Quiz No.19

student:

Problem 1: The sum of the series $\sum_{n=0}^{\infty} \frac{x^n}{n!}$ is a well known function. Which one?

Problem 2: Write the expansion of $\frac{1}{1-x}$ as a power series. What is the interval of convergence?

Problem 3: Knowing that $\sin(x) = \sum_{n=0}^{\infty}(-1)^n \frac{x^{2n+1}}{(2n+1)!}$ for all x, write down the expansion of $\cos(x)$ as power series.

Problem 4: Using your answer for problem 3 and differentiation, give the expansion as a power series of the function $\frac{1}{(1-x)^2}$.

Problem 5: Using your answer for problem 3, give the expansion as a power series of the function $\ln(1-x)$. What is the radius of convergence?

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Problem 6: Maclaurin Series.
If f has a power series expansion
$f(x) = \sum_{n=0}^{\infty} c_n x^n$ for some interval $|x - 0| < R$, then the coefficients are
given by $c_n = \ldots$

Problem 7: Taylor Series.
If f has a power series expansion around a
$f(x) = \sum_{n=0}^{\infty} c_n (x - a)^n$ for some interval $|x - a| < R$, then the coefficients
are given by $c_n = \ldots$

Problem 8: Suppose e^{2x} has a power series expansion. Find the first four
term of the series.

Problem 9: Find the expansion of the function $x^2 + x + 1$ around 2.

Problem 10: Find the radius of convergence and the interval of convergence
of the series $\sum_{n=0}^{\infty} \frac{(x+2)^n}{n!}$