1. Consider \( f(x) = 2x + 3x^{\frac{1}{3}} \), find interval of increasing decreasing concavity and IP.

\[
f'(x) = 2 + 2x^{-\frac{2}{3}}
\]

\[
f'(c) = c
\]

\[
-2 = 2x^{-\frac{2}{3}}
\]

\[
-1 = \frac{1}{\sqrt[3]{x}}
\]

\[
x = -1
\]

2. Let \( f(x) = |2 - x| \). Show that there is no \( c \) such that \( \frac{f(3) - f(1)}{3 - 1} = f'(c) \), explain why this does not contradict the Mean Value Th.

The mean value theorem, let \( f \) be a function on \( [a,b] \) such that:

* \( f \) is cont.

* \( f \) is differentiable on \( (a,b) \).

\[
\frac{f(k) - f(1)}{k - 1} = 0 \quad \forall k
\]

Therefore, there is no critical number so we couldn't use the mean value theorem.