

Watch. Practice. Understand. | Lesson 289

Calculus section 4.2 Rolle's Theorem and Mean Value Theorem

Watch the matching video: <https://www.youtube.com/watch?v=o0AmVZLjwa0>

Practice focus: IVT, Rolle's theorem and MVT

Original extra practice matched to the listed lesson topic.

Name: _____ Date: _____ Show your reasoning and check units.

01 Apply Rolle's theorem to $f(x)=x^2-4x+3$ on $[1,3]$.

02 Apply the mean value theorem to $f(x)=x^2$ on $[1,4]$.

03 Why does Rolle's theorem not apply to $f(x)=|x|$ on $[-1,1]$?

04 Use IVT to locate a zero of x^3-2 in $(1,2)$.

Worked answers | Lesson 289

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01 Apply Rolle's theorem to $f(x)=x^2-4x+3$ on $[1,3]$.

Polynomial is continuous/differentiable and $f(1)=f(3)=0$. $f'(c)=2c-4=0$ gives $c=2$.

02 Apply the mean value theorem to $f(x)=x^2$ on $[1,4]$.

Secant slope $(16-1)/3=5$. $f'(c)=2c=5$ gives $c=5/2$, in $(1,4)$.

03 Why does Rolle's theorem not apply to $f(x)=|x|$ on $[-1,1]$?

Although endpoints agree and f is continuous, f is not differentiable at 0.

04 Use IVT to locate a zero of x^3-2 in $(1,2)$.

Polynomial is continuous; $f(1)=-1$ and $f(2)=6$ have opposite signs, so a zero lies between them.