

### 1998 AP Calculus AB Free-Response Questions

4. Let  $f$  be a function with  $f(1) = 4$  such that for all points  $(x, y)$  on the graph of  $f$  the slope is given by  $\frac{3x^2 + 1}{2y}$ .
- (a) Find the slope of the graph of  $f$  at the point where  $x = 1$ .
  - (b) Write an equation for the line tangent to the graph of  $f$  at  $x = 1$  and use it to approximate  $f(1.2)$ .
  - (c) Find  $f(x)$  by solving the separable differential equation  $\frac{dy}{dx} = \frac{3x^2 + 1}{2y}$  with the initial condition  $f(1) = 4$ .
  - (d) Use your solution from part (c) to find  $f(1.2)$ .
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