Problem 3. Show that if a differentiable function $f(x)$ on an interval (a,b) has a positive derivative, $f'(x) > 0$, for all $x \in (a,b)$, except for two points at which $f'(x) = 0$, then the function $f(x)$ is strictly increasing on (a,b).

~~Let x_1, x_2 be the points on (a,b) at which $f'(x)=0$, Then $\forall x, y$: $a < x < y < b$,~~

~~Let~~

Let $x_1 < x_2$ be the points on (a,b) at which $f'(x)=0$.
We'll show that f is strictly increasing on $(a, x_1]$, $[x_1, x_2]$, and $[x_2, b)$, which will imply $f(x)$ is strictly increasing on (a,b).

$\forall x, y$: $a < x < y \le x_1$, we have
$f(y) - f(x) = f'(c)(y-x)$ for some $c \in (x,y)$ by MVT. Then $f'(c) > 0$ and $y - x > 0$, ~~Similarly, we'll see that~~
so $f(y) - f(x) > 0$.
Thus, f is increasing on $(a, x_1]$.
The other 2 intervals are done in the same way