A MacLaurin series is a Taylor series at $x = 0$:

$$C_0 + C_1x + C_2x^2 + C_3x^3 + \cdots$$

where $C_n = \dfrac{f^{(n)}(0)}{n!}$.

1. Find the MacLaurin series for $f(x) = e^x$ using the table below:

n	0	1	2	3	4	5
$f^{(n)}(x)$	e^x					
$f^{(n)}(0)$						
$C_n = \frac{f^{(n)}(0)}{n!}$						

Write the MacLaurin series for e^x using $\cdots$, and also using summation notation (Σ):

2. Use the 5th degree Taylor polynomial for e^x at $x = 0$ to approximate $e = e^1$.

3. Find the MacLaurin series for $g(x) = e^{x^2}$ by plugging in x^2 to your previous series.

4. Find the 8^{th} derivative of e^{x^2} at $x = 0$.