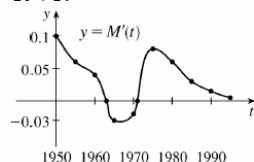


48. $f(x) = \sqrt[3]{x+x-1}$ is continuous on the interval $[0,1]$, $f(0) = -1$, and $f(1) = 1$. Since $-1 < 0 < 1$, there is a number c in $(0,1)$ such that $f(c) = 0$ by the Intermediate Value Theorem. Thus, there is a root of the equation $\sqrt[3]{x+x-1} = 0$, or $\sqrt[3]{x} = 1-x$, in the interval $(0,1)$.

29. (a) $f'(v)$ is the rate at which the fuel consumption is changing with respect to the speed. Its units are $(gal/h) / (mi/h)$.

(b) The fuel consumption is decreasing by $0.05(gal/h) / (mi/h)$ as the car's speed reaches $20 mi/h$. So if you increase your speed to $21 mi/h$, you could expect to decrease your fuel consumption by about $0.05(gal/h) / (mi/h)$.

15. It appears that there are horizontal tangents on the graph of M for $t=1963$ and $t=1971$. Thus, there are zeros for those values of t on the graph of M' . The derivative is negative for the years 1963 to 1971.



37. f is not differentiable at $x = -1$ or at $x = 11$ because the graph has vertical tangents at those points; at $x = 4$, because there is a discontinuity there; and at $x = 8$, because the graph has a corner there.