



9.3

③ $e^x \approx 1 + x + \frac{x^2}{2} + \frac{x^3}{6}$

$|x| \leq 0.1$

e^x
 e^x
 e^x
 e^x
 e^x [0, .1]

$$\frac{e^{.1}}{4!} (.1)^4$$

.0000046

⑨ $\sin^2 x = 1 - \cos^2 x = 1 - \left[\frac{1}{2} + \frac{1}{2} \cos 2x \right]$
 $\frac{1}{2} - \frac{1}{2} \cos 2x$

$f(x) = \cos x$ $f(0) = 1$
 $f'(x) = -\sin x$ $f'(0) = 0$
 $f''(x) = -\cos x$ $f''(0) = -1$
 $f'''(x) = \sin x$ $f'''(0) = 0$
 $f^{(4)}(x) = \cos x$ $f^{(4)}(0) = 1$

$$1 - \frac{1}{2!} x^2 + \frac{1}{4!} x^4$$

$$\sum_{k=0}^{\infty} \frac{(-1)^{n/2}}{(2n)!} x^{2n}$$

$$1 - \frac{1}{2!} (2x)^2 + \frac{1}{4!} (2x)^4$$

$$-\frac{1}{2} + \frac{1}{2! \cdot 2} (2x)^2 - \frac{1}{4! \cdot 2} (2x)^4$$

$$+\frac{1}{2}$$

$$\sum_{k=0}^{\infty} \frac{(-1)^n}{(2n)!} (2x)^{2n}$$

$$\sum_{k=0}^{\infty} \frac{(-1)^{n+1}}{(2n)! \cdot 2} (2x)^{2n}$$

$$\sum_{k=1}^{\infty} \frac{(-1)^{n+1}}{(2n)! \cdot 2} (2x)^{2n}$$

$$\sum_{k=1}^{\infty} \frac{(-1)^{n+1}}{(2n)! \cdot 2!} (2)^{2n} \cdot x^{2n}$$

$$\sum_{k=1}^{\infty} \frac{(-1)^{n+1}}{(2n)!} (2)^{2n-1} x^{2n}$$

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$$(19) \sin x \approx x - \frac{x^3}{6}$$

f	$\sin x$	0
f'	$\cos x$	1
f''	$-\sin x$	0
f'''	$-\cos x$	-1
$f^{(4)}$	$\sin x$	0
$f^{(5)}$	$\cos x$	

$$\frac{1}{5!} (x)^5 < 5 \times 10^{-4}$$

$$\sqrt[5]{x^5} < \sqrt[5]{(5 \times 10^{-4}) 5!}$$

$$x < .56$$

$$x < .5697$$

$$|x| < .570$$