1. Find dy/dx by implicit differentiation when $\sqrt{x+y} = 1 + x^2y^2$.

13 pts

$$\frac{1}{2}\frac{1}{\sqrt{x+y}}(1+y') = x^2 \cdot 2yy' + y^2 \cdot 2x$$

$$y'\left(\frac{1}{2}\frac{1}{\sqrt{x+y}} - 2x^2y\right) = 2xy^2 - \frac{1}{2}\frac{1}{\sqrt{x+y}}$$

$$y' = \frac{2xy^2 - \frac{1}{2}\frac{1}{\sqrt{x+y}}}{\frac{1}{2}\frac{1}{\sqrt{x+y}} - 2x^2y}$$

2. The equation of motion of a particle is $s(t) = 2t^3 - 15t^2 + 36t + 2$, where s is in meters, and t is in seconds.

12 pts

(a) Find all critical points of the **VELOCITY** function.

$v(t) = 6t^2 - 30t + 36$ is diff. on $\mathbb{R}$.

$v'(t) = 12t - 30 = 0$ if $t = \frac{30}{12} = \frac{5}{2}$.

$t = \frac{5}{2}$ is the only critical #.

(b) What is the acceleration at the times you identified in (2a)? $a(t) = 12t - 30$

$a(\frac{5}{2}) = v'(\frac{5}{2}) = 0 \ m/s^2$.