Introduction to Maclaurin Series (Taylor Series with c = 0)

Taylor Series of a Function f(x) about x = c
If c = 0, The Taylor Series is called a Maclaurin Series

We build a Taylor Series "Term-by-Term"
We build each Term "Part-by-Part"

Each Term consists of the following parts starting at n = 0:
1. The n^{th} derivative of the function evaluated at c, $f^{(n)}(c)$.
2. $(x - c)^n$
3. n!

The Parts are assembled in the pattern: $\frac{f^{(n)}(c)\ (x-c)^n}{n!}$

Find the Maclaurin Series for f(x) = sin x

n	$f^{(n)}(x)$	$f^{(n)}(c)$	$(x - c)^n$	n!
0	sin x	0	$(x)^0$	0!
1	cos x	1	$(x)^1$	1!
2	-sin x	0	$(x)^2$	2!
3	-cos x	-1	$(x)^3$	3!
4	sin x	0	$(x)^4$	4!
5	cos x	1	$(x)^5$	5!
6	-sin x	0	$(x)^6$	6!
7	-cos x	-1	$(x)^7$	7!
8	sin x	0	$(x)^8$	8!
9	cos x	1	$(x)^9$	9!

$$\sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \frac{x^{11}}{11!} + \frac{x^{13}}{13!} - \frac{x^{15}}{15!} + \ldots = \sum_{n=0}^{\infty} \frac{(-1)^n x^{2n+1}}{(2n+1)!}$$

<u>AP Calculus BC 1 Assignment 111 Monday, September 28, 2015</u>
02.05 Implicit Differentiation Page 146, #'s 21-32 Odd
Also: Show work to write the 1st 5 non-zero terms of the Maclaurin Series for $f(x) = e^x$.