Name: _____ Date: _____ Period: _____ 2016

AP Calculus – Spot Check 1

t (days)	$W(t)$ (°C)
0	20
3	31
6	28
9	24
12	22
15	21

1. The temperature in degrees Celsius, $\left(^{\circ}C\right)$, of the water in a pond is a differentiable function W of time t. The table above shows the water temperature as recorded every 3 days over a 15-day period.
   a. Use data from the table to find an approximation for $W'(12)$. Show the computations that lead to your answer. Indicate units of measure.

   b. A student proposes the function P, given by $P(t) = 20 + 10te^{-t/3}$, as a model for the temperature of the water in the pond at time t, where t is measured in days and $P(t)$ is measured in degrees Celsius. Find $P'(12)$. Using appropriate units, explain the meaning of your answer in terms of water temperature.

2. Consider the curve given by $xy^2 - x^3y = 6$.
   a. Show that $\frac{dy}{dx} = \frac{3x^2y - y^2}{2xy - x^3}$

   b. Find all points on the curve whose x-coordinate is 1, and write an equation for the tangent line at each of these points.