Warm-Up

Ex. (a) Find the third-degree Maclaurin polynomial for $f\left(x\right)=e^{x}$.

(b) Use your answer to (a) to find: $\lim\limits_{x\to 0}\frac{f\left(x\right)-1}{2x}$

Feb 24-7:47 AM

9.3 Taylor Series with Remainder

What is the 5th order Maclaurin series for $f(x)=\sin x$

What is the maximum error when approximating $\sin x$ on $[-\pi,\pi]$

Solve Graphically and Numerically:

Feb 27-10:14 AM

How many terms are needed in the Maclaurin series for $\sin x$ in order to approximate $\sin x$ within .0001 on $[-\pi, \pi]$

Feb 27-10:16 AM

On what interval, does the 3rd order Maclaurin series approximate $\sin x$ within .01?

Feb 27-10:19 AM

Taylor's Remainder Estimation Theorem

with an nth order polynomial

$$f(x) \approx f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \ldots + \frac{f^n(a)}{n!}(x-a)^n$$

$$\text{Error} \le \left| M \frac{(x-a)^{n+1}}{(n+1)!} \right|$$

M is the max value of $f^{n+1}(x)$ on the interval

Feb 27-10:20 AM

The approximation $\ln(1+x) \approx x - \frac{x^2}{2}$ is used when x is small.

Use the Remainder Estimation Theorem to get a bound for the maximum error when $|x| \le .01$
Support your answer graphically.

Feb 27-7:43 AM

Give an error bound when e^x is approximated by the 4th degree polynomial about x = 0 for $x \le .5$

Feb 27-7:47 AM

What values of x may be used in $1 - \frac{x^2}{2!} + \frac{x^4}{4!}$ to approximate $\cos x$ with an error no greater than 5×10^{-4}

Feb 27-7:51 AM