Name _____

AP Calculus BC

7.5 Eulers Method Use calculator as needed

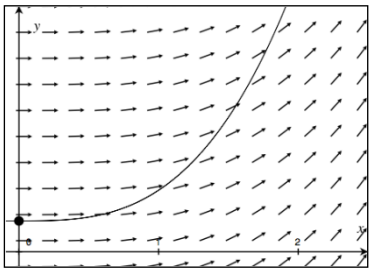
1. Given $\frac{dy}{dx} = 2x + 3$ and $(1,3)$, approximate $f(1.4)$ using $\Delta x = 0.2$

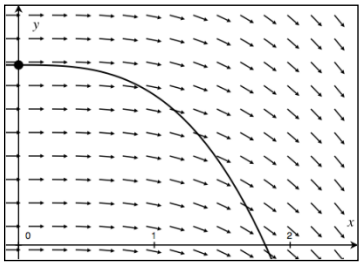
2. Given $f'(x, y) = \frac{x}{y}$ and $(0,3)$, approximate $f(0.3)$ using $\Delta x = 0.1$

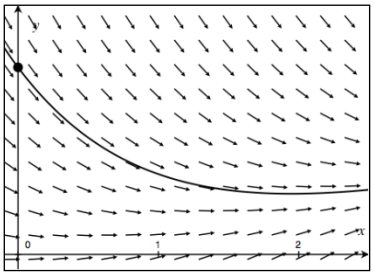
3. Given $f'(x, y) = y - 1$ and $f(0) = 2$ approximate $f(1.2)$, using 4 equal steps.

4. Let $y = f(x)$ be the solution to the differential equation $\frac{dy}{dx} = 2x + y$ with initial condition $f(1) = 0$. What is the approximation for $f(2)$ obtained by using Euler's method with two steps of equal length, starting at $x = 1$?
   A. 0
   B. 1
   C. 2.75
   D. 3

5. The slope field for a differential equation and the particular solution passing through the point on the *y*-axis are shown. If Euler's method is used to approximate the solution, which graph will give the over-approximation?

I. 

II. 

III. 

   A. I only B. II only C. III only D. I and III only

6. Answer the following questions.

   a. Given the differential equation $\frac{dy}{dx} = x + 2$ and $y(0) = 3$. Find an approximation for $y(1)$ by using Euler's Method with two equal steps.

   b. (Review of FTC) Solve the differential equation $\frac{dy}{dx} = x + 2$ with the initial condition $y(0) = 3$, and use your solution to find $y(1)$.

   c. The error in using Euler's Method is the difference between the approximate value and the exact value. What was the error in your answer? How could you produce a smaller error using Euler's Method?