AP CALCULUS AB Dr. Paul L. Bailey

Homework 0414 Tuesday, April 14, 2020

Problem 1. Let f be a function defined by $f(x) = k\sqrt{x} - \ln x$ for x > 0, where k is a positive constant (a) Find f'(x) and f''(x).

(b) For what value of the constant k does f have a critical point at x = 1? For this value of k, determine whether f has a relative minimum, relative maximum, or neither at x = 1. Justify your answer.

(c) For a certain value of the constant k, the graph of f has a point of inflection on the x-axis. Find this value of k.

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

(a) Sketch the solution curve that passes through the point (3, -1), and sketch the solution curve that passes through the point (1, 2).



(b) Write an equation for the line tangent to the solution curve that passes through the point (1, 2).

(c) Find the particular solution y = f(x) to the differential equation with the initial condition f(3) = -1, and state its domain.