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Lecture Seventeen Practice

Practice problems

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Abstract. *Practice problems for Lecture Seventeen Content*

Problem. 1 : Let $f(x) = |x|$. Does $f(x)$ satisfy the three hypotheses of Rolle's Theorem on the interval $[-1, 1]$?

no

yes

? Check work

Problem. 2 : Let $f(x) = x^3$. Does $f(x)$ satisfy the three hypotheses of Rolle's Theorem on the interval $[-1, 1]$?

no

yes

? Check work

Problem. 3 : Let $f(x) = \frac{1}{x}$. Does $f(x)$ satisfy the three hypotheses of Rolle's Theorem on the interval $[-1, 1]$?

no

yes

? Check work

Problem. 4 : Let $f(x) = \sin x \cos x$. Does $f(x)$ satisfy the three hypotheses of Rolle's Theorem on the interval $[0, \pi]$?

Problem. 5 : Find all values c that satisfy the conclusion of Rolle's Theorem if

$f(x) = 2x^2 - 4x + 4$ on the interval $[-1, 3]$.

$c =$

Problem. 6 : Find all values c that satisfy the conclusion of Rolle's Theorem if $f(x) = x + \frac{1}{x}$ on the interval $[\frac{1}{2}, 2]$.

$c =$

Problem. 7 : Find all values c that satisfy the conclusion of Rolle's Theorem if $f(x) = \tan^2(x)$ on the interval $[-\frac{\pi}{4}, \frac{\pi}{4}]$.

$c =$

Problem. 8 : Let $f(x) = \cot(x)$ on the interval $[0, \pi]$. Does this function satisfy the two hypotheses of the Mean Value Theorem?

Problem. 9 : Let $f(x) = \ln(x)$ on the interval $[1, e]$. Does this function satisfy the two hypotheses of the Mean Value Theorem?

Problem. 10 : Let $f(x) = e^x + e^{-x}$ on the interval $[0, \ln(2)]$. Does this function satisfy the two hypotheses of the Mean Value Theorem?

yes

no

? Check work

Problem. 11 : Find all numbers, c , that satisfy the conclusion of the mean value theorem for $f(x) = 2x^2 - 3x + 1$ on the interval $[0, 2]$.

$c =$

?

Problem. 12 : Find all numbers, c , that satisfy the conclusion of the mean value theorem for $f(x) = \sqrt{x} + 2$ on the interval $[4, 9]$.

$c =$

?

Problem. 13 : If $f(1) = 10$ and $f'(x) \geq 2$ for $1 \leq x \leq 4$, how small can $f(4)$ possibly be?

$f(4) \geq$

?