

More review problems: (These are from Calculus and Analytic Geometry, 4th ed, by G. Thomas—Any Calculus book will have similar problems).

1. For what range of values of x can one replace $\sin(x)$ by $x - x^3/6$ with an error not greater than $5 \cdot 10^{-4}$?
2. If $\cos(x)$ is replaced by $1 - x^2/2$ and $|x| < 0.1$, what estimate can you give of the error?
3. For what range of values of x can one replace $\ln(1 + x)$ by x with an error not greater than one percent of the value of x ?
4. The approximation

$$\sqrt{1+x} \approx 1 + x/2$$

is used when $|x|$ is small. Give an estimate of the error if $|x| < 0.01$.

5. The quantity $\sqrt{e} = e^{0.5}$ is to be computed from a Taylor polynomial of e^x centered at zero. How large degree Taylor polynomial do we need to guarantee the error is less than 0.0005?