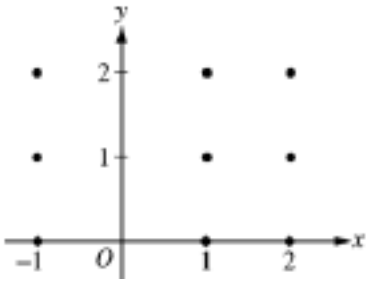
AP Calculus BC 2 Assignment 219 Monday, March 16, 2015 Hour Name

Page 1 Non-Calculator

Consider the differential equation $\frac{dy}{dx} = \frac{y - 1}{x^2}$, where $x \neq 0$.

a. On the axis provided, sketch a slope field for the given differential equation at the nine points indicated.



b. Find the particular solution $y = f(x)$ to the differential equation with the initial condition $f(2) = 0$.

c. For the particular solution $y = f(x)$ described in part (b), find $\lim_{x \to \infty} f(x)$

A particle is moving along the curve so that its position at time t is (x(t), y(t)), where $x(t) = t^2 - 4t + 8$ and y(t) is not explicitly given. Both x and y are measured in meters, and t is measured in seconds. It is known that $\frac{dy}{dt} = te^{t-3} - 1$.

a. Find the speed of the particle at time t = 3 seconds.

b. Find the total distance traveled by the particle for $0 \le t \le 4$ seconds.

c. Find the time t, $0 \le t \le 4$, when the line tangent to the path of the particle is horizontal. Is the direction of motion of the particle toward the left or toward the right at that time? Give a reason for your answer.

d. There is a point with x-coordinate 5 through which the particle passes twice. Find each of the following.

(i) The two values of t when that occurs

(ii) The slopes of the lines to the particle's path at that point

(iii) The y-coordinate of that point, given $y(2) = 3 + \frac{1}{e}$