AP® CALCULUS BC FREE-RESPONSE QUESTIONS

No calculator is allowed for these problems.

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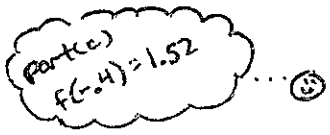
4. Consider the differential equation $\frac{dy}{dx} = 2x - y$.



(d) Find $\frac{d^2y}{dx^2}$ in terms of x and y. Determine whether the approximation found in part (c) is less than or greater than $f(-0.4)$. Explain your reasoning.

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6. Let f be the function whose graph goes through the point (3, 6) and whose derivative is given by $f'(x) = \frac{1 + e^x}{x^2}$.

(a) Write an equation of the line tangent to the graph of f at $x = 3$ and use it to approximate $f(3.1)$.

(b) ~~Use Euler's method, starting at $x = 3$ with a step size of 0.05, to approximate $f(3.1)$~~. Use f'' to explain why this approximation is less than $f(3.1)$.
