Watch. Practice. Understand. | Lesson 332

2022 Calculus BC Taylor Remainder Error (Rogowski 8.4 2nd Half)

Watch the matching video: https://www.youtube.com/watch?v=lYDvbgjDp0A

Practice focus: Taylor remainder bounds

Original extra practice matched to the listed lesson topic.

Name: ____________________ Date: __________ Show your reasoning and check units.

01 Bound the error in approximating $e^{0.1}$ by $1+0.1+0.1^2/2$.

02 Bound the error in approximating $\sin 0.2$ by $0.2-(0.2)^3/6$ using the alternating series.

03 State the Lagrange remainder bound for a degree-n Taylor polynomial about a.

04 Why is the next-term alternating-series bound not valid for every power series?

Worked answers | Lesson 332

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01 Bound the error in approximating $e^{0.1}$ by $1+0.1+0.1^2/2$.

Third derivative $e^x \le e^{0.1}$ on $[0,0.1]$. Error $\le e^{0.1}(0.1)^3/3! \approx 0.0001842$.

02 Bound the error in approximating $\sin 0.2$ by $0.2-(0.2)^3/6$ using the alternating series.

Next omitted term gives error $\le (0.2)^5/120 \approx 0.000002667$.

03 State the Lagrange remainder bound for a degree-n Taylor polynomial about a.

If $|f^{(n+1)}(t)| \le M$ between a and x, then $|R_n(x)| \le M|x-a|^{(n+1)}/(n+1)!$.

04 Why is the next-term alternating-series bound not valid for every power series?

It requires alternating signs and term magnitudes decreasing to zero at the evaluation point. General series need another justified bound.