$\frac{\partial f}{\partial t}$ or $\frac{\partial f}{\partial y}$ inside of a "Wronskian" computation does not count

6.[14] Define the function f by the formula

$$f(t,y)=\begin{cases}(t-y)^2 & \text{if } t\le y,\\ (t-y)^{3/2} & \text{if } t>y.\end{cases}$$

For what values of t_0 and y_0 does the initial value problem

$$y'=f(t,y),\ y(t_0)=y_0,$$

have a unique solution defined on some open interval $t_0-h<t<t_0+h$ containing t_0?

+6 if $\frac{\partial f}{\partial t}$ (instead of $\frac{\partial f}{\partial y}$)

+7 if anything about continuity/discontinuity/$\frac{\partial f}{\partial y}$/ y' or $f(t,y)$ defined everywhere

8 [If $f(t,y)$ and $\frac{\partial f}{\partial y}(t,y)$ are cont. in a neighborhood containing (t_0,y_0), then there is a unique soln to the IVP on some interval containing t_0.

2 [First, $f(t,y)$ is cont. for all (t,y) since when $t=y$, $f=0$ (both "pieces" of the piecewise fnc agree).

or if "defined" instead of continuous

if no cont. check at $t=y$, then +1/2 (for either)

$\frac{\partial f}{\partial t}$ instead +1/2

2 [Next, $\frac{\partial f}{\partial y}(t,y)=\begin{cases}-2(t-y) & \text{if } t\le y\\ -\frac{3}{2}(t-y)^{1/2} & \text{if } t>y\end{cases}$ is also cont. for all (t,y) since when $t=y$, $\frac{\partial f}{\partial y}(t,y)=0$ (again, both "pieces" agree).

note: the square root is well defined since $t-y>0$

2 [$\Rightarrow$ there is a unique soln for all (t_0,y_0).

must earn all other points in order to earn these 2 points (unless they check $\frac{\partial f}{\partial t}$ instead of $\frac{\partial f}{\partial y}$)