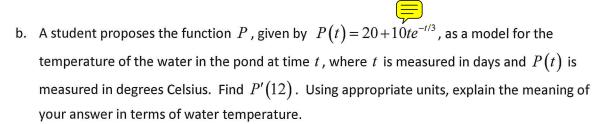
AP Calculus - Spot Check 1

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

- 1. The temperature in degrees Celsius,  $({}^{\circ}C)$ , 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.

$$W'(12) = \frac{W(15) - W(9)}{15 - 9} = \frac{21 - 24}{15 - 9} = -\frac{1}{2} {}^{\circ}C/doy$$



The temperature of the water is decreasing at 0.549 % day  $\infty$  2. Consider the curve given by  $xy^2 - x^3y = 6$ . on day 12.

a. Show that 
$$\frac{dy}{dx} = \frac{3x^2y - y^2}{2xy - x^3}$$

$$y^{2} + 2xy \frac{dy}{dx} - 3x^{2}y - x^{3} \frac{dy}{dx} = 0$$

$$(2xy - x^{3}) \frac{dy}{dx} = 3x^{2}y - y^{2} \qquad \frac{dy}{dx} = \frac{3x^{2}y - y^{2}}{2xy - x^{3}}$$

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.

at each of these points.  

$$xy^{2} - x^{3}y = 6$$

$$y^{2} - y = 6$$

$$y^{2} - y = 6$$

$$y^{2} - y - 6 = 0$$

$$(y - 3)(y + 2) = 0$$

$$y = 3$$

$$y = -2$$

$$y = 3$$

$$y = -2$$