

**2019 AP<sup>®</sup> CALCULUS AB FREE-RESPONSE QUESTIONS**

6. Functions  $f$ ,  $g$ , and  $h$  are twice-differentiable functions with  $g(2) = h(2) = 4$ . The line  $y = 4 + \frac{2}{3}(x - 2)$  is tangent to both the graph of  $g$  at  $x = 2$  and the graph of  $h$  at  $x = 2$ .

(a) Find  $h'(2)$ . (4 points)

(b) Let  $a$  be the function given by  $a(x) = 3x^3h(x)$ . Write an expression for  $a'(x)$ . Find  $a'(2)$ . (5 points)