MEAN VALUE THEOREM

LESSON 3.2

TWO IMPORTANT THEOREMS

Let f be continuous and smooth on the interval $[a,b]$. Then...

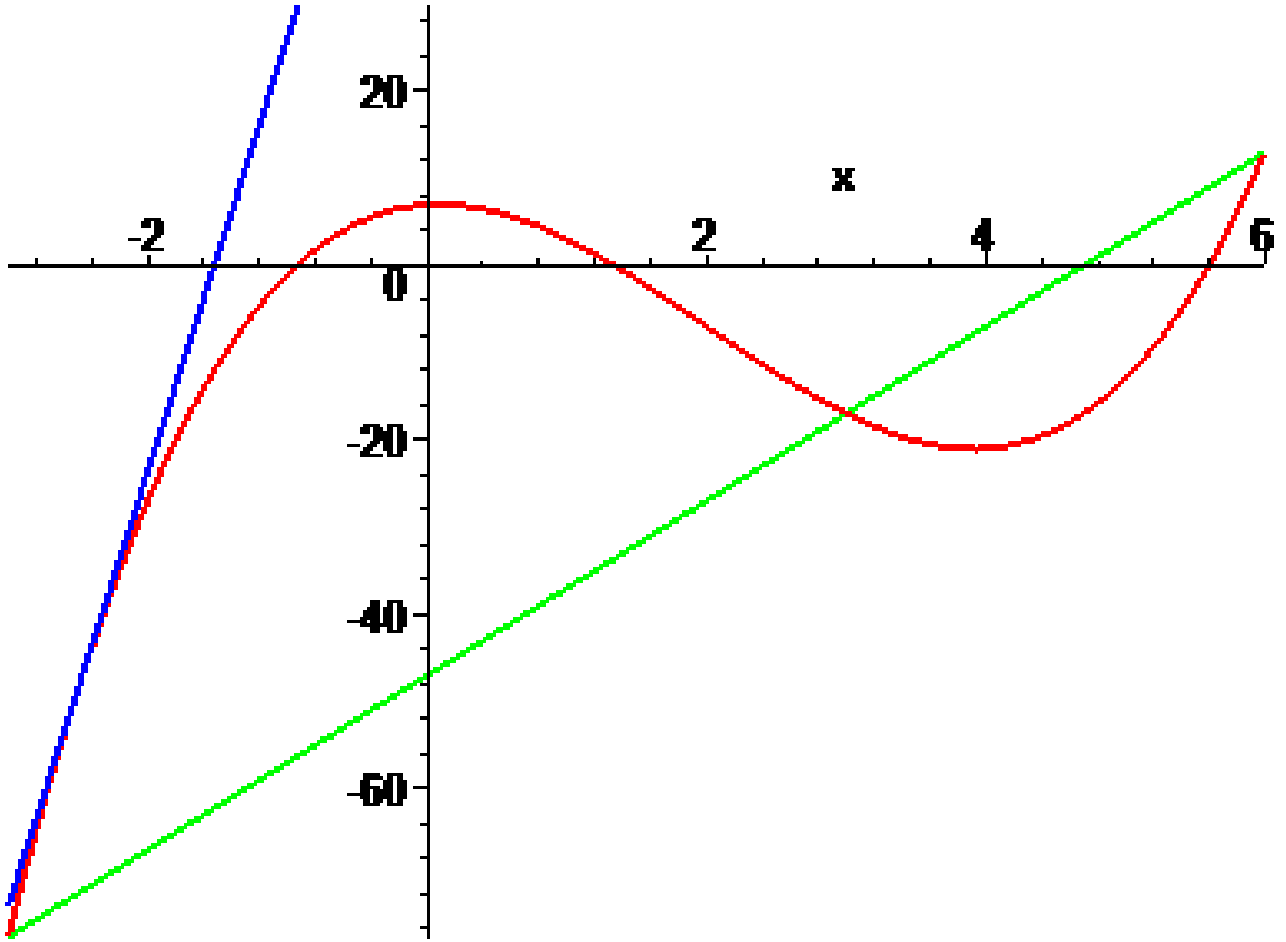
Rolle's Theorem

... if $f(a) = f(b)$, there exists a number c in (a,b) such that $f'(c) = 0$.

Mean Value Theorem

...there exists a number c in (a,b) such that $f'(c) = \dfrac{f(b) - f(a)}{b - a}$.

MEAN VALUE THEOREM



WARM UP

Apply the Mean Value Theorem to $f(x) = x^2$ on the interval $[-2,1]$. If possible, find the c value and explain what it means.

PROBLEM

Two stationary patrol cars are 5 miles apart on a highway. As a truck passes the first patrol car, its speed is clocked at 55 mph. Four minutes later, when the truck passes the second patrol car, its speed is clocked at 50 mph. Prove that the truck must have exceeded the speed limit (>55 mph) at some time during the trip.