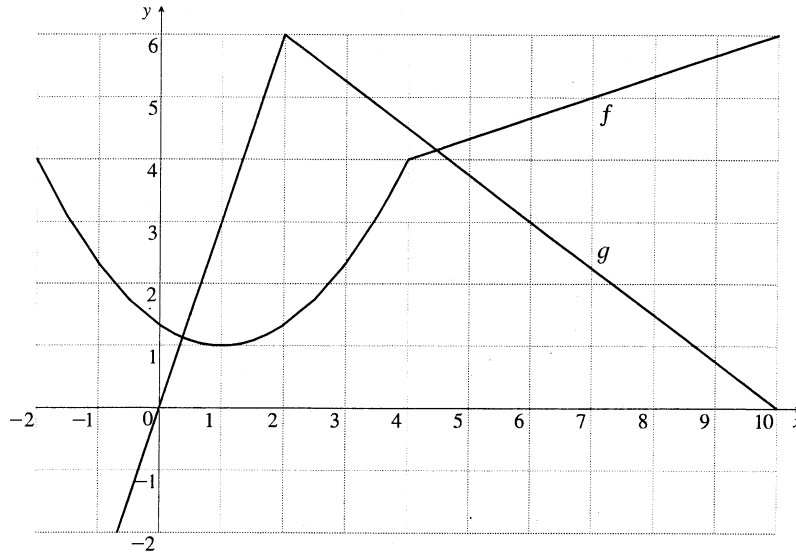
Define $h = f \circ g$.

1. Compute $h'(1)$.

2. Compute $h'(0)$.

3. Does $h'(2)$ exist?