

Calculus Stewart Ch10 Sec 2

67. If f' is continuous and $f'(t) \neq 0$ for $a \leq t \leq b$. Show that the parametric curve $x = f(t), y = g(t), a \leq t \leq b$, can be put in the form $y = F(x)$.

Proof:

$\because f'$ is continuous and $f' \neq 0$ on $[a, b]$

$\therefore f'$ is either > 0 or < 0

$\Rightarrow f$ is strictly monotonic

$\Rightarrow f^{-1}$ exists

Then, $t = f^{-1}(x)$

$$y = g(t) = g(f^{-1}(x)) = F(x)$$